

Friday, June 14<sup>th</sup>, 2019

Cherie Blatt  
California Regional Water Quality Control Board  
North Coast Region  
5550 Skylane Blvd., Ste. A  
Santa Rosa, CA 95403



Dear Ms. Blatt,

As a North Coast dairy producer I'd like to thank you for the opportunity to provide comments on the draft General Waste Discharge Requirements (GWDR) for North Coast Dairies. This letter is to comment and request consideration on Order Number R1-2019-0001 Draft General Waste Discharge Requirements and those items still open for consideration as requested by the Board.

As you are aware, Alexandre Family Farm has been operating in Humboldt and Del Norte for the last 25 plus years. Since the implementation of the Waiver of Waste Discharge Requirements, we have invested a half million dollars in infrastructure improvements, best practices training, compliance costs and associated fees to ensure the success of our program. These efforts have improved farm best practices and helped the Dairy develop strong working relations with the University of California, and Regional Water Board Staff such as yourself, including organizations like California Dairy Quality Assurance Program to assist with implementation of the waiver over the last 7 1/2 years. We feel we have developed a true collaborative partnership where we can work with agencies in the interest of improving water quality and help to educate on what is feasible and not so feasible for us to implement under the new draft order.

Currently, we are in agreement with many of the dairy producers who expressed their concerns at the meeting in Fortuna on July 5<sup>th</sup>. As such, our two main concerns are as follows with the draft GWDR:

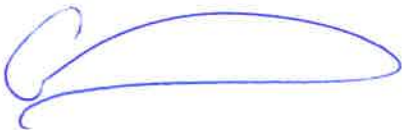
**Surface Water Monitoring:** the proposed addition of bacterial sampling to the monitoring and reporting plan would cause our dairy to incur an added \$150-\$300 annual cost for surface sampling. The cost would be tolerable if we felt that the sampling could provide accurate information that helped us to improve manure management practices. Many sources on our farm can influence the presence of bacteria, including the vast numbers of water fowl and elk that utilize our farms on a daily basis. As we welcome these critters on our farm, we are unclear how these tests which add these costs will be able to distinguish without considerable cost the difference in wildlife vs livestock wastes? In the end, Alexandre Dairy like most other dairy's in Del Norte dealing with massive wildlife populations in our watercourses daily cannot afford a 300% increase in compliance costs that won't be of help in improving manure management practices. As stated in our December 2018 letter, we support the continuance of ground water and surface water monitoring, but believe it monitoring should be discontinued or conducted every 4 or 5 years based on establishing the first three (3) year baseline with new data.

**Nutrient Management Planning Documentation:** As Blake expressed in the June 5th meeting in Fortuna, we don't feel our Comprehensive Nutrient Management Plans (CNMPs) or NMPs as other Dairy's current hold should be required for submission. These documents are created to provide a guideline to us, but can change monthly based on observation of soil and pasture health, weather conditions and livestock nutrient needs. Information provided to the water board in the Nutrient Management Planning Document or some form of worksheet would likely give a more accurate picture of what average conditions dictate on a monthly or annual basis.

Thank you for all your and staff's efforts to get out to the dairy farmers where they live and work to communicate and help understand our concerns. It truly does show the Boards and staffs willingness to understand the impacts of the proposed regulations. Thank you for the opportunity to comment on the new draft Order R1-2019-0001.

Should you have questions please don't hesitate to reach out.

Sincerely,

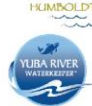
A handwritten signature in blue ink, appearing to read 'Chris Howard', with a large, sweeping loop at the end.

Chris Howard

Alexandre Family Farm

707-487-1000





June 14, 2019

Chair David Noren and Board Members  
North Coast Regional Water Quality Control  
Board 5550 Skylane Blvd., Suite A  
Santa Rosa, CA 95403

Sent via electronic mail to: [North.Coast@waterboards.ca.gov](mailto:North.Coast@waterboards.ca.gov)

**RE: Comment Letter – Draft General Waste Discharge Requirements for Dairies in the North Coast Region, Order No. R1-2019-0001**

Dear Chair Noren and Regional Board Members:

California Coastkeeper Alliance (CCKA) is a network of California Waterkeeper organizations working to protect and enhance clean and abundant waters throughout the state for the benefit of Californians and California ecosystems. On behalf of the California Waterkeepers, including Russian Riverkeeper, Humboldt Baykeeper, and Klamath Riverkeeper, we appreciate the second opportunity to comment on the Draft General Waste Discharge Requirements for Dairies in the North Coast Region, Order No. R1-2019-0001 (Draft Order).

Coastal rivers and streams, such as those found throughout the North Coast Region, are a precious resource. As described by the California Coastal Commission's California Coastal Resource Guide, "[o]n their way to the ocean, California's coastal streams and rivers flow through the canyons and valleys of coastal mountains, linking forest, chaparral, scrubland, grassland, and marsh. Riparian woodlands develop along stream banks and floodplains, and coastal wetlands and estuaries form where the rivers enter the sea. Rivers transport nutrients, sediments, and oxygen through the watershed, and life flourishes in their path."<sup>1</sup> Coastal streams and the adjacent estuarine and riparian habitats throughout California also support a wide variety of flora and fauna, many of which are unique to the North Coast Region.

Dairies operate as Concentrated Animal Feeding Operations (CAFOs), often located near streams and waterways. Water discharges from dairy facilities pose significant threat to water quality by transporting pollutants – ranging from toxic pesticides, sediment, nitrate, phosphorus, salts, pathogens, and heavy metals – from livestock grazing lands into surface and groundwater. Nutrient pollution and eutrophication are pressing challenges to water quality in California and agriculture is the largest source of nitrogen input into the environment in the state. Further, the over- or improper application of manure fertilizers onto agricultural fields can cause excess nutrients to be lost to the environment through runoff, erosion, leaching, or volatilization, and impair beneficial uses of water throughout the state, including drinking water and recreation.

These dairy operations must be particularly well managed to minimize impacts to human health and aquatic ecosystems. There are multiple best management practices that must be implemented to minimize the impacts of CAFOs and the resulting waste discharges. This includes various mechanisms for runoff control, solid and liquid waste storage and reuse, and nutrient management. The specific practices individual operations should implement are dependent on the type of facility, the animal in the CAFO, any potential receiving water, and the specific area of the facility that is the problem.

Given the specific requirements that govern CAFOs, we respectfully request the Regional Water Board require:

- (1) Large CAFOs, facilities that aggregately contribute to surface and groundwater contamination, and those that spread manure to enroll in a NPDES permit.

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<sup>1</sup> California Coastal Commission, California Coastal Commission's California Coastal Resource Guide, available at <http://ceres.ca.gov/ceres/calweb/coastal/streams.html>.

- (2) Nutrient management plans must be made publicly available, include enforceable terms, and be submitted electronically to comply with state and federal law.
- (3) Ensure effective monitoring to provide the Regional Water Board with an adequate ‘feedback loop’ to determine compliance and BMP effectiveness consistent with the statewide Antidegradation Policy.

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**I. THE REGIONAL WATER BOARD SHOULD REQUIRE LARGE CAFOS, FACILITIES THAT AGGREGATELY CONTRIBUTE TO SURFACE AND GROUNDWATER CONTAMINATION, AND THOSE THAT SPREAD MANURE TO ENROLL IN A NPDES PERMIT.**

1. All large CAFOs are categorical point sources under the federal Clean Water Act and must enroll under an NPDES permit.

Section 301 of the federal Clean Water Act,<sup>2</sup> prohibits the discharge of pollutants into waters of the United States by any person from a point source, except in accordance with certain provisions under the federal Clean Water Act that allow a discharge to be authorized under the National Discharge Pollution Elimination System (NPDES).<sup>3</sup> The federal Clean Water Act defines a point source as:

[A]ny discernible, confined and discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, *concentrated animal feeding operation*, or vessel or other floating craft, from which pollutants are or may be discharged. This term does not include agricultural stormwater discharges and return flows from irrigated agriculture.<sup>4</sup>

Federal regulations define Animal Feeding Operations (AFOs) as operations where animals have been, are, or will be stabled or confined and fed or maintained for a total of 45 days or more in any 12-month period, and where vegetation is not sustained in the confinement area during the normal growing season.<sup>5</sup> Federal regulations further define a CAFO as any AFO that either meets a certain animal population threshold, or, regardless of population, is determined to be a significant contributor of pollutants to waters of the United States by the appropriate authority.<sup>6</sup>

A facility must confine the necessary number and type of animals to be classified a CAFO. For dairy cows, this includes a herd of 700 cows or more, whether milked or dry, for the facility to be classified as a large CAFO.<sup>7</sup> A facility is a medium CAFO if it has 200 to 699 mature dairy cows, whether milked or dry, and it either: (1) discharges “into waters of the United States through a man-made ditch, flushing system, or other similar man-made device”; or (2) “[p]ollutants are discharged directly into waters of the United States which originate outside of and pass over, across, or through the facility or otherwise come into direct contact with the animals confined in the operation.”<sup>8</sup> Finally, a small or designated CAFO is an “AFO that is designated as a CAFO and is not a Medium CAFO.”<sup>9</sup>

The initial waiver adopted by the North Coast Regional Water Board (R1-2012-0003) states that “[l]arge CAFOs (700 or more mature dairy cows) that are not point sources and want to enroll under this Order must be implementing a Nutrient Management Plan...” A facility, however, *cannot* be a large CAFO and not be considered a point source subject to NPDES permit requirements. Large CAFOs are federally defined point sources that are ineligible to enroll in a waiver absent evidence that the CAFO does not discharge to waters of

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<sup>2</sup> 33 U.S.C.A. § 1311(a).

<sup>3</sup> 33 U.S.C.A. § 1342.

<sup>4</sup> 33 U.S.C.A. § 1362(14). (*emphasis added*)

<sup>5</sup> 40 C.F.R. § 122.23(b)(1)(i).

<sup>6</sup> 40 C.F.R. § 122.23(b)(4) & (6).

<sup>7</sup> 40 C.F.R. 122.23(4)(i).

<sup>8</sup> 40 C.F.R. § 122.23(6).

<sup>9</sup> 40 C.F.R. § 122.23(9).

the United States. As written, the waiver does not demonstrate that these facilities must show that there is no discharge to waters of the United States, and must simply have a Nutrient Management Plan in place. This is problematic as this proposed Dairy Order will supersede R1-2012-0003, which in turn will enroll facilities known by the North Coast Regional Water Board to be large CAFOs – facilities that are federally defined as point sources – into the GWDR instead of an NPDES permit without otherwise demonstrating that a facility does not in fact discharge to waters of the United States.

The proposed Dairy Order further recognizes that “[l]ivestock grazing lands and confined animal facilities, including dairies, are identified as categorical pollutant sources in certain watersheds,” and that these facilities “are required to implement site-specific management measures to control and reduce animal waste and sediment runoff.” If a facility is categorically a large CAFO, however, that facility *cannot* discharge during any rain event that is equivalent or less than a 25-year, 24-hour storm.<sup>10</sup> These facilities must be prohibited from discharging, rather than simply “reduc[ing]” the discharge of animal waste, under the final Dairy Order.

The proposed Dairy Order additionally states that “the conditions and standards required by the Order will result in the implementation of Best Practicable Treatment or Control (BPTC) of discharges from dairy operations.” Yet, the federal Clean Water Act specifies that “there must be no discharge of manure, litter, or process wastewater pollutants into waters of the United States from production areas.” The use of the BPTC is inappropriate and causes confusion regarding the requirements of discharges from production areas. Specifically, with limited exception,<sup>11</sup> there must be no discharge into waters of the United States from production areas of large CAFOs:

- (1) Whenever precipitation causes an overflow of manure, litter, or process wastewater, pollutants in the overflow may be discharged into the U.S. waters provided:
  - (i) The production area is designed, constructed, operated and maintained to contain all manure, litter, and process wastewater including the runoff and the direct precipitation from a 25-year, 24-hour rainfall event;
  - (ii) The production area is operated in accordance with the additional measure and records required by § 412.37(a) and (b).<sup>12</sup>

Without incorporating the regulations imposed under the federal Clean Water Act, the North Coast Regional Water Board is proposing a conflicting, weakened standard for the regulation of discharges from large CAFOs. The language of the final Dairy Order must be revised to reflect the federal standard under 40 U.S.C. § 412.31 to reduce confusion regarding discharge requirements. Further, if this Dairy Order intends to include designated, medium, or large CAFOs, then the federal discharge prohibitions for each category of CAFO must be included in the final Dairy Order as discharge prohibitions to reflect federal law.

Ultimately, this Dairy Order cannot cover facilities that require NPDES permit coverage and not require these facilities to fulfill NPDES permit requirements – this includes actual discharge prohibitions, rather than reductions in animal waste. This Dairy Order must reflect federal CAFO regulations and requirements, which includes requiring applicable dairies to enroll under R1-2012-0001 or combine this final Dairy Order as a joint WDR/NPDES permit with tiered requirements based on whether an individual facility requires an NPDES permit.

Finally, we request that the language under paragraph 28 be updated to read (proposed language in **red**): “The Regional Water Board, however, may determine that specific individual dairies are not appropriately regulated under this GWDR and must obtain **individual WDRs NPDES permit coverage.**”

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<sup>10</sup> 40 C.F.R. § 412.13(b) (“The discharge of process wastewater is permissible only when rainfall events cause an overflow of process wastewater from a facility designed, constructed, operated, and maintained to contain all process-generated wastewaters plus the runoff from a 25-year, 24-hour rainfall event at the location of the point source.”).

<sup>11</sup> 40 U.S.C. § 412.31(a)(1)-(2).

<sup>12</sup> 40 U.S.C. § 412.31.

2. *The Regional Water Board should exercise its discretion to broaden the threshold for NPDES permit requirements for all dairies that contribute to water quality degradation of surface waters or groundwater basins.*

For facilities smaller than a medium CAFO, the U.S. EPA or agencies with delegated authority may designate any AFO as a CAFO if it determines that the AFO is a significant contributor of pollutants to waters of the United States.<sup>13</sup> In other words, regardless of the number of animals present at any given facility, the EPA may find that the facility is a significant contributor of pollutants and classify the AFO as a CAFO in need of NPDES permitting coverage. As discussed above, federal regulations define a CAFO as any AFO that either meets a certain animal population threshold, or, regardless of population, is determined to be a significant contributor of pollutants to waters of the United States by the appropriate authority – such as the North Coast Regional Water Board.<sup>14</sup>

A Regional Water Board has the authority under 40 C.F.R section 122.23(c) to determine that an AFO should be considered a CAFO if the AFO is a significant contributor of pollutants to waters of the United States.<sup>15</sup> To make this determination, a Regional Board must consider all relevant factors, including (i) the size of the AFO and the amount of waste reaching waters of the United States; (ii) the location of the AFO relative to waters of the United States; (iii) the means of conveyance of animal wastes and process waste waters into waters of the United States; (iv) the slope, vegetation, rainfall, and other factors affecting the likelihood or frequency of discharge of animal wastes manure and process waste waters into waters of the United States; and (v) other relevant factors.<sup>16</sup>

For example, in 1999, the Santa Ana Regional Water Board determined that all dairy-related AFOs with a herd size of 20 dry or milking cows or 50 heifers, calves, or cattle qualify as CAFOs and are, therefore, subject to waste discharge requirements.<sup>17</sup> The Santa Ana Regional Water Board made this determination based on findings by the Regional Water Board staff that each dairy-related AFO in the Region fulfilled one relevant factor that had the potential to contribute to pollutants to the Santa Ana River or the San Jacinto River, both waters of the United States.<sup>18</sup> The factors considered by the Board to be relevant included “the location of the AFO relative to surface waters, the slope, rainfall and other factors that increase the likelihood or frequency of discharges, and the impact of the *aggregate amount of waste from many small operations in a watershed* that exceed that of larger operations.”<sup>19</sup>

Similarly, the North Coast Regional Water Board must evaluate the presence of pollutants in waterbodies throughout the Region related to dairy operations and determine whether the CAFO threshold requirements should similarly be reduced to account for the aggregate amount of waste from dairy operations throughout the watershed.

In 2012, the North Coast region had seventeen surface waters listed as impaired for REC-1 beneficial use due to pathogen bacteria. The water quality objectives promulgated by the North Coast Regional Water Board previously in 2011 for pathogenic indicator bacteria were specifically to protect REC-1 and SHELL beneficial uses. Specifically, the ‘Water Contact Recreation’ beneficial use (REC-1) includes the “uses of surface water for recreational activities involving body contact with water, where ingestion of water is

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<sup>13</sup> 40 C.F.R. § 122.23.

<sup>14</sup> 40 C.F.R. § 122.23(b)(4) & (6).

<sup>15</sup> Order No. R8-2018-0001, Attachment D, II at 2 (*citing* 40 CFR 122.23(4) and (6)).

<sup>16</sup> 40 CFR 122.23(c).

<sup>17</sup> National Pollution Discharge Elimination System (“NPDES”) General Permit No. CAG018001, Regional Water Quality Control Board – Santa Ana Region Order No. R8-2018-0001 (*hereinafter* Order No. R8-2018-0001) at 7.

<sup>18</sup> Order No. 99-11 at 3.

<sup>19</sup> Order No. 99-11 at 3; *see also* Order No. R8-2018-0001, Attachment D, II at 3 (*emphasis added*).

reasonably possible.”<sup>20</sup> As described by the State Water Board, these uses include, but are not limited to, swimming, wading, water-skiing, skin and scuba diving, surfing, white-water activities, fishing, or use of natural hot springs. Shellfish Harvesting (SHELL) beneficial use is defined as water “suitable for the collection of filter-feeding shellfish (e.g., clams, oysters, and mussels) for human consumption, or sports purposes.”<sup>21</sup>

Sampling conducted in 2018 for indicator bacteria throughout Sonoma and Humboldt counties has demonstrated water quality impairments for total coliform bacteria due to cattle – particularly after wet weather events. In areas where samples were taken near grazing cows, the majority of samples contained ruminant fecal waste. Further, nearly all locations sampled in Humboldt County exceeded the total coliform bacteria objectives for SHELL beneficial use. While these sampling locations did not contain waters designated for SHELL beneficial use, each of the locations sampled were directly up-stream of waters designated for SHELL beneficial use – which directly impact the viability of the \$9.8 million shellfish industry of Humboldt Bay.<sup>22</sup> This industry is dependent on water quality free from pathogens, as harvesting operations for filter-feeding shellfish must be suspended when fecal coliform and indicator bacteria levels increase in the bay following wet weather events.

Meanwhile in Sonoma County, North Coast Regional Water Board staff have explicitly identified dairy facilities to be “a probable source of pathogens.”<sup>23</sup> Further sampling in the lower Russian River has demonstrated that indicator bacteria have exceeded the California Department of Public Health Draft Guidance for Fresh Water Beaches for Indicator Bacteria and recommended aggregate criteria by the U.S. EPA.<sup>24</sup> Both Sonoma County Water Agency staff<sup>25</sup> and Russian Riverkeeper staff have identified annual phosphorus exceedances throughout the lower Russian River and below the Santa Rosa Laguna. Phosphorus is a pollutant directly related to dairy operations and fertilizer use.

During a single rain event in January 2019, Russian Riverkeeper collected 7 samples from the edge of 6 individual dairies along the lower Russian River and Santa Rosa Laguna. These samples demonstrated gross exceedances of NPDES effluent limits for the individual pollutants affecting REC-1 beneficial uses.

#### **Water Quality Samples Collected in Russian River Watershed: January 2019**

<b>Sample No.</b>	<b>Total Coliform Bacteria (MPN/100 mL)</b>	<b>E. Coli (MPN/100 mL)</b>	<b>Total Phosphorus (mg/L)</b>
1	>241,960*	>241,960**	3.5***
2	198,630*	21,870**	2.3***
3	>241,960*	241,960**	6.1***
4	>241,960*	81,640**	16***
5	198,630*	8,840**	4.6***

\* Exceeds NPDES effluent limit for single sample MPN of 240/100ml.

\*\* Exceeds U.S. EPA Geometric Mean of  $\leq 100/100\text{ml}$  and Statistical Threshold Value of  $\leq 320/100\text{ml}$ .

\*\*\* Exceeds recommended USEPA Criteria on Aggregate Ecoregion 3 0.022 mg/L.

<sup>20</sup> State Water Resources Control Board, “Beneficial Use Definitions”, available at [https://www.waterboards.ca.gov/about\\_us/performance\\_report\\_1314/plan\\_assess/docs/bu\\_definitions\\_012114.pdf](https://www.waterboards.ca.gov/about_us/performance_report_1314/plan_assess/docs/bu_definitions_012114.pdf) (Accessed June 12, 2019).

<sup>21</sup> *Id.*

<sup>22</sup> Eureka, CA, Fishing Community Sustainability Plan, Revised Public Review Draft (March 2019).

<sup>23</sup> North Coast Regional Water Board, Staff Report for the Action Plan for the Russian River Pathogen TMDL (Aug. 2017).

<sup>24</sup> Sonoma County Water Agency, Russian River Water Quality Summary for the 2014 Temporary Urgency Change at 9 (March 2015).

<sup>25</sup> *Id.*

As demonstrated by a number of water quality monitoring samples by agency and local Waterkeeper staff, an ongoing presence and exceedance of pollutants associated with dairies exists throughout the North Coast region – particularly during and immediately following a storm event. The North Coast Regional Water Board must carefully evaluate the aggregate impact of dairies on individual waterbodies and adjust the CAFO threshold as necessary in its final Dairy Order to prohibit the discharge of pollutants into chronically impaired waterways.

3. Regardless of the size of a dairy, manure applied to fields is a point source that requires NPDES permit coverage.

The discharge of waste to a surface water is a prohibited and must be regulated by a National Pollution Discharge Elimination System (NPDES) permit. As currently drafted, the proposed Dairy Order states “[t]his Order covers the management of process water, manure, and other organic materials at dairies, including the application of such materials to land. This Order covers the discharge of wastes and water quality impacts from owned or leased dairy cattle grazing lands, dairy croplands, and dairy cattle raising lands that have the potential to discharge wastes to *surface waters* and groundwater.” The draft Dairy Order appears to justify a Waste Discharge Requirement (WDR) over an NPDES permit by explaining that “[d]airies defined as large CAFOs that discharge stormwater from cropland where manure, litter, or process wastewater has been applied must be implementing an NMP upon enrollment under this Order. Such discharges can qualify as ‘agricultural stormwater discharges,’ not subject to NPDES permitting.”

Wastewater, however, is regulated under the federal Clean Water Act and broadly constitutes anything that comes in contact with the animal – such as hay, bedding, or manure. Process wastewater means water directly or indirectly used in operation of the AFO for activities including: washing, cleaning, or flushing AFO facilities; washing or spray cooling animals; dust control; or any water that comes into contact with any raw materials, products, or byproducts including manure, litter, feed, milk, or bedding.<sup>26</sup> The discharge of process wastewater is permissible only when rainfall events cause an overflow of process wastewater from a facility designed, constructed, operated, and maintained to contain all process-generated wastewaters plus the runoff from a 25-year, 24-hour rainfall event at the location of the point source.<sup>27</sup>

Further, federal courts have specifically determined that manure applied to a field that flow into navigable waters are point sources, regardless of whether the field itself was a point source. In *Southview Farm*, the Second Circuit reasoned that “the manure spreading vehicles themselves were point sources,” since “collection of liquid manure into tankers and their discharge on fields from which flows into navigable waters.”<sup>28</sup> Liquid manure spreading operations were therefore determined to qualify as a point source within the meaning of section 1362(14) of the federal Clean Water Act and not subject to the agricultural exemption.

Various federal courts have since upheld this determination and have reiterated the intent and purpose the federal Clean Water Act to protect our nation’s waters from animal waste. As seen in Washington state, defendant dairies have claimed that the land application areas were not included within the definition of a CAFO and therefore were not point source discharges. The court denied this claim, noting that:

[d]efendants are incorrect in asserting that only the area where the animals are confined and the adjacent areas without vegetation can be considered a point source. Congress and the EPA were concerned with the amount of animal wastes generated by a CAFO and the

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<sup>26</sup> 40 C.F.R. § 122.23(b)(7); 40 C.F.R. § 412.2(d).

<sup>27</sup> 40 C.F.R. § 412.13(b).

<sup>28</sup> *Concerned Area Residents for Environment v. Southview Farm*, 34 F.3d 114, 119 (1994).

threat those wastes pose to the waters of the United States. Regulation of a CAFO as narrowly defined by Defendants would mean that a CAFO could remove the wastes from the denuded land where the animals are confined and distribute or apply them elsewhere without regard to the potential of those animal wastes to discharge into the waters of the United States. This would avoid the clear intent of Congress as expressed in the CWA and by EPA in its NPDES regulations to insure that the animal wastes produced by CAFOs do not pollute the waters of the United States.<sup>29</sup>

The Ninth Circuit has further affirmed that a CAFO qualifies as a point source subject to regulation under an NPDES permit, by “[d]efining a CAFO to include any manure spreading vehicles, *as well as manure storing fields, and ditches used to store or transfer the waste* serves the purpose of the CWA to control the disposal of pollutants in order to restore and maintain the waters of the United States.”<sup>30</sup> As established under federal case law, manure or wastewater application associated with dairy operations is not an agricultural stormwater discharge, and as such, this Dairy Order must require applicable dairies to enroll under R1-2012-0001 or combine this final Dairy Order as a joint WDR/NPDES permit with tiered requirements based on whether an individual facility requires an NPDES permit based on its manure spreading practices.

## **II. NUTRIENT MANAGEMENT PLANS MUST BE MADE PUBLICLY AVAILABLE, INCLUDE ENFORCEABLE TERMS, AND BE SUBMITTED ELECTRONICALLY TO COMPLY WITH STATE AND FEDERAL LAW.**

Nutrient management plans play a vital role in protecting water quality, as these plans constitute effluent limitations under the Clean Water Act by affecting the rates of discharge from a point source to navigable waters.<sup>31</sup> Effluent limits for discharges from land application areas require that the permittee: (1) develop and implement the BMPs laid out in 40 C.F.R. section 412.4 [nutrient management plan], and (2) maintain records specified in 40 C.F.R. section 412.37 [recordkeeping for land application areas]. The clarity of the nutrient management plan requirements must be acknowledged and reflected in the terms of the final Dairy Order due to the enforceable nature of these plans. In accordance with state and federal law, these plans must be made publicly available with enforceable terms, and be submitted electronically.

### **1. Nutrient management plans must readily be made to the public.**

As described in our letter to the North Coast Regional Water Board on January 3, 2019, the federal Clean Water Act, the Porter-Cologne Act, and California’s Nonpoint Source Policy require all data be made available to the public. Specifically, the federal Clean Water Act clearly states that parameter data are always required to be disclosed and deliberately excludes effluent data from amounting to a protected trade secret:

Any records, reports, or information obtained under this section (1) shall, in the case of effluent data, be related to any applicable effluent limitations, toxic, pretreatment, or new source performance standards, and (2) shall be available to the public, except that upon a showing satisfactory to the Administrator by any person that records, reports, or information, or particular part thereof (*other than effluent data*), to which the Administrator has access under this section, if made public would divulge *methods or processes* entitled to protection as trade secrets.<sup>32</sup>

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<sup>29</sup> *Community Association for Restoration of the Environment v. Sid Koopman Dairy*, 54 F Supp. 2d 976, 981 (1999).

<sup>30</sup> *Community Association for Restoration of the Environment v. Henry Bosma Dairy*, 305 F.3d 943 (2002) (*emphasis added*).

<sup>31</sup> *Sierra Club Mackinac Chapter v. Department of Environmental Quality*, 747 N.W.2d 321 (2008), appeal denied 766 N.W.2d 857.

<sup>32</sup> 33 U.S.C. § 1381(b) (*emphasis added*).



The only types of information that may be considered trade secrets are methods and processes.<sup>33</sup> Any interpretation of trade secrets that includes contamination levels, their locations, and the owner of those locations, violates the mandate of the federal Clean Water Act to make available to the public information related to water quality.

Further, California's Nonpoint Source Policy requires that, regardless of the monitoring required, "all monitoring programs should be reproducible, provide a permanent/documented record and be available to the public."<sup>34</sup> This requirement is to ensure that Key Element 4 can be achieved. Key Element 4 states "[a]n NPS control implementation program shall include sufficient feedback mechanisms so that the RWQCB, dischargers, and the public can determine whether the program is achieving its stated purpose(s) . . . ."<sup>35</sup> The public cannot conduct its duty under the Nonpoint Source Policy to ensure the program is achieving its purpose if data cannot be tied to particular BMPs. By not providing all field data, including its location and owner, the public will not be able to determine the effectiveness of BMPs and which dairy operators are making an effort to comply with the Dairy Order requires to reduce the amount of waste discharged from individual sites. Without the ability of the public to determine the effectiveness of individual BMPs, this Dairy Order lacks the feedback mechanisms required by the Nonpoint Source Policy to evaluate and improve the control of polluted discharge.

Finally, nutrient management plans must be made available to the public due to the incorporation of enforceable terms that must be subject to review to ensure the public can exercise its right to protect water quality through citizen enforcement.<sup>36</sup> Without public review of these nutrient management plans, the public is unable identify individual operators that are not in compliance. If the public cannot determine who is in violation of the enforceable terms within the nutrient management plans, the public is unable to exercise its right to enforce the federal Clean Water Act.

## 2. Nutrient management plans must include enumerated requirements as enforceable terms.

The requirements of an NPDES permit for a CAFO are the same as those issued to other point sources. The Dairy Order must contain effluent limitations, monitoring and reporting requirements, record-keeping requirements, special conditions, and standard conditions to ensure applicable CAFOs are in compliance with the federal Clean Water Act. Specifically, a CAFO permit must include technology-based effluent limitations (TBELs). However, a CAFO permit must also include more stringent water quality-based effluent limitations (WQBELs) when such limitations are necessary to meet water quality standards when those standards are not being met. Additionally, all CAFO permits must include a requirement to implement a nutrient management plan, that at a minimum, contains best management practices necessary to meet enumerated requirements and applicable effluent limitations and standards.<sup>37</sup> Those enumerated requirements include:

- (1) Manure and process wastewater storage;
- (2) Management of mortalities;
- (3) Diversion of clean water from the production area;
- (4) Prevention of direct contact of confined animals to waters of the United States;
- (5) Chemical and contaminant management of manure, litter, process wastewater, stormwater storage or treatment;

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<sup>33</sup> *Id.*

<sup>34</sup> State Water Resources Control Board, Policy for Implementation and Enforcement of the Nonpoint Source Policy Implementation Program (2004) at 14.

<sup>35</sup> *Id.* at 13.

<sup>36</sup> 33 U.S.C. § 1365.

<sup>37</sup> 40 C.F.R. § 122.42(e)(1).

- (6) Conservation practices;
- (7) Protocols for testing manure, litter, process wastewater, and soil;
- (8) Protocols for applying manure, litter, or process wastewater in accordance with the site-specific nutrient management plan; and
- (9) Record keeping.

Regardless of the size of the dairy facilities regulated by the Dairy Order, all nutrient management plans under the Dairy Order must include enforceable effluent limitations that are reported to the Regional Water Board and made publicly available to ensure discharge of pollutants to the Region's waterways is minimized and ultimately eliminated.

### *3. Nutrient management plans must be electronically reported under federal law.*

Current federal law requires electronic reporting.<sup>38</sup> All NPDES permits must require electronic filing of monitoring reports as of December 21, 2016.<sup>39</sup> Bypass, non-compliance, and twenty-four hour reports must be electronically submitted starting December 21, 2020.<sup>40</sup> NPDES permits for CAFOs, such as the Dairy Permit, must require electronic submission of the minimum set of NPDES data for these permits by December 21, 2020.<sup>41</sup> In this context, that minimum set of data is found in an Annual Program Report and includes a detailed description of the CAFO, including the type and number of animals; the amount of manure, litter and process wastewater; the total number of acres for land application covered by a nutrient management plan; the type and yield of crops; and other information.<sup>42</sup> The federal requirement for electronic reporting is a known condition of all NPDES permits, including CAFO-specific NPDES permits. Such conditions are required to either be incorporated into an NPDES permit either expressly or by reference.<sup>43</sup>

The final Dairy Order should require dairies to submit *all* reports electronically, including non-compliance reports and nutrient management plans. Dairy operators should submit these reports to a searchable and publicly accessible database to improve data accuracy, compliance, and promote transparency. California already maintains an electronic database that could be modified to allow electronic reporting for regional CAFO permittees. The North Coast Regional Water Board could, and should, require electronic reporting to begin as early as the effective date of the final Dairy Order. At a minimum, the Dairy Order should be revised to acknowledge the approaching federal electronic deadline and place applicable NPDES permittees – including small dairies that spread manure on site – on notice of this significant change.

### **III. THE DAIRY ORDER FAILS TO COMPLY WITH THE STATEWIDE ANTIDEGRADATION POLICY DUE TO A LACK OF EFFECTIVE MONITORING TO PROVIDE THE REGIONAL WATER BOARD WITH AN ADEQUATE FEEDBACK LOOP TO DETERMINE COMPLIANCE AND BMP EFFECTIVENESS.**

As described in our letter to the North Coast Regional Water Board on January 3, 2019, the Draft Order does not comply with the State Antidegradation Policy. Antidegradation law requires that, in high-quality waters, baseline water quality must be maintained unless it is demonstrated that any change in quality will (1) be consistent with the maximum benefit to the people of the state (“maximum benefit”); (2) not unreasonably affect present or probable future beneficial uses; and (3) not result in water quality less than

<sup>38</sup> National Pollutant Discharge Elimination System (NPDES) Electronic Reporting Rule, 80 Fed. Reg. 64064, Oct. 22, 2015 (“Electronic Reporting Rule”).

<sup>39</sup> 40 C.F.R. § 122.41(l)(4)(i).

<sup>40</sup> 40 C.F.R. §§ 122.41(l)(4), 122.41(l)(6)(i), 122.41(l)(7), 122.41(m)(3).

<sup>41</sup> 40 C.F.R. §§ 127.11(a), 127.16(a).

<sup>42</sup> 40 C.F.R. §§ 122.11(a)(3), 122.42(e)(4).

<sup>43</sup> 40 C.F.R. § 122.41.

that prescribed by state policies. Furthermore, any activity that produces or may produce waste, and that discharges into high-quality waters,<sup>44</sup> must result in best practicable treatment control (BPTC) to ensure that (a) pollution or nuisance will not occur, and (b) the highest water quality consistent with maximum benefit will be maintained.

Despite inclusion of language that “The Order incorporates antidegradation requirements as described in Findings 42-48; describes management practices and performance standards to be met, requires annual monitoring and reporting, and the development of management plans to protect water quality. These plans and reports provide a feedback mechanism to the Regional Water Board on the effectiveness of the management practices and set clear milestones for meeting objectives,” the North Coast Regional Board provides no substantive content to demonstrate *how* the Dairy Order will promote the attainment of water quality objectives and basin plan requirements. In fact, in the Regional Water Board staff’s response to comments, staff acknowledges that the “discharges permitted under this Order may impact some water bodies that are high quality for some constitutions.” This contradicts the purposes of the Antidegradation Policy, and by acknowledging this potential degradation of high quality waters, the Regional Water Board should require those facilities that do discharge to these waterways to either enroll in the R1-2012-0001 NPDES permit or combine this final Dairy Order as a joint WDR/NPDES permit to cover those facilities that discharge to high quality waters.

By merely stating that the Antidegradation Policy has been satisfied, the Regional Water Board fails to make the required findings that would allow high quality waters to be degraded. When there “is a determination that the receiving water is high quality and that an activity will discharge waste into the receiving water” degradation is assumed<sup>45</sup> and an Antidegradation Policy analysis is required. Therefore to allow degradation, the Draft Order must “set forth findings that bridge the analytical gap between the raw evidence and ultimate decision.”<sup>46</sup> The State Water Board’s findings must provide “the analytic route [it] traveled from evidence to action” to satisfy this requirement, so as to allow the reviewing court to satisfy its duty to “compare the evidence and ultimate decision to ‘the findings.’”<sup>47</sup> Mere recitation of legal requirements – as done here - is not sufficient. The Draft Order authorizes continued noncompliance with the State Antidegradation Policy. In *Monterey Coastkeeper v. SWRCB*, the Court contemplated whether an Agricultural Waiver for the Central Coast was required to apply the Antidegradation Policy as laid out in *Agua*.<sup>48</sup> In that case, the State Water Board did not make any of the necessary findings to allow a degradation to occur and instead stated the Waiver was consistent with the policy “because it will ‘improve’ water quality.”<sup>49</sup> The Court found this analysis unacceptable and remanded and directed the Board “to consider whether the Waiver is consistent with the Antidegradation Policy, as interpreted by the Court in [*Agua*].”<sup>50</sup> Similarly, without analysis that provides an actual analytical ‘route’ to explain the North Coast Regional Water Board’s decision to permit the continued discharge of contaminants, the degradation allowed by the North Coast Regional Water Board is impermissible.

Further, the revised Draft Order superficially states that “[t]hese plans and reports provide a feedback mechanism to the Regional Water Board on the effectiveness of the management practices and set clear

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<sup>44</sup> The court in *Agua* found that an actual showing of degradation is not required; instead the policy applies when there “is a determination that the receiving water is high quality water and that an activity will discharge waste into the receiving water.” *Asociacion De Gente Unida Por El Agua (Agua) v. Central Valley Regional Water Board*, (2012) 210 Cal.App.4th 1255, 1272. The policy presumes from these two facts that the quality of the receiving water will be degraded by the discharge of waste. *Id.*

<sup>45</sup> *Agua*, at 1272. Degradation is assumed when waste is being discharged into high quality waters.

<sup>46</sup> See *Topanga Association for a Scenic Community v. County of Los Angeles* (1974) 11 Cal.3d, 506, 514-516.

<sup>47</sup> *Id.* at 515.

<sup>48</sup> *Monterey Coastkeeper v. SWRCB*, (2015) No. 34-2012-80001324.

<sup>49</sup> *Id.* at 39

<sup>50</sup> *Id.*

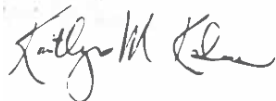
milestones for meeting objectives.” A proper feedback mechanism requires adequate monitoring and public review. As written, however, the Draft Order only states that water quality samples will be conducted from publicly accessible right of way in surface waters up and downstream of individual dairies, rather than directly monitoring where the discharge runs off a dairy. Improved monitoring practices will not only alleviate dairies of potential false positive claims that could result from other land-based pollutants not associated with the dairy, but will provide the Regional Water Board with the actual information needed to understand whether BMPs are effective and individual milestones are achieved. These monitoring practices must be taken at the discharge location during or immediately following a one-inch rain event, especially given the E. coli sampling requirements that must be evaluated by a lab within 6 hours of taking the sample to ensure a valid and viable sample. Finally, if the nutrient management plans are to provide a feedback mechanism for the Regional Water Board to assess BMP effectiveness and compliance, these nutrient management plans and resulting sampling data must be made available to the public to ensure this feedback mechanism is in effect and yielding actual improvements in water quality.

We strongly encourage the Regional Water Board to improve the monitoring practices outlined the final Dairy Order by requiring that monitoring take place at the actual point of discharge or location where stormwater runs offsite. And to ensure the effectiveness of the nutrient management plans in providing a feedback loop as required under *Agua*, the Regional Water Board must make these nutrient management plans and associated data available to the public. Finally, the Regional Water Board must explicitly state that where monitoring demonstrates an exceedance in water quality objectives, or where an individual facility fails to comply with the requisite BMPs, that facility must enroll in the R1-2012-0001 NPDES permit or otherwise adopt this Dairy Order as a joint WDR/NPDES permit.

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Transparency and accountability must become a cornerstone of California’s agricultural management. This includes requiring facilities that qualify as large CAFOs, those that are found to discharge to surface waters, or those that contribute to water quality pollution in the aggregate, to enroll in an applicable NPDES permit. It is time the California’s Water Boards take meaningful action to address the persistent pollution problems caused by California agricultural practices. Thank you for your careful consideration and integration of these comments.

Sincerely,

A handwritten signature in black ink, appearing to read "Kaitlyn Kalua".

Kaitlyn Kalua  
Policy Analyst

June 14, 2019

*Via Electronic Mail*

Cherie Blatt  
California Regional Water Quality Control Board  
North Coast Region  
5550 Skyline Boulevard, Suite A  
Santa Rosa, CA 95403  
[NorthCoast@waterboards.ca.gov](mailto:NorthCoast@waterboards.ca.gov)

Re: Comments on Draft Order No. R1-2019-0001, General Waste Discharge  
Requirements for Dairies Within the North Coast Region

Dear Ms. Blatt:

Our firm, Somach Simmons & Dunn, represents Dairy Cares on water quality and related issues throughout California. On behalf of Dairy Cares, we have reviewed recent revisions to Draft Order No. R1-2019-0001, General Waste Discharge Requirements for Dairies Within the North Coast Region (Draft Order). We provide here our comments on the Draft Order's revisions, specifically those that pertain to the submittal of nutrient management plans (NMPs) to the North Coast Regional Water Quality Control Board (Regional Water Board).

Dairy Cares is a coalition of California's dairy producer and processor organizations, including the state's largest producer trade associations (California Dairy Campaign, Milk Producers Council, and California Farm Bureau Federation) and the largest milk processing companies and cooperatives (including California Dairies, Inc., Dairy Farmers of America-Western Area Council, Hilmar Cheese Company, and Land O'Lakes, Inc.). Formed in 2001, Dairy Cares is dedicated to promoting the long-term sustainability of California dairies.

Dairy Cares recently became aware that the Draft Order was revised to include a new requirement that would mandate the submittal of NMPs to the Regional Water Board for all covered dairies. By virtue of the submittal of such documents, the NMPs would then become public records, and such records could be released to the public under the California Public Records Act (CPRA). Dairy Cares is greatly concerned with this revision and opposes the revised Draft Order's required submission of NMPs to the Regional Water Board.

We understand that this change was made because the Regional Water Board was concerned that their ability to access on-farm NMPs meant that the NMPs were public records under the CPRA, and if the NMPs were requested, then the Regional Water Board would have to round up all of the NMPs. We fundamentally disagree with the Regional Water Board's premise for several reasons.

First, access to the NMPs during inspections does not give the Regional Water Board possession of the NMPs. There is no duty to disclose those records under Government Code section 6253, subdivision (c).<sup>1</sup> "...[M]ere access to privately held information is not sufficient to establish possession or control of that information."<sup>2</sup>

Second, the purpose of an NMP, as stated in the Draft Order, "is to ensure that the facility is designed, constructed, operated, and maintained" in a manner that meets the terms and conditions of the Order. (Draft Order, p. 29) Effectively, an NMP functions as a facilities operations plan, providing a guidepost to the dairy for nutrient management. It is the result of an iterative process, adapted in response to seasonal farming and cropping decisions on an annual, monthly, and even daily basis.

Proposed revisions to the Draft Order characterize the NMP as "a feedback mechanism to the Regional Water Board on the effectiveness of the management practices and set clear milestones for meeting objectives." (Draft Order, p. 8.) This misstates the use of the NMP. The NMP is forward-looking, used by dairy owners and operators to adapt operations to manage nutrient applications and discharges. The plan cannot effectively be used by the Regional Water Board as "feedback" to verify the adequacy and efficacy of waste discharge program practices, as the NMP is not a direct consequence of reported sampling or analyses.

Further, the Draft Order's requirement that the NMP, and subsequent revisions, be submitted to the Regional Water Board reflects this mischaracterization of the NMP as a static document. It is neither feasible nor practical to require every revision of the NMP to be submitted to the Regional Water Board. Because an NMP undergoes regular revision, each submission of the document could become outdated as soon as it is submitted. It would be overly burdensome to dairy operators and owners to submit such revisions with limited utility for the Regional Water Board, which, to date, relies on the sufficiency of information contained in other reporting mechanisms, including the Annual Report, to monitor and enforce its regulatory goals. Maintaining a copy of the NMP on-site better suits the use of the

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<sup>1</sup> See *Anderson-Barker v. Superior Court* (2019) 31 Cal.App.5th 528, 540 (*Anderson-Barker*) ["The mere fact that it can 'access' the data does not equate to a form of possession or control. To conclude otherwise would effectively transform any privately held information that a state or local agency has contracted to access into a disclosable public record. Nothing in the text or history of the CPRA suggests it was intended to apply so broadly."] *Anderson-Barker, supra*, 31 Cal.App.5th at p. 541.; see also *Regents of University of California v. Superior Court* (2013) 222 Cal.App.4th 383, 398

<sup>2</sup> *Anderson-Barker, supra*, 31 Cal.App.5th at p. 541.

NMP by dairies, without compromising the reporting of relevant information to the Regional Water Board.

Moreover, the Regional Water Board does not approve the NMP, or its contents. It looks to see if one, at a minimum, was prepared with assistance from an identified specialist, is maintained onsite, and updated and amended as determined appropriate and necessary by the dairy operator. As stated previously, it is a facilities plan for managing nutrients. The Draft Order requirement to have an NMP does not automatically make that document a public record that must be disclosed by the agency upon request. Rather, the legal standard for disclosure is that the record in question must in fact be a public record, *and*, be in the agency's possession. "To establish an agency has a duty to disclose under section 6253, subdivision (c), the petitioner must show that: (1) the record 'qualif[ies] as [a] public record[]' within the meaning of section 6252, subdivision (e); and (2) the record is 'in the possession of the agency.'" <sup>3</sup> Thus, unless the NMP is in the Regional Water Board's possession, it is not a public record subject to disclosure.

Furthermore, because the NMP does not confirm a dairy owner or operator's compliance with the terms of the Order and because the NMP is subject to frequent revision, it has minimal informative value for the public. Currently, NMPs are not subject to disclosure under CPRA requests made to the Regional Water Board. The Regional Water Board is not in "possession" of the NMP as required for purposes of disclosure under the CPRA, as the Regional Water Board's authority is limited to access upon request. Review of NMPs on this ad hoc basis does not equate to physical possession nor does it amount to constructive possession, because the Regional Water Board does not have the authority to exercise control over the content of the NMP (*i.e.*, adding, deleting, or otherwise manipulating the information).<sup>4</sup>

To the extent that the Regional Water Board extracts some information from the NMP to determine compliance with the Draft Order, that extracted information, which is then in the Regional Water Board's possession, may be a public record that must be disclosed upon request made under the CPRA. But, rather than extract information from the NMP, we recommend an alternative approach whereby Dairy Cares proposes that the Regional Water Board—in conjunction with the dairies, their representatives, and any other interested stakeholders—discuss the desired information to be extracted from the NMPs for inclusion in the Annual Report. This simplified method of reporting avoids eliminating the utility of the

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<sup>3</sup> *Anderson-Barker, supra*, 31 Cal.App.5th at p. 538.

<sup>4</sup> *Anderson-Barker, supra*, 31 Cal.App.5th at pp. 537, 540.



Cherie Blatt

Re: Comments on Draft Order No. R1-2019-0001

June 14, 2019

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NMP without impeding the apparent purpose of the revised Draft Order. This approach should meet the Regional Water Board's needs and purposes while maintaining the utility of an on-farm NMP.

Very truly yours,

A handwritten signature in black ink, reading "Theresa A. Dunham". The signature is written in a cursive style with a large, looping initial "T".

Theresa A. Dunham

cc: J.P. Cativiela  
Michael Boccadoro

TAD/je

**From:** [Del Norte Rcd](#)  
**To:** [Blatt, Cherie@Waterboards](mailto:Blatt.Cherie@Waterboards)  
**Subject:** Order R1-2019-0001 Draft General Waste Discharger Requirements for Dairies  
**Date:** Friday, June 14, 2019 3:49:01 PM

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Cherie,

The Del Norte Resource Conservation District fully supports the U.C. Davis comments submitted to the North Coast Regional Water Quality Control Board regarding the draft decisions (redline/Strikeout) on the general waste discharge requirement for dairies.

Linda Crockett  
District Manager  
Del Norte Resource Conservation District  
241 1st Street, B  
Smith River, CA 95567

707 487 7630



## North Group-Redwood Chapter-Sierra Club

Felice Pace, Water Chair

28 Maple Road Klamath, Ca 95548 707-954-6588 unofelice@gmail.com

June 12, 2019

Matt St. John, Jonathan Warderman, James Burke and Cherie Blatt

NCRWQCB

Via E-Mail

Copies to: Russian Riverkeeper, Cal Coastkeeper Alliance, Humboldt Baykeeper, Tollowa Tribe, Wiyot Tribe, Bear River Tribe, QVIR.

**SUBJECT: Comments on additional Stakeholder Meetings, the NCRWQCB's Response to Comments & the Proposed Revisions to Order No. R1-2019-0001: General Waste Discharge Requirements For Dairies in the North Coast Region**

Dear Matt, Jonathan, James and Cherie,

The North Group's ability to participate in the initial phases of GWDR development for dairies was limited due to lack of time and people resources. However, we did submit a comment via a May 20, 2019 email to the NCWQCB. You should also be aware of our ongoing concerns about specific dairies and of the complaints we (or I as an individual) have filed for degradation of water quality at dairies in the Scott Valley and on the Smith River Plain/Estuary Area. These expressions of concern and the related complaints are in your files. They mainly pertain to lack of riparian and wetland protection, direct and stormwater discharges of animal waste to surface waters and discharge of pollutants to groundwater.

You should also be aware, that North Group or I as an individual have filed numerous complaints about the polluted discharges from non-dairy CAFO's, especially feedlots operated on live streams with no riparian or water quality protection. It is disappointing that the NCRWQCB continues to refuse to regulate non-dairy CAFOs as CAFOs, including the feedlots right on streams that deliver bovine waste to the waters of the state in violation of the Basin Plan, including basins like the Klamath River Basin that are "nutrient impaired." The photos below illustrates the problem.



Because they significantly degrade water quality, we once again request that you effectively regulate all non-dairy CAFOs and, in particular, all CAFOs established right on live streams with no riparian protection. Those CAFOs have a high likelihood to deliver livestock waste to watercourses during storms and via direct deposition from the livestock. They should be regulated as CAFOs in order to effectively address the water quality degradation threat they pose and to eliminate documented discharges at sites like and including those in the photos above.

I participated in the Stakeholder Meeting held by staff in Fortuna on June 5. Based on that meeting, review of proposed changes in the GWDR and a review of comments made on the proposed GWDR and the NCRWQCB's response to those comments, I submit the following comments on behalf of North Group:

### **1. Should NPDES permits be required in some cases?**

It was clear that the dairy owners/operators who participated in the Fortuna meeting would like a system whereby those who demonstrate year after year that they are not discharging to surface and groundwater are subject to less regulation, less monitoring of conditions and less reporting. The comment suggests a regulatory system that targets permit conditions on the individual situation of each dairy. We tend to agree: the proper way to regulate dairies where the risk and consequences of polluted discharges to surface or groundwater are high, or are known to have occurred, is an NPDES permit. An example is Reservation Ranch. It has documented degradation of groundwater used for drinking (nitrates, bacteria and 1,2,3-TCP) and it has altered and degraded its riparian areas and wetlands (see NOV's sent to RR). Therefore, it should be required to obtain an NPDES permit.

In this regard I would note that the Response to Comments did not address the April 18<sup>th</sup> testimony of the Coastkeeper Alliance asking "why this WDR is not a NPDES Permit" and citing several court precedents. However, your legal counsel appeared to confirm during the April 18<sup>th</sup> meeting that CAFO's which discharge do require NPDES permits. I believe that includes dairies that discharge animal waste and other pollutants to interconnected groundwater and, prjhaps, to any/all groundwater.

Given that BOTH the dairymen and those who want all CAFOs effectively regulated are calling for a system that can tailor requirements to the size, location, risk and likely consequences of discharge, shouldn't those dairies which pose significant risks to key resources (for example at risk salmonids) and those which have a history of significant polluted discharges to surface or groundwater be required to obtain an NPDES permit?

Please give thought to how we can get to a regulatory system for all CAFOs which combines relief for

good actors with more stringent requirements for those who pollute surface and groundwater, degrade riparian areas and wetlands and have other violations. Just as we have “progressive enforcement” shouldn't we have “progressive regulation”?

## **2. Riparian Protection:**

With respect to riparian protection we agree with the Coastal Commission Comment:

*Overall, we recommend stricter limits on riparian disturbance to protect the biological productivity and quality of coastal waters, thereby ensuring that this Order is in conformance with the statutory standards of the Coastal Act. Cattle crossings of riparian corridors should use the same footprint as road crossings, when possible. It would be ideal to bring greater emphasis to road management and sediment discharge related to construction and maintenance of roads by combining the cattle crossing with the road crossing design; this might enable us to afford a measure of control as to how the road crossings are constructed and maintained.*

*We recommend excluding riparian corridors from the areas made available for dairy access where possible, including grazing, for all the reasons identified in the Riparian Management Plan (RMP) document. This suggested exclusion would help protect riparian corridors for all dairies, regardless of size. At a minimum, we recommend requiring all dairies, including those below the head-count threshold, to submit a satisfactory RMP prior to allowing access to riparian corridors.*

CDFW also agrees with the Coastal Commission that there should be adequately sized riparian buffers from which all grazing should be excluded. And yet you feel justified in rejecting those recommendations even though they are from expert agencies, as well as the fact that you have in your files numerous complaints, reports and NOVs documenting degradation of riparian areas at CAFOs, including dairies! You are on very thin ice in this case.

Because you have rejected riparian livestock exclusion, you will be forced to rely on staff inspections to assure that approved Riparian Management Plans are being followed and are effective at preventing degradation of water quality. As you know, mechanisms to determine effectiveness is a requirement of the SWRCB's Non-Point Source Policy. Therefore those inspections must include inspection of all riparian areas and wetlands that are grazed no matter at what season or frequency. I do not believe you have the staff time to do that anywhere near as often as it should be done. The fact that you do not have the resources to inspect riparian area conditions to confirm that management plans are being followed and are effective, is one of the reasons you should accept the CC/DFW recommendation for exclusion of grazing from riparian areas and wetlands.

If y'all insist on allowing riparian and wetland grazing, you should explain how you intend to comply with the SWRCB Non Point Policy's requirement that you include measures and monitoring sufficient to determine the effectiveness of the RMP approach with grazing allowed. Please also explain the science you relied upon in determining the proper size of riparian zones subject to RMPs or livestock exclusion. In this regard we recommend that you defer to expert agency DFW on the size of riparian management zone needed to protect sensitive fisheries and other beneficial uses.

If exclusion is required, however, there's no need for a RMP so that is also one way to reduce paperwork as requested by the dairy owners/operators. If you are not going to commit the resources needed for adequate monitoring of RMP implementation and effectiveness, you should recommend to the Board that they adopt the CDF/CC recommendation for full riparian exclusion of an adequately

sizes riparian zone. Please also make it clear that the provisions for riparian protection (whatever they end up being) also apply to wetlands or explain why that clarification is not needed.

If y'all insist on allowing riparian and wetland grazing, I would like to review the procedures you will follow in doing riparian and wetland inspections. How will you establish a baseline and target conditions? Will the inspection be systematic or random? Will the evaluation be subjective or rely on measurements? Is staffing adequate to do full riparian inspections as often as needed? The answers to these questions are critical to determining if the conditions for riparian management in the Order will be effective or are simply symbolic, that is, a way to claim effective regulation where there is no effective regulation.

I have seen too many discharges from dairies and other CAFOs directly to the waters of the state, too many stormwater issues on dairies and too much degradation of riparian areas and wetlands. I don't think you are willing or able to commit the staff resources needed to effectively evaluate whether operators are following Riparian Management Plans. Therefore, you should support adoption of the DFW/Coastal Commission regulation for adequate riparian and wetland buffers from which livestock are excluded. That will also allow you to respond positively to the dairy operators' calls for paperwork reduction. If we have full livestock exclusion from an adequately sized riparian area and from all wetlands there is no need to require RMPs.

### **3. Change in Order: no cover of manure plies and using 25 year return storm 24 hours.**

In response to a request from the Del Norte RCD you propose eliminating the requirement for covering manure piles in winter:

*“The GWDR sentence will be removed that states: “In the winter rainy season, manure piles are required to be covered to protect air quality, reduce objectionable odors, and reduce the potential to discharge manure to surface waters or groundwater.” The sentence will be replaced with: “Dairies must practice best available technology to reduce objectionable odors as needed to reduce complaints, especially new dairies in locations not previously occupied by a dairy.”*

I object strenuously to this change. The change totally ignores and sets aside the objective to “reduce the potential to discharge manure to surface waters or groundwater.” That is irresponsible. On the Smith River Plain the Point Precipitation 24 Hour Frequency for a 25 year storm is 7.88 inches; in Scott Valley it is 4.98 inches. Under these conditions manure piles either need to be covered or they need a berm totally surrounding the pile. However, while a berm could control surface discharges, a berm might actually facilitate degradation of groundwater quality. Covering manure piles during the rainy season is the only practical way to prevent stormwater discharges of manure at dairies.

If you insist on eliminating the requirement to cover manure piles during the rainy season, there is a high likelihood that discharges will occur and so you must require NPDES permits. Please return to the original language!

### **4. Should the NCWQCB build in mandatory review of how this Order is working?**

The proposed Order incorporates new monitoring and management requirements that are both controversial and unproven. The Order also ignores a major recommendation from the Coastal Commission and DFW and instead substitutes Riparian Management Plans and undefined “inspections” which the Board claims will assure that objectives for riparian areas and wetlands are met.

Under these circumstances it is irresponsible to lock in the Order. Instead, a finding and condition should be added indicating that, because several new practices, reports, plans and monitoring have been incorporated that are unproven and at some points at odds with the recommendations of expert agencies, the Order ought to be reviewed in five years to determine if these new approaches and requirements are adequate and appropriate or, alternatively, if changes are needed to add, remove or modify requirements in order to better regulate while eliminating or reducing regulatory and reporting requirements that turn out to not be needed to protect water quality.

Please contact me if you have questions about this input and our recommendations.

Sincerely,

Via Email  
Felice Pace



Friday, June 14, 2019

Cherie Blatt  
California Regional Water Quality Control Board  
North Coast Region  
5550 Skylane Blvd., Ste. A  
Santa Rosa, CA 95403

Dear Ms. Blatt,

As a North Coast dairy producer I'd like to thank you for the opportunity to provide comments on the draft General Waste Discharge Requirements (GWDR) for North Coast Dairies.

McClelland Dairy, is a second and third generation family farm, that has been operating in the North Coast Region for 81 years. We have been regulated under the Waiver of Waste Discharge Requirements since 2012. Over the past 7 ½ years we have invested over \$600,000 into infrastructure improvements, compliance costs and fees. We are working on a project with AMMP investing over \$1,750,000 over the next two years to convert our flush system to a scrape system and reduce methane produced at our farm. In addition, we are working with CDFA on a Healthy Soils project. We continue to work to have best management practices on the dairy, and create a positive partnership in the interest of improving water quality on the North Coast.

As a dairy producer who has worked hard to be in compliance with the existing waiver I'd like to address two issues of concern that are a result of changes made earlier this spring to the draft GWDR:

1) **Nutrient Management Planning Documentation:** I have extreme concern adding the Nutrient Management Plans (NMP's) as a requirement to be submitted to the water board. Submitting it to the water board makes it public record. Extreme activist groups will use these public documents about our personal, proprietary business to plan attacks on our operation. These groups target animal agriculture and then use this information to cause harm to our animals and create safety concerns for farm employees. The Nutrient Management Plan is most effective if it is kept at the farm and shared with the water board at the farmers location. Not having it a public document, creates an environment for producers to have critical thinking and develop plans that will enhance the overall environment.

Information provided to the water board in the Nutrient Management Planning Document would likely give a more accurate picture of what average conditions dictate, and the annual report could provide a supplemental look at what has occurred each year.

2) **Surface Water Monitoring:** the proposed addition of bacterial sampling to the monitoring and reporting plan would cause our dairy to incur an added \$150-\$300 annual cost for surface sampling alone. The cost would be tolerable if we felt that the sampling could provide accurate information that helped us to improve manure management practices; that however is unlikely. Many sources can influence the presence of bacteria in local waterways, including: other livestock sources, faulty septic systems, wildlife and transient living situations. We are open to testing options that will garner the information needed to determine discharges, but our industry simply cannot afford a 300% increase in compliance costs that likely won't be of help in discovering or solving these issues.

Again, thank you for the opportunity to comment on this important piece of regulation. We appreciate your staff working with the family farms. We take pride in protecting the environment and being part of solutions!

Thank you,

*Jana McClelland*

Jana McClelland  
Partner,  
McClelland Dairy

## Robert McClelland Dairy

Robert and Jolynn McClelland

13200 Valley Ford Road

Petaluma, CA 94952

(707) 876-3292

jemcows@yahoo.com

Friday, June 14<sup>th</sup>, 2019

Cherie Blatt  
California Regional Water Quality Control Board  
North Coast Region  
5550 Skylane Blvd., Ste. A  
Santa Rosa, CA 95403

Dear Ms. Blatt,

My husband and I are North Coast dairy producers and would like to thank you for the opportunity to provide comments on the draft General Waste Discharge Requirements (GWDR) for North Coast Dairies.

We started our dairy, Robert McClelland Dairy, in the spring of 2005. We are an organic dairy farm located in the North Coast Region. We have been regulated under the Waiver of Waste Discharge Requirements since 2012. Over the past 7 ½ years we have invested time and money into infrastructure improvements, compliance costs and fees. In addition, we've worked with industry support organizations, the University of California, and Regional Water Board Staff to, attend educational seminars, improve best management practices on the dairy, and create a positive partnership in the interest of improving water quality on the North Coast.

As a dairy producer who has worked hard to be in compliance with the existing waiver I'd like to address two issues of concern that are a result of changes made earlier this spring to the draft GWDR:

1) **Surface Water Monitoring:** the proposed addition of bacterial sampling to the monitoring and reporting plan would cause our dairy to incur an added \$150-\$300 annual cost for surface sampling alone. The cost would be tolerable if we felt that the sampling could provide accurate information that helped us to improve manure management practices; that however is unlikely. Many sources can influence the presence of bacteria in local waterways, including: other livestock sources, faulty septic systems, wildlife and transient living situations. We are open to testing options that will garner the information needed to determine discharges, but our industry simply cannot afford a 300% increase in compliance costs that likely won't be of help in discovering or solving these issues.

2) **Nutrient Management Planning Documentation:** Nutrient Management Plans (NMPs) should not be required to be submitted to the water board. NMP's are created to provide a guideline for nutrient applications on the dairy, but can change annually based on observation of soil and pasture health, weather conditions and cattle nutrient needs. Information provided to the water board in the Nutrient Management Planning Document would likely give a more accurate picture of what average conditions dictate, and the annual report could provide a supplemental look at what has occurred each year.

Again, thank you for the opportunity to comment on this important piece of regulation. We continue to appreciate the dedication of your staff to creating a successful program that allows for the success of our family farms while protecting the environment that we are proud and fortunate to be a part of. We have two young sons who have shown interest in our operation. Therefore, it is very important to us that we have a sustainable farm to pass onto the next generation. Should you have questions please don't hesitate to reach out.

Thank you,

Jolynn McClelland

Robert McClelland Dairy

# Six Rivers Dairy Association

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5601 S. Broadway  
Eureka, CA 95503

June 10, 2019

Cherie Blatt  
North Coast Regional Water Quality Control Board  
5550 Skylane Blvd., Suite A  
Santa Rosa, CA 95403

Subject: Comments for Draft General Waste Discharge Requirements for Dairies in the North Coast Region, Order No. R1-2019-0001

Dear Cherie,

The Six Rivers Dairy Association was formed in 2012 to administer the Humboldt County Surface Water Group Monitoring Program, and has conducted representative surface water sampling for its members for compliance under the current Regional Water Board dairy permit program. We offer the following comments on the 2019 draft GWDR:

**1. Remove the requirement for testing surface water samples for *e. coli*.**

This requirement would be an inefficient use of time and resources, and would be an added expense that would not provide any information on what the bacteria source could be. In terms of additional costs, as per the current QAPP, each storm event requires 11 downstream sampling sites. Lab fees for *e. coli* testing alone would equate to approximately \$1500 for 3 events, not including additional technician time and fuel costs. As sampling is currently being proposed, if a water sample tested positive for *e. coli*, it would be assumed to be strictly bovine, which is a false interpretation given there could be multiple sources for the bacteria. For example, Humboldt County has a large homeless population, and previous HSU graduate student research done in the Arcata area watersheds showed increased fecal coliform in waterways after storm events due to homeless encampments in the forested areas. Other potential sources of *e. coli* in water samples in our area could include other ruminants (beef cattle operations are not currently regulated), equine, domestic animals such as dogs and cats, or even leaking septic systems.

**2. Remove the requirement for surface water sampling within 18 hours of a 1-inch storm event.**

This is too prescriptive and will be infeasible to meet since storm events can occur anytime during a 24-hour period. Sampling is conducted during the winter season when daylight hours are reduced, which could lead to safety concerns for sampling technicians. If testing for *e. coli* is required, storm events could occur on weekends or holidays when the lab is closed. Additionally, the Eel River has periodic flood events that have coincided with 1-inch storm events. It could be up to 24-36 hours later that runoff could still be occurring and would be safe enough to sample, but would be outside the 18 hour limitation as currently proposed, which would prevent sampling a storm event.

**3. Remove requirement for NMPs to be submitted.**

The NMP portion of a CNMP is not useful as a stand-alone document. It is our understanding NRCS uses the CNMP as a planning and guidance document, and nutrient application schedules are not something that must be strictly followed by producers. Also, the tool that NRCS uses for developing nutrient application schedules as part of a CNMP has limitations for pasture-based dairies. The NMP worksheet that is being proposed is redundant because it asks for duplicate information that is already required in the Annual Report or Water Quality Plan. We suggest that information required in the Annual Report and the Water Quality Plan is sufficient instead of requiring NMPs to be submitted.

**4. Reduce number of required groundwater samples.**

Work with UC Davis, producers and CDFA's Milk Inspectors to find ways to reduce duplicative efforts for groundwater sampling that is already occurring.

We would also like to offer a reminder for the Board to not lose sight of the fact that the majority of Region 1 dairies were previously regulated under the Waiver, which by the Board's definition meant that dairies posed a low risk to water quality. The Waiver program has an end date, so the GWDR is being developed as its replacement. However, the majority of Region 1 dairies have not increased their level of risk posed to water quality. They continue to be proactive in their management practices to protect water quality, and continue to make dairy facility infrastructure improvements as funding and time allows. Please do not make the new permit overly burdensome on producers.

Additionally, we want to emphasize that the State Water Board permit fees that must be paid annually by dairies could be better used towards projects on dairies to make improvements to operations. We would also like to request that the Regional Water Board advocate for more program funding to boost the CDFA's Alternative Manure Management Program.

SRDA also fully supports the comments submitted by UC Davis.

Sincerely,

Six Rivers Dairy Association Board of Directors

Dave Renner

Mary Ann Renner

Chris Cahill

Andy Titus

Jeff Mason

George Bianchi, Inc  
3151 Pepper Rd  
Petaluma, CA 94952  
bianchidairy@msn.com

June 14, 2019

Cherie Blatt  
California Regional Water Quality Control Board  
North Coast Region  
5550 Skylane Blvd., Ste A  
Santa Rosa, CA 95403

Via email : [NorthCoast@waterboards.ca.gov](mailto:NorthCoast@waterboards.ca.gov) ; [Cherie.Blatt@waterboards.ca.gov](mailto:Cherie.Blatt@waterboards.ca.gov)

Dear Ms. Blatt,

First of all, I want to thank you for this opportunity to comment on the draft General Waste Discharge (GWDR) requirements for North Coast Dairies. As a North Coast dairy producer, I appreciate the relationships that the Board and the dairy producers have developed over the past many years. I strongly believe that we have all worked together diligently, and the results show positive improvements to the watershed. I sincerely hope that we can continue this association that is built, in large part, on trust and mutual respect.

Our dairy has been operating at our current location as a family business since the late 1960's. We have been regulated under the Waiver of Waste Discharge Requirements since 2012. Over the past seven and a half years, we have invested many tens of thousands of dollars into infrastructure improvements, compliance costs, and fees. In addition, we've worked with industry support organizations, the University of California and Regional Water Board Staff to attend educational seminars, improve best management practices on the dairy and create a positive partnership in the interest of improving water quality on the North Coast.

As a dairy producer who has worked hard to be in compliance with the existing waiver, I would like to address two issues of major concern that are a result of changes made earlier this spring to the draft GWDR:

- 1) **Nutrient Management Planning Documentation:** As a dairy who was subject to (actually victim of) a frivolous lawsuit from an environmental group in the late 1990's, I am strongly opposed to Nutrient Management Plans being required to be submitted to the water board. My experience taught me that the general public has a lack of knowledge about our industry and that information is often mis-understood. NMPs are created to provide a guideline for nutrient applications on the dairy, but can change annually based on observation of soil and pasture health, weather conditions and cattle nutrient needs. I do not believe that this is, or should be, a document that can be shared with the general public. In the wrong hands, the NMP provides



ammunition and makes dairies an easy target. Remember, lawsuits can be filed with very little evidence, or bad evidence, as we have already experienced. It cost us nearly \$100,000 to defend ourselves, when our innocence was clear. I respectfully request that you carefully consider the disastrous implications that your proposed requirements could have on the local dairy industry.

- 2) **Surface Water Monitoring:** The proposed addition of bacterial sampling to the monitoring and reporting plan would cause our dairy to incur and added \$150-\$300 annual cost for surface sampling alone. The cost could be tolerable if we felt that the sampling could provide accurate information that helped us to improve manure management practices; however, that is unlikely. Many sources can influence the presence of bacteria in local waterways, including: other livestock sources, faulty septic systems, wildlife and transient living situations. We are open to testing that will garner the information needed to determine discharges, but our industry simply cannot afford a 300% increase in compliance costs that likely won't be of help in discovering or solving these issues. Again, I fear that this information could be misconstrued and, once again, the North Coast dairy industry becomes a prime target for litigation. I believe more time is needed to come up with a beneficial plan.

Again, I respectfully request that the Board consider proposed changes *very, very carefully*. Our livelihood, our way of life and our hopes for future generations is in your hands. Our industry is continually threatened, and it is increasingly difficult to combat the pressures from environmental groups, activists and anti-animal agriculture interests. It is a horrible feeling to live in fear and to be a target, especially when we know we are doing a good job and complying with regulations.

Now is the time for the Board to applaud and support the efforts of North Coast dairy producers. I hope to continue forging a positive relationship with the Board with the outcome being continued improvements to our watershed. I fear that increased regulation and requirements will slowly degrade the Board/producer rapport.

Thank you again for this opportunity to comment on this important piece of regulation. We continue to appreciate the dedication of your staff to work with local dairy producers to create a successful program. We are all working hard to find the balance that allows for the success of the family farm while protecting the environment that we truly love and appreciate. Please contact me with any questions.

Respectfully,

A handwritten signature in cursive script, appearing to read "Susan Bianchi".

Susan Bianchi  
George Bianchi, Inc





June 14, 2019

Ms. Cheri Blatt, Water Resources Control Engineer

Mr. Matthew St. John, Executive Officer North Coast Regional Water Quality Control Board

Dear Ms. Blatt and Mr. St. John,

Thank you for the opportunity to provide public input regarding potential changes to proposed Waste Discharge Requirements Order No R1-2019-0001 for dairies in the North Coast Region. We appreciate your many efforts to work with dairy producers, University of California Cooperative Extension Advisors, Specialist and other partners in the California Dairy Quality Assurance Program and other stakeholder groups. We are grateful for the public workshops held at the end of May and in early June. We have worked closely with Regional Board staff during development and implementation of the existing Conditional Waiver.

Dairies under North Coast Regional Water Quality Control Board jurisdiction are predominantly organic, provide pasture for their cows and have challenges finding quality individuals familiar with pasture dairying needs to provide compliance assistance. Since the adoption of the conditional WDR in 2012, educational efforts focused on assisting producers to do their own compliance calculations and monitoring. A grant from CDFA provided funding for each dairy to work with their Resource Conservation District to develop and identify required components of aerial maps. All dairies in the region have evaluated manure and process water production, storm water generated runoff destined to the dairy lagoon and storage capacity. All dairies obtained 4 well samples to evaluate water quality (unless they had no wells). The existing Animal Resource Management Committee surface water monitoring was formalized for the representative monitoring program in the southern part of the region. Two new surface water monitoring programs were developed (Six Rivers and Smith River). Annual reports from these representative programs have been submitted. Many, although not all, producers have completed a Comprehensive Nutrient Management Plan (CNMP) with the Natural Resources Conservation Service. These are just a few of the changes that have occurred since the conditional waiver was adopted. Countless hours went into development of educational materials and delivering workshops and office hours to aid producers to achieve compliance.

University of California Cooperative Extension Advisors and Specialist are quite familiar with dairy producers in the North Coast through educational programs (workshop and office hour participation), on-farm visits, and the opportunity to accompany staff during some inspections. We provide these comments based on both an understanding of your regulatory goals and potential water quality concerns. These comments predominantly reflect proposed changes since the previous set of comments was submitted.

Page	Comment
WDR	
	It would be helpful to have an appendix with a summary table identifying differences in water quality sampling (analytes for surface water; frequency of sampling for groundwater). It would be helpful to have a summary table identifying the revisions to the Water Quality Plan.
12 item 47	The word data is plural. In a sentence one needs to write data are (not data is)
Definitions section	Need to include definition for IS/MND
28 item 1	Please synchronize submission of the NOI with the annual report for 2019 and modify NOI document page 5
28 item 2	Please synchronize the submission of the WQP with the annual report for November 30, 2020.
Notice of Intent	
5 Section VI	Modify due date to agree with date in WDR.
Monitoring and Reporting Program	
4 B paragraph 2	The requirement for groundwater monitoring results to be uploaded to Geotracker will be a difficult barrier for some producers. All individuals do not have computers let alone the ability to scan documents or manage email attachments.
5 a	It would be helpful if Regional Board Staff could keep an updated list of ELAP certified labs. The interactive map has had challenges resulting in no information being available for individuals to determine which labs are acceptable.
5 a	Insert at bottom of page. And the measurement of pH and temperature <del>and the measurement of pH and temperature</del> is not....
6	Also at the identified monitoring locations, bacterin cocentrations are to be sampled.... Please clarify if this is just samples where total ammonia nitrogen $\geq 3$ . Including a requirement for bacteria analysis significantly modifies the complexity of the group surface water monitoring program due to sample delivery requires per EPA methods. Sample hold time (40CFR122...) is 6 hrs from when the sample is collected until analysis begins. Logistical challenges will occur as most laboratories have a cut off time during their work day to receive these samples (labs have not been contacted specifically about this issue at this time as the ELAP interactive map was not functional at the time we were in the process of inquiring. An email was sent to the email address listed requesting an updated list.) Sample preservation is $< 10C$ and a preservative needs to be added if chlorine is present. The need to return samples to the laboratory may require a runner or additional trips by the individual conducting sampling. Daylight hours are already in short supply when samples need to be collected.
8 2 paragraph 2	The WQP and Annual Report forms require information on the groundwater wells samples such as location, depth, and construction. Inserted information in the WQP P 5 item 23 "If well construction and screen locations are provided...then depth to water is not necessary. Known information about wells is required. If any of this information is not known by the discharger and obtaining the information would harm the well or well seal, then the discharger may simply state information that can be obtained". Perhaps the intent here is that information can NOT be obtained. Experience in obtaining well information on older wells is hit and miss.
9	For facilities with $NO_3-N \geq 5$ mg/l the need to develop a work plan signed by a professional engineer or registered geologist is excessive. This trigger value is one-half of the drinking water standard. Certainly if direct inundation of wellheads occurs, a professional engineer or registered geologist is the logical individual to hire to improve wellhead protection. However, if the problem is one of manure application and management thentaff from the Natural Resources Conservation Service, Resource

	Conservation Districts, dairy trade associations, University of California Cooperative Extension and other groups may be well qualified to assist producers to identify management improvements. Condemning a facility to a detailed groundwater monitoring work plan when one-half of the drinking water NO <sub>3</sub> -N concentration exists is expensive and may not yield any difference in water quality. Please allow local service providers to aid producers before requiring expensive groundwater monitoring. Additionally, the threshold of 5 mg/l seems quite low. Based on groundwater results received to date, what percent of dairies would have nitrate concentrations that would trigger this need? Perhaps a value of 8 mg/l is more reasonable.
12	Well samples are analyzed at three year
18	NOI currently is listed to be due October 1, 2019, with WQP due October 1, 2020. Please have documents due at the same time as the Annual Report to minimize confusion of dates. As indicated previously, insufficient resources (qualified staff and dollars) are available to write NMP for those who have no plan AND update existing plans by November 30, 2020. Funds through NRCS are not guaranteed in perpetuity. Costs associated with plan development given the sampling requirements will exceed \$10,000
Water Quality Plan	
	Please streamline water quality plan for existing dairies. Identify new information (not already submitted to the Regional Board as part of the last Water Quality Plan). Separate this information out to allow producers to supplement existing water quality plan. Kindly be sure that if information is required in an NOI that it is not also required in the water quality plan or required again in the Nutrient Management Plan worksheet.
Nutrient Management Plan	
10 F	Plant tissue composite will be less than 10 grab samples for smaller fields. Please identify the number of grab samples needed depends on field size and larger fields should include 10 grab samples to combine for the composite sample. Note: this is for forage preserved by ensiling. Dry hays have a different sampling protocol. Sampling pastures is particularly challenging. A more precise method may be to use one of a few different mass balance approaches. Results can be more precise and cost effective than intensive sampling to describe highly variable conditions.
Nutrient Management Plan worksheet	
	General comments. Parts of this worksheet is repetitive. The questions were asked and would have been answered in the Water Quality Plan, Riparian Area Management Plan or the Annual Report. Please separate out the worksheet for an existing facility from a new or expanding facility from. Page 1 1. Indicates there is no need to duplicate information already in a Water Quality Plan on record at the Regional Water Board. Having a separate worksheet will reduce redundancy.  It is important to realize nutrient management on grazing pasture is accomplished differently than nutrient management for mechanically harvested forages or other crops. It is desirable for the Nutrient Management Plan to allow for different methods to calculate likely nutrient application and uptake by pasture without mandating annual dry matter determination (via clippings) and analysis of plant tissue.
4 e	Reference to "as described in Section A" is unclear. This area appears to be pasted from a previous document. Section A is not in the worksheet as a reference.

Please don't hesitate to contact us should you need additional information.

Sincerely,

Deanne Meyer, Ph.D. Livestock Waste Management Specialist, UC Davis

David Lewis, Watershed Management Advisor, County Director

Randi Black, Dairy Advisor Sonoma, Marin and Mendocino Counties

Jeff Stackhouse, Livestock and Natural Resources Advisor, Humboldt-Del Norte Counties



June 14, 2019

Cherie Blatt  
California Regional Water Quality Control Board  
North Coast Region  
5550 Skylane Blvd., Ste. A  
Santa Rosa, CA 95403

Dear Ms. Blatt,

Western United Dairymen (WUD) appreciates the opportunity to provide comments on the draft General Waste Discharge Requirement (GWDR) for Dairies in the North Coast Region in light of the changes that were made recently.

We would like to thank staff for consideration of our previous comments, dated December 21, 2018. Several improvements to the GWDR were made as a result of those comments. Our comments below focus on changes made to the order since submission of our previous comments in late 2018.

1. **Groundwater quality:** While the proposed schedule for monitoring was adjusted to provide the necessary information, while allowing dairies that do not have issues a reduced monitoring schedule, the trigger for increased sampling was not changed. Our specific comment on this issue was not addressed in the response to comments.
2. **Surface Water monitoring:** We are concerned with the requirement for sampling of bacteria in surface water due to the cost to dairies and logistics of sampling for that requirement in relation to the potential useful information that may be gathered. Bacteria are ubiquitous in the environment from a variety of sources. This sampling could result in information that provides no actionable measures for dairies to implement yet results in increased costs and a logistical nightmare. We request that routine bacterial sampling be removed from the GWDR. If it must be included then we suggest that it be focused in areas where there is a documented issue with bacteria (ie: watersheds with an identified TMDL) and that the frequency be minimized to provide just the information required. In addition, we request that the GWDR clearly state that it is the intent of the board to allow the Executive Officer to reduce sampling upon request if the information submitted is not useful to direct specific management changes on the dairy.
3. **Nutrient Management Plans:** NMPs should not be submitted to the Regional Board on a routine basis. The NMP guides manure applications, but it is not a report of what happens on a dairy annually based on weather conditions, soil health and crop yields. The NMP should be a living document that evolves overtime and would not be meaningful once submitted. Regional Board staff should be able to review the current NMP during inspections on the farm. Narrative information submitted to the regional board via the Nutrient Management Planning Document (Attachment D, Appendix 2) should be sufficient to determine compliance.

In closing, we would like to reiterate our appreciation for your staff, their hard work, and the many hours and long discussions with stakeholders on how to continue to make this program successful. Our members are committed to continuing a strong, positive relationship with the North Coast Water Board with the interest of improving both water quality and the success of dairies in our region. Please do not hesitate to reach out to our local field Representative, Melissa Lema at ([mlema@westernuniteddairymen.com](mailto:mlema@westernuniteddairymen.com)) or myself should you feel the need.

Sincerely,

A handwritten signature in blue ink that reads "Paul Sousa". The signature is fluid and cursive, with the first name "Paul" and the last name "Sousa" clearly distinguishable.

Paul Sousa,  
Director of Environmental and Regulatory Affairs  
Western United Dairymen  
(209)527-6453  
[psousa@westernuniteddairymen.com](mailto:psousa@westernuniteddairymen.com)

**From:** [Bob Legge](#)  
**To:** [NorthCoast](#)  
**Cc:** [Blatt, Cherie@Waterboards](#); [Warmerdam, Jonathan@Waterboards](#); [Burke, James@Waterboards](#)  
**Subject:** Comment Letter RE: "Substantive Changes to the Draft General Waste Discharge Requirements Order No. R1-2019-0001 for Dairies in the North Coast Region since November 1, 2018"  
**Date:** Friday, June 14, 2019 3:45:32 PM  
**Attachments:** [R8-2018-0001\\_General\\_WDR\\_CAFO.pdf](#)  
[Pathogen TMDL\\_Staff Report\\_Action Plan\\_blackline.pdf](#)  
[RRK\\_SUBSTANTIAL\\_CHANGES\\_DAIRY\\_GWDR\\_COMMENTS.pdf](#)

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The following (4) attachments are being submitted on behalf of Russian Riverkeeper

R8-2018-001\_General\_WDR\_CAFO.pdf  
Pathogen TMDL\_Staff Report\_Action Plan  
RRK\_SUBSTANTIAL\_CHANGES\_DAIRY\_GWDR\_COMMENTS  
Laguna Dairy sample points over parcel map

Thank you all for your consideration regarding our comments,

Best regards,  
Bob Legge  
RRK Policy Director  
[bob@russianriverkeeper.org](mailto:bob@russianriverkeeper.org)  
(707)-433-1958



June 14, 2019

Mrs. Cherie Blatt, Southern Nonpoint Source and Forestry  
North Coast Regional Water Quality Control Board  
5550 Skylane Boulevard, Suite A,  
Santa Rosa, CA 95403

**RE: Comment Letter- Substantive Changes to Draft General Waste Discharge Requirements Order No. R1-2019-0001 for Dairies in the North Coast Region Since November 1, 2018**

Dear Cherie,

Russian Riverkeeper ("RRK") is one of twelve Waterkeeper organizations within the California Coastkeeper Alliance ("CCKA") network. RRK works tirelessly to protect and enhance the 1484 square mile Russian River Watershed for the benefit of its inhabitants, its visitors and our ecosystems. On behalf of RRK, we appreciate the opportunity to provide comments on the "**Substantive Changes to the Draft General Waste Discharge Requirements Order No. R1-2019-0001 for Dairies in the North Coast Region since November 1, 2018**"

Over one million Californians do not have access to clean drinking water, mostly due to pollution from farms and specifically dairies that discharge nitrates and other pollutants. The Laguna de Santa Rosa, where all Russian River watershed dairies are located, is impaired for nitrate, phosphorous, bacteria and several other pollutants, thus depriving the public of their right to enjoy the beneficial uses of the Laguna. Furthermore, pollution from the Laguna is exported to the lower Russian River where beach closures from toxic algal outbreaks and detections of indicator bacteria create significant economic damage to the river economy. This pollution has the potential to harm human health and cause economic damage. Waterboards in other regions of California, such as the Santa Ana Region 8, understand that all Dairies discharge or have a high potential to discharge pollution to water of the US. In Region 8, Order R8-2019-0001, they assert in the Findings section that Dairies are major sources of pollutants that harm beneficial uses. Based on this fact alone, the Region 8 Dairy order states that any Dairy over 20 cows is a Concentrated Animal Feeding Operation (CAFO) and is subject to an NPDES permit. We have not seen any data presented by the North Coast Waterboard that effectively documents that North Coast



Dairies do not discharge or have the potential to discharge pollutant's to Waters of the US such as to the Laguna de Santa Rosa. We do not believe the current draft Dairy Order or revisions meet legal mandates and for this reason Russian Riverkeeper does not support the adoption of this Order without substantial revisions.

The remainder of this comment letter is organized in to two sections. Section One contains our greatest concerns. These concerns address and seek remedy to the Substantive Changes made to **(1) MRP-Appendix D (Monitoring and Reporting Plan) (2) GWDR Finding 31 page 8 and Findings 42-46 pages 11-12 (Basin Plan Water Quality Objectives, Nonpoint Source Policy and Anti-degradation) (3) GWDR Findings 47-48 pages 12-13 (Demonstrate compliance/evaluate effectiveness of management measures) (4) NMP submittal and Worksheet (GWDR Condition J.3. page 29)**. In Section Two we offer more generalized comments and seek clarification/offer recommendations with regards to other Substantive Changes. We strongly believe that if our comments, concerns and recommendations are addressed and incorporated the Dairy Program will be more protective of Beneficial Uses and will get us closer to meeting Water Quality Objectives within the North Coast Region.

## SECTION ONE

The comments below focus on the following Substantive Changes

- (1) MRP-Appendix D (Monitoring and Reporting Plan)**
- (2) GWDR Finding 31 page 8 and Findings 42-46 pages 11-12 (Basin Plan Water Quality Objectives, Nonpoint Source Policy and Anti-degradation) and**
- (3) GWDR Findings 47-48 pages 12-13 (Demonstrate compliance/evaluate effectiveness of management measures)**

Our comments on the above Substantive Changes to the Draft General Waste Discharge Requirements Order focuses on the Dairies in the Laguna de Santa Rosa sub-watershed of the Russian River where all but one of the Russian River dairies are located. Since 2002 we have collected water quality samples for laboratory analysis and consistently found exceedances of water quality standards. It should be noted that in the Russian River, our organization has directly collected and analyzed more water quality samples than the North Coast





Waterboard staff from the edge of dairy properties in the Russian River that accurately depict water quality resulting from dairy operations. It's is stunning to us that the Waterboard staff conclude based on a deficient MRP that Dairy facilities enrolled in the current permit are not discharging pollution and likely subject to NPDES permitting. All our data points to Dairies in the Russian River being a major source of water pollution. In order to adequately regulate a pollution source of industry the Waterboard should first arm itself with information on baseline conditions from water quality sampling and analysis. When we review Waterboard files there is a dearth of water quality data or studies conducted by Waterboard staff or contractors like we see in other regions that accurately assesses water quality impacts. This leads to flawed regulatory permits and requirements due to the absence to data that isolates Dairy facilities from all other land uses in order to depict real world conditions during periods of rain when pollution is mobilized and delivered to Waters of the US. We assert that the draft GWDR Monitoring and Reporting Program (MRP), GWDR Finding 31, Findings 42-46, and Findings 47-48 does not meet legal requirements to accurately evaluate whether Dairy facilities are in compliance with the Order, are not violating Water Quality Standards or benchmarks for the following reasons:

- 1. Draft MRP does not require monitoring when pollution is being discharged during rain events**
- 2. Draft MRP doesn't require water quality samples to be collected at the edge of Dairy property to accurately assess management practices as required by CA Non-Point Source Policy**
- 3. Draft MRP doesn't require sampling for all impairing pollutants that might be discharged to impaired waterways**
- 4. The final MRP will be adopted AFTER the close of public comments and only be approved by the North Coast Executive Officer with only limited public involvement and no opportunity to revisit the MRP or reopen the GWDR once the MRP is approved.**

**1. The Draft MRP does not require monitoring when pollution is being discharged during rain events.**

According to USEPA and the State Waterboards websites stormwater pollution is when rain picks up or mobilizes pollutants and delivers them to our creeks and rivers. When it rains on a dairy once the ground is saturated after the first few rains, runoff is produced that has the potential to convey pollutants to Waters of the U.S. That runoff is most energetic in the "rising limb" of a streams



hydrograph that documents a streams rise and fall after a rain event. The past MRP in the previous Dairy Order (2012) allowed water quality sampling for pollution to occur up to one day after rain ended thus capturing samples after pollution delivery had ceased. This time lag allowed pollution flows to cease by the time the sampler arrived to collect samples. The new draft MRP now allows sample collection up to 18 hours after rain starts and this still leaves open the possibility that samplers will collect samples at some sites well after pollution concentrations drop in the falling limb of hydrograph as the pulse of runoff is ending. The reality is pollution moves with pulses of rain and does not wait for a sampler to arrive up to 18 hours after the rain starts. Russian Riverkeeper has managed dozens of water quality surveys including the largest study of pesticide runoff in the North Coast region and sampled "first Flush" stormwater runoff in both urban and rural areas for over 8 years. We have years of experience sampling water quality during and after rain events and what we learned is "when the rain stops the pollution drops". The allowance for sampling well after rain and runoff may have ended is almost designed to avoid detecting pollution but the mandate is to sample stormwater runoff when pollution occurs so the current MRP allows sampling when the potential for detection is low thus providing an inaccurate picture of pollution runoff from Dairy properties. We have heard from Dairy representatives that safety concerns over roadways, night sampling, steep and muddy terrain prevents them from collecting samples in rain events. For seven years we managed the Russian River First Flush program we had between 24 and 120 trained volunteers collecting samples often in the middle of the night during rain events and not one volunteer was injured or harmed. Every construction site in our watershed must sample during rain events and we talk to the people bringing in samples to the labs we use and they all take a break from their work and gear up and do what is required with no issues. The group monitoring program's safety concerns can and should be addressed with safety gear, adequate clothing and footwear and basic training on wet weather sampling. The self-imposed obstacles can be avoided with a bit more effort based on our experience over the last 20 years and due to the gravity of the impairments to the Laguna these are obstacles that must be addressed so we can accurately assess whether Dairy facilities are complying with water quality standards and benchmarks and ensuring that management practices on each Dairy result in GWDR the attainment of water quality standards.



## **2. Draft MRP doesn't require water quality samples to be collected at the edge of Dairy property to accurately assess management practices as required by CA Non-Point Source Policy**

It is very clear that the states Non-Point Source Policy (NPS Policy) requires water quality monitoring that is sufficient to assess whether management practices at a Dairy property are effective at avoiding or reducing pollution to Waters of the State and U.S. This requires that the MRP be designed to collect undiluted samples of runoff from dairy facilities that accurately portray the efficacy of management practices to control pollution. In order to accomplish this MRP required water quality samples must be collected at the edge of a Dairy property. In the current Dairy Order almost all sampling locations are distant from actual dairy properties thus the water samples collected represent many properties in addition to Dairy properties. This fails to accurately assess whether they are meeting water quality objectives or standards and therefore fails to meet the requirements of the state NPS Policy. To illustrate we mapped the sampling locations in the Laguna de Santa Rosa for one Dairy property to illustrate the thousands of individual parcels that contribute runoff to the sample points. As you can see on the map attached to our comments, the Dairy runoff is mixing with thousands of large and small parcels so how can the downstream sample points yield data that can accurately assess management practices on one property out of thousands? For this reason the MRP doesn't remotely meet the mandate to evaluate management practices to determine if Dairies are discharging pollutants nor the concentrations of those pollutants so they can be compared to water quality standards.

The Dairy representative for the group Monitoring Program for the Marin Sonoma Dairies stated that they can only collect samples from publically accessible locations and cannot sample at the edge of dairy properties. This is a self-imposed constraint that makes any data collected useless to evaluate effectiveness of management practices to control pollution. If the staff of the group monitoring program is working for the Dairies then we do not understand why they cannot sample at the edge of the dairy properties. In our sample collection on January 16, 2019 we had no trouble finding locations to sample at the edge of dairies.

## **3. The Draft MRP doesn't require sampling for all impairing pollutants that might be discharged to impaired waterways**



The failure to include Phosphorous in the Monitoring and Reporting Plan (MRP) fails to assess all impairing pollutants that might be discharged into an impaired waterway thus fails to ensure protection of downstream beneficial uses and is therefore illegal. Russian Riverkeeper also collected stormwater runoff samples on January 16, 2019 at the edge of six dairy properties in the Laguna de Santa Rosa (Laguna) sub-watershed in the Russian River watershed that will be subject to this Order and currently enrolled in the existing Dairy Order. The results from the January 2019 samples for Total Phosphorous document discharges of Phosphorous from Dairy operations subject to this Order into Laguna de Santa Rosa tributaries. The results ranged from 2.3 mg/L to 17.0mg/L of Total Phosphorous, which is between 23 and 1700 times the USEPA established 0.10mg/L concentration they used to determine the Laguna Phosphorous impairment in 2006.

As discussed in the Fact Sheets for the 2014 Integrated Report (Clean Water Act Section 303(d) and 305(b)) present decision ID 45751 ([https://www.waterboards.ca.gov/water\\_issues/programs/tmdl/2014\\_16state\\_ir\\_reports/03302.shtml#45751](https://www.waterboards.ca.gov/water_issues/programs/tmdl/2014_16state_ir_reports/03302.shtml#45751)) states that:

*(1) While no numeric water quality objective is available for phosphorus, USEPA provided guidelines that were used to assess the magnitude of the observed phosphorus concentrations. (2) Assessment of phosphorus measurements show that many measurements are an order of magnitude higher than the USEPA-provided thresholds. (3) The Laguna is infested with exotic aquatic vegetation (Ludwigia) that thrives in oxygen poor, nutrient rich waters. This plant prevents effective mosquito control efforts. (4) The nutrient driving biostimulatory conditions in the mainstem Laguna de Santa Rosa and mainstem Mark West Creek below the confluence with the Laguna de Santa Rosa is phosphorus (Fitzgerald 2013). Preliminary TMDL linkage analysis and modeling results by Butkus (2012b) provide evidence that total phosphorus concentrations drive algal biomass, and Regional Water Board staff conclude that reductions in total phosphorus are needed to reduce algal biomass and thus reduce the biostimulatory response. (5) The data used satisfies the data quality requirements of Section 6.1.4 of the Policy. (6) The data used satisfies the data quantity requirements of Section 6.1.5 of the Policy.*

This demonstrates that discharges of an impairing pollutant are being discharged from Dairies in the Laguna watershed in excess of standards used by the USEPA



to establish that Beneficial Uses in the Laguna are not supported due to this impairment. We point to the Region 8 Dairy Order as that requires Dairies to sample for Phosphorous, if cows in the Santa Ana Region produce phosphorous in their manure why wouldn't cows in Sonoma County or anywhere on the North Coast? The draft Dairy Order's Fact Sheet and Findings have no data to assert there's a difference between cows in Santa Ana region and the North coast region.

Russian Riverkeeper has also sampled a dairy facility subject to this Order for over 3 years from 2002 to 2005 and found consistent exceedances of Basin Plan narrative criteria for Biostimulatory substances such as Phosphate. We are unaware of any substantial improvements to that facility so assume that is still the reality since compliance samples are taken well downstream providing an inaccurate evaluation of effectiveness of water quality management practices. We have shared all our Phosphorus sampling results with the Regional Waterboard staff and Dairy representatives. When we raised the issue of including Phosphorous in the MRP in a May 31, 2019 workshop with the North Coast Waterboard, we were told by Waterboard staff that "no water quality standards for phosphorous have been promulgated for the North Coast Basin Plan so we won't require monitoring".

While it might be true that no numeric water quality standard has been adopted in the Basin Plan, USEPA did indeed establish a numeric endpoint to determine that the Laguna de Santa Rosa was impaired using the science based numeric standard for biostimulation is 0.10 mg/L of Total Phosphorous (2006 Final 303(d) list for CA). Further the Waterboard in Order No. R1-2005-0045 NPDES No. CA0022764 for the City of Santa Rosa provided a rationale for establishing a numeric water quality standard for that pollution source of 0.00mg/L of Phosphorous. That limit 0.00mg/L is a zero net limit showing how stringent permits should be if we want to recover beneficial uses in the Laguna and how critical the need to address Phosphorous. Now in the Dairy Order they have changed their position with no justification and the past Dairy MRP required sampling results do not provide any meaningful data to support not including Phosphorous. The Waterboard has provided no data that supports their conclusion not to include Phosphorous in the Dairy Order which is in direct conflict with Order R1-2005-0045 nor has the Waterboard demonstrated with evidence that the Laguna de Santa Rosa no longer has a phosphorous impairment. It is stunning to us that Waterboard staff list Dairy/Livestock as a



source of Phosphorous but yet do not require them to monitor for it. The omission of Phosphorous from the MRP fails to meet legal requirements in the NPS Policy or Porter Cologne or Federal Clean Water Acts.

**4. The final MRP will be adopted AFTER the close of public comments and only be approved by the North Coast Executive Officer with little public involvement.**

Given the profound shortcomings outlined in the current Dairy Order MRP and the failure to address many of our previous comments on the draft Dairy Order MRP we are concerned that the new MRP even though it will be released for public comment may not include edge of field monitoring nor will it have the ability to be reopened once approved by the EO. Our biggest concerns are related to sampling locations to ensure we accurately evaluate management practices along with sample collection timing. That information will not be known until well after permit adoption and currently there is only a limited process for public review. We do not have confidence that the final approved MRP will address our concerns nor provide adequate data to accurately assess whether dairies are discharging pollutants and the exact concentrations. Unless the MRP is subject to reopening and external peer review we will be forced to challenge the draft Dairy Order if adopted, since we have only a limited recourse in that the EO will accept comments on the proposed Group Monitoring Plan but he does not have to incorporate or respond to any public comments regarding the future Group MRP and there will be no recourse no recourse to address deficiencies once the EO approves the Group MRP.

**Additional MRP Comments**

**Public Notification of Spills or Failures to Protect Public Health  
(Noncompliance Reporting)**

Currently, RRK is unclear that the public would be informed of Order violations that might threaten public health. A good example of that fact and the grave problems it could create was during two flood events in Dec 2014 and February 2019. A manure pond at a Dairy south of Sebastopol was inundated when the Laguna flooded. First, this was a major violation that we only became aware of recently so the public is not being informed and this could have threatened public health as many people- such as our staff out collecting samples in kayaks during these events and could have been exposed to raw liquid manure. If the





only means of informing the public is if someone requested a copy of the Dairy Annual Report, which the public is unaware of and is not easily accessible except via ??? SMARTS? that is difficult at best for a member of the public to access information. This information of course would be available so far after the fact – up to 18 months after a manure pond failure-it fails to alert or warn the public to the threat to their health. When we were kayaking on the Laguna immediately after the February 28, 2019 flood, we had no idea there was a manure pond failure and that is not acceptable for protecting public health.

**(2) GWDR Finding 31 page 8 and Findings 42-46 pages 11-12 (Basin Plan Water Quality Objectives, Nonpoint Source Policy and Anti-degradation**

**Finding 31 These plans and reports provide a feedback mechanism to the Regional Water Board on the effectiveness of the management practices and set clear milestones for meeting objectives**

R1 staff must require that Certified Nutrient Management Plans or their equivalent be submitted to the North Coast Board and that these be made available to the public for review. RRK believes that CNMPs and any updates to these CNMPs would provide the foundation for an adequate feedback mechanism to R1 staff and aid in their attempt to assess effectiveness of management practices as it relates to the application of nutrients. The public should not be banned from having access to them. We implore you to follow the NPDES Permit requirements adopted by the Region 8 Water Board. Keep the current Change Order as written and require Dairies covered under the permit to submit CNMP's or equivalent certified documents.

Other plans and reports as currently written do not provide an adequate feedback mechanism for Board Staff to assess compliance nor do they provide enough information as to the **"effectiveness of the management practices"** nor **"set clear milestones for meeting objectives"** as staff claims.

A prime example of this is the current MRP and future Group Monitoring Plan. These were discussed in detail above.

**Finding 43 The Regional Water Board has conducted a general assessment of the existing water quality data that is reasonably available--the discharges permitted under this Order MAY impact some water bodies.** RRK believes that



you have omitted certain monitoring data sets available to you. We reviewed monitoring data collected as part of the Pathogen TMDL guidance that involved PhyloChip analysis and Bacteroides analysis. The data compiled pointed unequivocally to the marker for bovine manure. This should be a red flag that discharges from dairies are occurring and that this could also do not have enough Dairy surface water information available to you. You are relying upon only two sampling sets. The first set was completed where the sampling points were unknown (blind/secretive) and the other where only limited data was collected from surface water above and below the dairies. Not only was this second data set collected on publicly accessible right of ways which revealed nothing about whether management practices on the dairies were effectively protecting Beneficial Uses or contributing to WQ impairments but the samples may have reflected dozens of other land uses that were occurring throughout the drainage area above and at the location of the sampling points.

Our review of the data that the Regional Board Staff has collected as it relates to Phylochip Analysis, Bacteroides Analysis, and Phosphorus Data (as collected as part of the Santa Rosa and Windsor WWTP NPDES Permits) all point to a firm belief that **the discharges permitted under this Order WILL impact some water bodies.** See the discussion above on the MRP

**Here then is a brief discussion on NPS and antidegradation to inform our comments on the Substantive Changes to Findings 44 and 45 below**

**Resolution 68-16 establishes a two-step process to comply with the policy. In the first step, an antidegradation analysis should demonstrate: (1) beneficial uses would continue to be protected; (2) the established water quality objectives would be met; and (3) any lowering of water quality would be consistent with maximum benefit to the people of California.**

**In the second step, any discharges to high quality waters must implement best practicable treatment or control to assure that a pollution or nuisance will not occur and to assure the highest water quality consistent with maximum benefit to the people of California. Best practicable treatment or control means levels that can be achieved using best efforts and reasonable control methods.**





**Finding 44 The Board finds that coupled with the environmental and water quality benefits that will result from implementation of the conditions in the Order,**

RRK believes that environmental and water quality benefits WILL NOT result from implementation of the conditions in the Order as it is currently written. The current MRP and future Group MRP must be reflective of impairments in our waterways (CyanoHABS, Nutrient impairments) in order to better understand conditions and the effects of management practices on the dairies covered under this permit.

**maintaining the North Coast dairy industry is consistent with the maximum benefit of the people of the state to prevent a loss of jobs and adverse impacts to local communities.**

RRK wants nothing more than to see the dairy industry prosper. There are many exceptional dairies whose owners are excellent stewards of our lands. Where we are concerned is that we feel the regulations as currently written do not go far enough in determining to what extent the dairies are protective of WQO or downstream BU's. R1 Board staff has failed to provide enough information as to how BU's will be protected under this permit. Neither has it demonstrated how the established WQO will be met.

**Finding 45 The implementation of the measures outlined in the Order will limit any degradation and will not result in water quality less than that prescribed in the North Coast Water Board Basin Plan. Implementation of the measures outlined in the Water Quality Plan, including Nutrient Management Plan measures, Riparian Management Measures, and performance standards required by title 27 design standards will result in the BPTC of discharges.**

As an example, the proposed Order requires the Dischargers to continue to maintain and properly operate existing waste containment structures. In order for the public to effectively ascertain the best practicable treatment or control (BPTC) of the discharge necessary to avoid a pollution or nuisance and to maintain the highest water quality consistent with the maximum benefit to the people of the State (1) the public should have access to nothing less than the CNMP's or an NMP that is certified and contains all the information necessary to evaluate the BPTC (2) We must have an adequate monitoring and reporting



program that samples and runs analyses of constituents of concern in discharges/stormwater runoff migrating off the dairy property. R1 Staff makes the claim that current BPTC will limit degradation. How can the public know with any certainty whether this is actually occurring without access to the CNMP's (or equivalent) and data acquired as the result of an informative, robust Monitoring and Reporting Plan (Please review and incorporate Region 2 and Region 8's requirements for Monitoring Constituents [See attached])

(See our discussion above on our discussion on the MRP)

**Finding 46** b. Any limited degradation of high quality water that results from discharges regulated by this Order will be consistent with the Antidegradation Policy if the terms and conditions of this Order are met.

Staff has failed to substantiate that any limited degradation of high quality water that results from discharges regulated by this Order will be consistent with the Antidegradation Policy if the terms and conditions of this Order are met.

**(2) GWDR Findings 47-48 pages 12-13 (Demonstrate compliance/evaluate effectiveness of management measures)**

**Finding 47** The effectiveness of management measures will be evaluated through required ground and surface water monitoring and reporting, including annual report submission. Management measures and monitoring may be modified as water quality data is assessed and reported, and whenever site evaluations show that measures need to be improved to meet water quality standards.

The effectiveness of management measures will be unable to be evaluated through required surface water monitoring and reporting IF the monitoring personnel are required to monitor up and downstream from the dairy on "publically accessible land" and are able to monitor up to "18 hours after a one inch rain event" where they are employing only two or three sampling personnel especially when you consider the large geographical area they will need to cover. (Region One and Two) With the addition of E. Coli sampling (which has to be at a lab within 6 hours of taking the sample) how is this possibly going to work? See our recommendations in the MRP section below.



**Finding 48** The Order requires groundwater monitoring for nitrogen to ensure that dairies are preventing adverse nitrate impacts to groundwater

Please consider this fact... R1 Staff has verifiable data collected over decades of studies that prove Nitrate Contamination is real and that it is occurring in ground water. As good science dictates, staff is having the dairies test wells on the dairy properties for nitrates. However, we do not have any data that evaluates the Phosphorus levels that are being discharged as a result of management practices on dairies, the degree to which these Phosphorus discharges are contaminating surface waters and/or the extent they are contributing to Nutrient Impairments (i.e CyanoHABs, biostimulatory responses). RRK advances the argument--why isn't there phosphorus monitoring and a robust MRP established to determine the extent of the Nutrient Impairment?

**(4) NMP submittal and Worksheet (GWDR Condition J.3. page 29) The NMP must be submitted to the Regional Water Board by December 31, 2020 or within 30 days of completion. Subsequent revisions to the NMP must be submitted to the Regional Water Board within 30 days of final revision.**

RRK Thanks you for this requirement. This is in line with precedents throughout the State. Please require that all NMPs submitted be Certified and have the same information the CNMPs have.

## **SECTION TWO**

General Comments on Substantive Changes

### **APPENDIX 2**

#### **Nutrient Management Plan**

##### **I. Record-Keeping and NMP Review**

THE FOLLOWING WAS STRUCK FROM THE RECORD

**i. General calculations showing the total nitrogen, phosphorous, and potassium to be applied to each field, including sources other than manure or process wastewater (Nutrient Budget);**

**i. j. Total amount of nitrogen, phosphorus, and potassium actually applied to each field, including documentation of calculations for the total amount applied.**



Please explain your rationale for deleting these requirements. This is critical information needed in order to ascertain whether nutrient applications are being managed correctly. By not requiring this information to be disclosed in the NMP and thus not available to the public we can't possibly make a determination as to whether BU's are being protected or WQO are being met. Please reinstate these requirements and make this information available to the public as they have a right to know this information.

Please see **REGION 8 Order No. R8-2018-0001 NPDES Permit No. CAG018001** (attached) for their requirements as they relate to NMP content and submittals

## **II. Water Quality Requirements**

### **I. Section 22563 (b) Run-Off & Percolation**

**Nutrient application should be done according to the dairy Nutrient Management Plan. Fall or winter manure application is allowed on fully vegetated areas during dry weather when less than two inches of precipitation has fallen within the last 30 days and there is less than 30 percent chance of rain in the next 48 hours. This is provided best management practices are utilized and nutrients do not result in discharges or potential discharges to surface waters or groundwater. The majority of nutrient application is complete on the dairy by what date each year:**

Please explain the rationale behind devising such a requirement? If the goal here is to reduce the potential for facility wastewater to result in runoff from disposal fields and ultimately to reduce the potential for storm water runoff why were these metrics chosen? Please explain what "FULLY VEGETATED" actually means? We have witnessed a lot of storms where the percent chance of rain went from 30% to considerably more AFTER the 48 hour window!!!! . What if we see someone not adhering to this practice? Then what? Or what if someone is applying when there is a 50% chance of rain in the next 48 hours?

### **J. REQUIRED REPORTS AND NOTICES**

#### **3. Nutrient Management Plan (NMP)**

**Appendix 2 contains a questionnaire to be filled out and submitted by dairies to the Regional Water Board by November 30, 2021, to show the dairy meets the NMP requirements.**



This questionnaire in no way, shape or form comes close to the information provided by a CNMP or equivalent certified NMP. It is not necessary. Please have those that are covered under the permit submit their CNMP directly to the R1 staff so that the public may review it. The questionnaire is an exercise in futility. Do not require those dairies covered to submit it.

## **STRIKE OUT/ADDITIONAL LANGUAGE ATTACHMENT D – MRP**

### **Monitoring and Reporting Program**

**No. R1-2019-0001**

**Page 1**

*The required sampling and analyses are minimum parameters necessary to evaluate if dairy operations are **violating the waste discharge prohibition or** contributing to adverse water quality impacts.*

As currently written, the required surface water sampling and analyses will not provide enough information to ascertain whether the dairy operations are **violating the waste discharge prohibition.**

Please Consider the language in the Region 8 Order

**REGION 8 Order No. R8-2018-0001 NPDES Permit No. CAG018001  
Concentrated Animal Feeding Operations Attachment B – Monitoring &  
Reporting Program**

### **II. MONITORING LOCATIONS**

**A representative grab sample of the discharge must be collected for any discharge of wastes from the waste containment structures to surface waters.**

**Each discharge event must be sampled and the samples must be collected within the first hour of discharge or soon thereafter.**

**The samples collected according to Section II above must be analyzed for total dissolved solids (filterable residue), *Escherichia coli*, total nitrogen, total phosphorus and total suspended solids.**

### **IX. OTHER MONITORING REQUIREMENTS**

**A. The Dischargers must collect a representative sample of manure, at least on an annual basis, during a corral cleaning event. The Discharger must have the**



sample analyzed for nitrate (as nitrogen), sodium, chloride, calcium, sulfate, potassium, total phosphorus, and total dissolved solids (filterable residue)...

(The most recent manure nutrient analysis must be provided to the manure haulers)

These Monitoring Locations and Requirements and the resulting sampling and analyses will provide board staff with the minimum parameters necessary to evaluate if dairy operations are **violating the waste discharge prohibition or** contributing to adverse water quality impacts. Please incorporate these type of location and monitoring requirements in the R1 GWDR MRP.

### Page 13

GWDR Order No. R1-2019-0001 -13- Appendix 1 - Water Quality Plan  
**For Facilities Without a Prepared NMP:**

*2. In the interim (from now until the NMP is completed and nutrient management practiced) is manure and process water generated at your facility, applied to cropland and pastures at rates that are agronomically sound for the crop, soil, climate, special local situations, management system, and manure and process water characteristics? Yes ☐ No ☐ **Please explain:***

What should be required here is a whole lot more info than an obscure undefined **please explain**. Staff needs to require that analytically sound data that describes and computes agronomic rates be submitted here.

### CHANGE SHEET

#### **General Waste Discharge Requirements for Dairies (GWDR) Finding 11**

**This Order does not authorize discharges to surface water that would otherwise require a NPDES permit. Dairies that have a discharge requiring a NPDES permit must obtain coverage under NPDES Permit for Concentrated Animal Feeding Operations Within the North Coast Region, Order No. R1-2012-0001, or subsequently adopted NPDES permit.**

All dairies covered under this GWDR will at some point have a discharge. Some will have many. R1 staff should seriously consider moving from a GWDR to a general NPDES permit as Region 8 has done.



In conclusion, Russian Riverkeeper appreciates the opportunity to engage the Regional Board by commenting on the **Substantive Changes to Draft General Waste Discharge Requirements Order No. R1-2019-0001 for Dairies in the North Coast Region Since November 1, 2018** We look forward to receiving your written response to our comments and look forward to discussing this further at the future adoption hearing. Please contact me directly to discuss any questions or comments in response to this letter.

Sincerely,

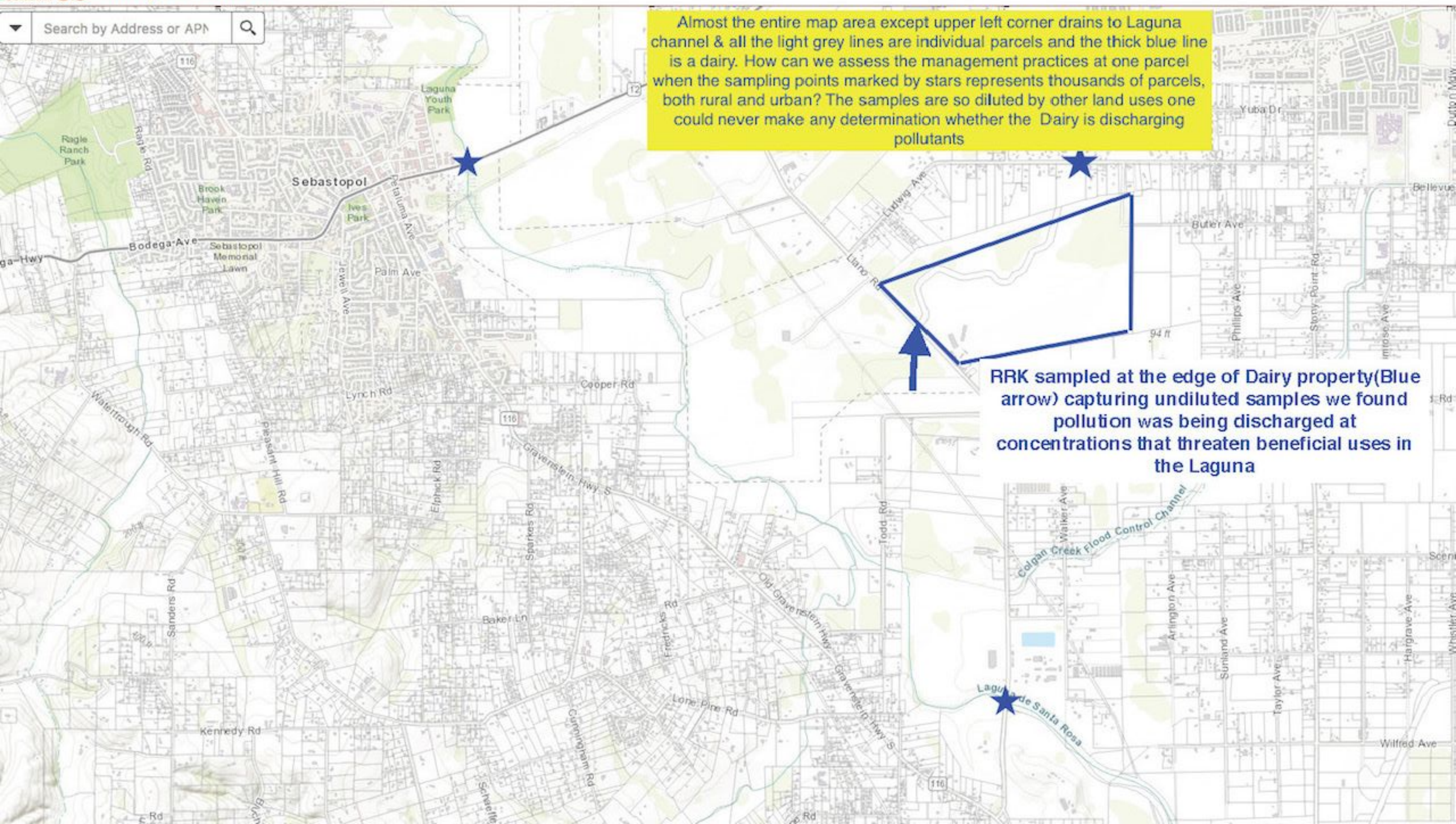
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Search by Address or APN

Almost the entire map area except upper left corner drains to Laguna channel & all the light grey lines are individual parcels and the thick blue line is a dairy. How can we assess the management practices at one parcel when the sampling points marked by stars represents thousands of parcels, both rural and urban? The samples are so diluted by other land uses one could never make any determination whether the Dairy is discharging pollutants



RRK sampled at the edge of Dairy property(Blue arrow) capturing undiluted samples we found pollution was being discharged at concentrations that threaten beneficial uses in the Laguna



**STATE OF CALIFORNIA**  
**California Regional Water Quality Control Board**  
**Santa Ana Region**

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**ORDER NO. R8-2018-0001**  
**NPDES PERMIT NO. CAG018001**

**GENERAL WASTE DISCHARGE REQUIREMENTS FOR CONCENTRATED ANIMAL  
FEEDING OPERATIONS (DAIRIES AND RELATED FACILITIES) WITHIN THE  
SANTA ANA REGION**

Dischargers described below, who have complied with the requirements for coverage under this Order, are authorized to discharge wastes once permit coverage is effective, subject to the waste discharge requirements set forth in this Order:

Dischargers	Persons discharging dairy wastes or other similar kinds of wastes from an existing dairy or related facility to waters of the United States in any manner that may affect water quality are hereinafter referred to as "Dischargers" and may obtain coverage under this Order. Persons discharging wastes from other types of animal feeding operations must obtain coverage under a separate general permit or individual waste discharge requirements. Persons discharging wastes from a proposed or newly-constructed dairy or related facility must obtain coverage under individual waste discharge requirements
-------------	---

This Order was adopted by the Regional Water Quality Control Board on:	December 7, 2018
This Order shall become effective on:	March 17, 2019
This Order shall expire on:	March 15, 2024

IT IS HEREBY ORDERED that this Order shall supersede Order No. R8-2013-0001 except for enforcement purposes, and, in order to meet the provisions contained in Division 7 of the California Water Code (commencing with section 13000) and regulations adopted thereunder, and the provisions of the Federal Clean Water Act and regulations and guidelines adopted thereunder, the Dischargers shall comply with the requirements in this Order.

I, Hope A. Smythe, Executive Officer, do hereby certify that this Order with all attachments is a full, true, and correct copy of an Order adopted by the California Regional Water Quality Control Board, Santa Ana Region, on December 7, 2018.

  
\_\_\_\_\_  
Hope A. Smythe, Executive Officer

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## I. FINDINGS

### A. CONCENTRATED ANIMAL FEEDING OPERATIONS AND NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM PERMIT

1. Section 502 of the Clean Water Act (CWA) defines concentrated animal feeding operations (CAFOs) as point source discharges. All discharges of pollutants from point sources to waters of the U.S. should be regulated under an NPDES permit. 33 U.S.C. §§ 1342, 1362(14). Discharges of wastes from CAFOs within the region are currently regulated under a General NPDES permit, Order No. R8-2013-0001, adopted by the Regional Board on June 7, 2013. Order No. R8-2013-0001 expired on June 6, 2018 but was administratively continued pursuant to Title 23 of the California Code of Regulations section 2235.4 and 40 C.F.R. § 122.6. Order No. R8-2018-0001 renews the expired permit.

### B. DISCHARGE INFORMATION

2. An animal feeding operation (AFO) is considered a CAFO based on either a facility's animal population or if it is determined to be a significant contributor of pollutants to waters of the United States by the appropriate authority, regardless of population. 40 C.F.R. § 122.23(b)(4) and (6). The wastes generated by CAFOs are manure that the animals excrete, process wastewater (primarily wash water from the milk barn) and storm water runoff from manured areas. Approximately 10% of the manure that a milking cow excretes each day is excreted while in the milk barn, and approximately 90% of the manure excreted from the animals is deposited in the corrals<sup>1</sup>. CAFO owners/operators scrape and remove manure from the corrals generally twice per year<sup>2</sup>. The average moisture content of manure when it is removed from the corrals is 33% (all the manure numbers used in this Order refer to manure with 33% moisture content)<sup>3</sup>. In 2017, CAFOs removed approximately 186,000 tons of manure from their corrals in the region. This is equivalent to approximately 431,000 cubic yards of manure.
3. Wastes produced at CAFOs may contain pathogens, biochemical oxygen demand (an indicator of biodegradable materials), ammonia, nitrate, phosphorus, excreted pharmaceuticals and their metabolites, metals and

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<sup>1</sup> Santa Ana Watershed Planning Agency, 1974. *Dairy waste management*. Albert A. Webb Associates, March 1974.

<sup>2</sup> Ibid.

<sup>3</sup> Ibid.

other salt compounds<sup>4, 5, 6, 7</sup>. Unless properly managed, these wastes could adversely impact the quality of receiving waters (both surface and groundwaters). Discharges of waste from CAFOs within the region could adversely impact water quality in the Santa Ana River, the San Jacinto River, and their tributaries. Impaired waterbodies located within these watersheds include Lake Elsinore, Canyon Lake, and Santa Ana River, Reach 3; Mill Creek (Prado Area); and Chino Creek, Reaches 1A, 1B, 2. As such, it is critical to regulate the discharge of wastes from all significant sources of pollutants to these waterbodies. The Santa Ana Regional Water Quality Control Board (Regional Board), as the designated authority, has determined that all AFOs with a herd size of more than 20 dry or milking cows or 50 heifers, calves, or cattle within the Santa Ana Region are a significant contributor of pollutants to waters of the U.S. As such, these facilities must be regulated under waste discharge requirements.

4. There are currently 109 dairy and dairy-related CAFOs within the Santa Ana Region. These CAFOs include dairies, heifer ranches and calf nurseries. As of December 31, 2017, these CAFOs contained approximately 126,000 animals. This population is comprised of 67,000 milking cows, 11,400 dry cows, 31,500 heifers (12 to 18-month-old cows), 13,000 calves (less than 12-month-old cows), and 3,100 other animals (beef cows, horses, bulls, etc.). Eighty-Four (84) of these facilities (with 78,000 animals) are in the Santa Ana River Basin and 25 of these facilities (with 48,000 animals) are in the San Jacinto River Basin.
5. This Order applies to owners and/or operators (hereinafter Dischargers) of any existing CAFOs that discharge pollutants to waters of the U. S. within the Santa Ana Region.

### C. ELIGIBILITY FOR COVERAGE

6. Only those facilities that have coverage under Order No. R8-2013-0001 are eligible for coverage under this Order. New facilities that do not currently

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<sup>4</sup> USEPA, 2013. *Literature review of contaminants in livestock and poultry manure and implications for water quality*. EPA 820-R-13-002, July 2013; USEPA, 2004. *Risk management evaluation for concentrated animal feeding operations*. EPA/600/R-04/042, Office of Research and Development, National Risk Management Research Laboratory, Cincinnati OH, May 2004

<sup>5</sup> Watanabe, N. et al, 2010. *Use and environmental occurrence of antibiotics in freestall dairy farms with manured forage fields*. Environmental Science and Technology. 2010, 44: 6591-6600.

<sup>6</sup> Watanabe, N. et al, 2008. *Environmental occurrence and shallow groundwater detection of the antibiotic monensin from dairy farms*. Journal of Environmental Quality. 2008, 37: S-78 – S-85.

<sup>7</sup> Zheng, W. et al. 2008. *Analysis of steroid hormones in a typical dairy waste disposal system*. Environmental Science and Technology. 2008, 42:2, 530-536.

exist must file a report of waste discharge to be covered under an individual order.

7. Dischargers who have submitted a completed Notice of Intent form (NOI, Attachment C), Engineered Waste Management Plan and a Nutrient Management Plan (where applicable) to discharge wastes under Order No. R8-2013-0001, but have not received an authorization, will be covered under this Order upon receipt of the discharge authorization letter from the Executive Officer. The Engineered Waste Management Plan and the Nutrient Management Plan should be prepared as specified under Sections IV.C. and IV.D. of this Order.
8. The following types of facilities are generally not required to obtain coverage under this Order.
  - a. Dairies where the animal population is less than 20 (dry or milking cows).
  - b. Heifer, calf, or cattle ranches where the herd size is less than 50.

Such facilities are not authorized to discharge wastes which may affect water quality, or cause a nuisance or pollution as defined in Section 13050 of the California Water Code (Water Code). Persons proposing to discharge wastes from a newly constructed dairy or related facility must obtain coverage under individual waste discharge requirements.

#### D. ENROLLMENT REQUIREMENTS

9. To obtain authorization to discharge pollutants under this Order, existing Dischargers must submit a new completed Notice of Intent form within 45 days of the effective date of this Order. The Discharger may declare in the NOI their intent to continue to implement the approved Engineered Waste Management Plan and, if applicable, the approved Nutrient Management Plan for their facilities. If the Discharger does not intend to continue to implement the approved Engineered Waste Management Plan and Nutrient Management Plan, the Discharger must also include new plans with their NOI.
10. If a CAFO changes ownership or if a CAFO is relocated, the Discharger must submit a Notice of Termination form (NOT, Attachment F) for the old facility and a Notice of Intent form (NOI, Attachment C), an Engineered Waste



Management Plan, a Nutrient Management Plan (where applicable), and the first annual fee for the new facility. These documents are collectively referred to as permit registration documents.

11. Satellite corrals may occur at dairies where the milk parlor has been decommissioned but the corrals are still used to keep non-milking animals. These corrals may be on properties that have had Engineered Waste Management Plans (EWMPs) prepared and approved for the property. Unless a Discharger intends to prepare a new EWMP, they are required to implement all EWMPs approved for all properties where their herds are located. All applicable EWMPs must be reported in the Discharger's completed Notice of Intent form.
12. If an EWMP or Nutrient Management Plan has already been prepared and approved for a facility, the Discharger does not need to submit these documents if they expressly intend to implement them as identified in the NOI form or in separate written notice to the Regional Board.
13. All necessary permit registration documents must be submitted to the Regional Board office at the following address:

Santa Ana Regional Board - Dairy Program  
3737 Main Street, Suite 500  
Riverside, CA 92501

14. Information regarding the availability of the NOI, Engineered Waste Management Plan and the Nutrient Management Plan will be posted for a minimum of 30 days for public comments. If conditions are included, a draft discharge authorization letter will also be posted for a minimum of 30-days for public comments. These documents will be made available to interested parties upon request. If no significant comments are received, a final discharge authorization letter will be issued by the Executive Officer of the Regional Board to all facilities that meet the requirements specified in this Order. If there are significant comments that cannot be resolved, the application package will be scheduled for consideration by the Regional Board. If the CAFO does not meet the requirements specified herein, the Executive Officer will notify the facility operator that they are required to submit a report of waste discharge. Individual waste discharge requirements will be developed for consideration by the Regional Board.

## E. TERMINATION OF COVERAGE

15. Where a discharger ceases operating a permitted facility, the Discharger shall submit a written Notice of Termination form (NOT, Attachment F) to the Regional Board office. The Discharger shall indicate in the NOT how potential pollutants will be controlled or the party who will be responsible for controlling discharges from the facility following the termination of operations. If Regional Board staff determines that discharges of pollutants will be controlled, the Executive Officer will approve the NOT in writing and coverage under this Order will be terminated.
16. Where a facility is being closed, the Discharger must completely clean out the facility and ensure that there is no remaining potential for a discharge of pollutants (including, but not limited to, manure, litter and process wastewater) from the facility. The standard procedures may include, but are not limited to, scraping all manure from the corral areas and containment ponds, including any contaminated soil, and filling in the containment pond(s) with clean dirt.
17. Where a facility is being taken over by another eligible discharger or turned over for uses unrelated to dairies, the previous discharger may terminate coverage without cleaning the facility if the new discharger or the landowner takes responsibility for potential pollutants from the facility. This may be indicated by the new discharger submitting a completed NOI form for coverage under this Order, completing a NOI for coverage under the Construction General Permit, with expressed written agreement from the property owner, or some other form acceptable to the Executive Officer.

## F. CHANGE OF OWNERSHIP

18. In the event of any change in control or ownership of land or waste discharge facilities presently owned or controlled by the Discharger, the Discharger must submit a NOT as described above and notify the succeeding owner or operator of the existence of this Order by letter, and a copy of the notice must be immediately forwarded to the Regional Board.

## G. CONVERSION FROM GENERAL PERMIT TO INDIVIDUAL PERMIT

19. The Executive Officer of the Regional Board or the Regional Administrator of the U.S. Environmental Protection Agency (USEPA) may require any person authorized to discharge wastes under this Order to subsequently apply for and obtain individual waste discharge requirements. Cases where individual waste discharge requirements may be required include the following:
  - a. The Discharger is not in compliance with the conditions of this Order or the discharge authorization letter from the Executive Officer;

- b. New effluent limitation guidelines are promulgated for point sources covered by this General NPDES permit;
- c. Changes to the Basin Plan containing requirements applicable to the regulated facilities are approved;
- d. The requirements of 40 C.F.R. 122.28(a) are not met; or
- e. The discharge may adversely affect the water quality objectives of the receiving waters.

#### H. LEGAL AUTHORITY

- 20. This Order is issued pursuant to Section 402 of the CWA and implementing regulations adopted by the USEPA and Chapter 5.5, Division 7 of the California Water Code (Water Code, commencing with section 13370). This Order serves as an NPDES permit for point source discharges from CAFOs. This Order also serves as Waste Discharge Requirements pursuant to Article 4, Chapter 4, Division 7 of the Water Code (commencing with Section 13260). USEPA has promulgated Effluent Limitation Guidelines and Standards for CAFOs that are contained in 40 C.F.R. part 412. Additional guidelines and standards are contained in 40 C.F.R. §§122.23 and 122.42.
- 21. Regulations governing discharges from CAFOs, including dairies, are contained in California Code of Regulations (CCR), title 27, division 2, chapter 7, subchapter 2, article 1<sup>8</sup>.

#### I. LEGAL BASIS AND RATIONALE FOR REQUIREMENTS

- 22. The Fact Sheet (Attachment D) contains the legal basis, background information and rationale for requirements contained in this Order. The Fact Sheet is hereby incorporated into this Order and constitutes part of the Findings for this Order. Attachments A through G are also incorporated into this Order. However, the Executive Officer is authorized to make changes to the attached forms that are necessary to implement this Order, consistent with 40 C.F.R. part 412 and sections 122.23 and 122.42.

#### J. CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA)

- 23. This Order is both an NPDES permit, issued pursuant to federal law, and WDRs, issued pursuant to State law. Under Water Code section 13389, this action to adopt an NPDES permit is exempt from the provisions of CEQA, Public Resources Code sections 21000-21177. Requirements for “new sources” as defined in section 306 of the CWA are not covered by the exemption.

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<sup>8</sup> Available at: <http://www.calrecycle.ca.gov/Laws/Regulations/Title27/>

24. The renewal of WDRs or NPDES permits for existing facilities is exempt from CEQA requirements under CCR, title 14, section 15301. This Order is only applicable to existing facilities that are or have been regulated under Order No. R8-2013-0001.
25. Food and Agricultural Code section 33487 exempts state agencies from any requirement to prepare a CEQA document for CAFOs under the following circumstances: (1) when the dairy will be constructed and operated in accordance with the minimum standards in Chapter 5 of the Food and Agricultural Code; (2) where the applicable local agencies have completed all necessary reviews and approvals including those that are required by CEQA; and (3) where a permit for construction was issued by a local agency on or after the effective date of Food and Agricultural Code section 33487 and construction has begun.

#### K. TECHNOLOGY-BASED EFFLUENT LIMITATIONS (TBELs)

26. CWA section 301(b) and its implementing regulations at 40 C.F.R. § 122.44 require that permits include applicable TBELs and any more stringent effluent limitation necessary to meet applicable water quality standards. As such, all Dischargers under this Order must meet the federal technology-based standards as per 40 C.F.R. Section 412.31 representing the application of Best Practicable Control Technology (BPT). 40 C.F.R. part 412, Subpart C – Dairy Cows and Cattle Other Than Veal Calves, contains effluent limitation guidelines for CAFOs. These requirements are incorporated into this Order in Section II.B.1.

#### L. WATER QUALITY-BASED EFFLUENT LIMITATIONS (WQBELs) AND TOTAL MAXIMUM DAILY LOADS (TMDLs)

27. CWA section 301(b) and 40 C.F.R. § 122.44(d) require that permits include WQBELs to attain and maintain applicable numeric and narrative water quality criteria to protect the beneficial uses of the receiving waters. Where numeric water quality criteria have not been established, 40 C.F.R. § 122.44(d) specifies that WQBELs may be established using USEPA criteria guidance under CWA section 304(a), proposed State criteria, a State policy that interprets narrative criteria supplemented with other relevant information, or an indicator parameter. 40 C.F.R. §§ 122.44(k)(3) and (4) allows the use of BMPs to control or abate the discharge of pollutants when numeric effluent limitations are infeasible or when practices are reasonably necessary to achieve effluent limitations and standards or to carry out the purposes and intent of the CWA. As supported in detail in the Fact Sheet (Attachment D), the Regional Board has determined that it is infeasible to include numeric WQBELs in this Order. Therefore, this Order requires CAFOs to implement

best management practices, such as developing and implementing Engineered Waste Management Plans and Nutrient Management Plans and performing focused monitoring.

28. Federal regulations [40CFR § 122.44(d)(1)(vii)(B)] require inclusion of effluent limits that are “consistent with the assumptions and requirements of any available waste load allocation for the discharge prepared by the State and approved by EPA.” Currently, there are two total maximum daily loads (TMDLs) that have waste load allocations for the CAFOs in the region. These TMDLs are (1) the Middle Santa Ana River Bacterial Indicator TMDLs and (2) Canyon Lake/Lake Elsinore Nutrient TMDLs. This Order includes requirements in Section IV necessary to achieve the waste load allocations by the deadlines specified in the approved TMDLs.

#### M. WATER QUALITY CONTROL PLANS

29. The Regional Board adopted a revised Water Quality Control Plan for the Santa Ana Region (Basin Plan) that became effective on January 24, 1995. The Basin Plan designates beneficial uses, establishes water quality objectives, and contains implementation programs and policies to achieve those objectives for all waters in the Santa Ana Region. Since 1995, the Basin Plan has been amended a number of times.
30. The existing and potential beneficial uses of the various surface waters that could be impacted by the discharge of wastes from dairy and/or dairy related facilities in the Santa Ana Region include one or more of the following:
  1. Municipal and Domestic Supply,
  2. Agricultural Supply,
  3. Industrial Service Supply,
  4. Groundwater Recharge,
  5. Water Contact Recreation,
  6. Non-contact Water Recreation,
  7. Warm Freshwater Habitat,
  8. Limited Warm Freshwater Habitat,
  9. Wildlife Habitat,
  10. Rare, Threatened or Endangered Species, and
  11. Spawning, Reproduction, and Development.
31. The existing and potential beneficial uses of groundwaters that could be impacted by the discharge of dairy wastes within the Santa Ana Region include one or more of the following:
  1. Municipal and Domestic Supply,

2. Agricultural Supply,
3. Industrial Service Supply, and
4. Industrial Process Supply

N. NATIONAL TOXICS RULE (NTR) AND CALIFORNIA TOXICS RULE (CTR) [Not Applicable]

O. STATE IMPLEMENTATION POLICY [Not Applicable]

P. COMPLIANCE SCHEDULES AND INTERIM REQUIREMENTS

32. The Basin Plan contains schedules for achieving compliance with waste load allocations for bacterial indicator (Middle Santa Ana River) and nutrients (Lake Elsinore and Canyon Lake watershed). This Order requires CAFOs within those watersheds to develop and implement control measures to comply with the waste load allocations as per the time schedules specified in the approved TMDLs.
33. The Basin Plan specifies that when the Regional Board determines that it is infeasible to achieve compliance with an effluent limitation specified to implement a new water quality objective, the Regional Board may establish a schedule for compliance in waste discharge requirements. The State Board adopted Resolution No. 2008-0025, Policy for Compliance Schedules in National Pollutant Discharge Elimination System Permits. Schedules specified in this Order are consistent with the Policy.

Q. ANTI-DEGRADATION POLICY

34. Federal regulations at 40 C.F.R. § 131.12 require that State water quality standards include an anti-degradation policy consistent with the federal policy. The State Water Board established California's Anti-degradation policy in State Water Board Resolution 68-16, which incorporates the requirements of the federal Anti-degradation policy. Resolution 68-16 requires that existing quality of waters be maintained unless degradation is justified based on specific findings. As discussed in the Fact Sheet (Attachment D), the permitted discharge is consistent with the anti-degradation provision of 40 C.F.R. § 131.12 and State Water Board Resolution 68-16.

R. ANTI-BACKSLIDING REQUIREMENTS

35. Sections 402(o)(2) and 303(d)(4) of the CWA and federal regulations at 40 C.F.R. § 122.44(l) prohibit backsliding in NPDES permits. These provisions

require effluent limitations in a reissued permit to be as stringent as those in the previous permit, with some exceptions where limitations may be relaxed. All effluent limitations in this Order are at least as stringent as the effluent limitations in the previous Order.

#### **S. PROVISIONS IMPLEMENTING STATE LAW**

36. Provision II.D.2. implements state law only. Since this provision is not required or authorized under the CWA, violations of this provision are not subject to the enforcement remedies that are available for NPDES permit violations. State Water Code provides other enforcement remedies.

#### **T. MONITORING AND REPORTING**

37. Section 122.48 of 40 C.F.R. requires that all NPDES permits specify requirements for recording and reporting monitoring results. Sections 13267 and 13383 of the Water Code authorize the Regional Board to require technical and monitoring reports. The Monitoring and Reporting Program establishes monitoring and reporting requirements to implement these Federal and State requirements. The Monitoring and Reporting Program is provided in Attachment B.

#### **U. STANDARD AND SPECIAL PROVISIONS**

38. Standard Provisions, which, in accordance with 40 C.F.R. §§ 122.41 and 122.42, apply to all NPDES discharges and must be included in every NPDES permit, are provided in Attachment A. The Regional Board has also included in this Order special provisions applicable to the Dischargers. The rationale for the special provisions contained in this Order is provided in the Fact Sheet (Attachment D).

#### **V. NOTIFICATION OF INTERESTED PARTIES**

39. The Regional Board has notified the Dischargers and interested agencies and persons of its intent to prescribe Waste Discharge Requirements for the discharge and has provided them with an opportunity to submit their written comments and recommendations. Details of notification are provided in the Fact Sheet (Attachment D) of this Order.

#### **W. CONSIDERATION OF PUBLIC COMMENT**

40. The Regional Board, in a public meeting, heard and considered all comments pertaining to the discharge. Details of the Public Hearing are provided in the Fact Sheet (Attachment D).



## **X. ALASKA RULE**

41. On March 30, 2000, USEPA revised its regulation that specifies when new and revised State and Tribal water quality standards (WQS) become effective for CWA purposes (40 C.F.R. § 131.21, 65 FR 24641, April 27, 2000). Under the revised regulation (also known as the Alaska rule), new and revised standards submitted to USEPA after May 30, 2000, must be approved by USEPA before being used for CWA purposes. The final rule also provides that standards already in effect and submitted to USEPA by May 30, 2000, may be used for CWA purposes, whether or not approved by USEPA.

## **Y. STRINGENCY OF REQUIREMENTS FOR INDIVIDUAL POLLUTANTS**

42. This Order includes both technology and water quality-based effluent limitations. The technology-based effluent limitations are based on the USEPA's effluent limitation guidelines for this industrial category. Water quality-based effluent limitations are scientifically derived to implement the water quality objectives specified in the Basin Plan.

IT IS HEREBY ORDERED that the Discharger, in order to meet the provisions contained in Division 7 of the California Water Code and regulations adopted thereunder, and the provisions of the Clean Water Act, as amended, and regulations and guidelines adopted thereunder, must comply with the following:

## **II. PERMIT PROVISIONS**

### **A. DISCHARGE PROHIBITIONS**

1. The discharge of wastes to land or to surface waters, including storm water conveyance systems, shall be in accordance with the provisions of this Order. All other discharges of wastes to land and surface waters are prohibited.
2. The discharge of wastes to land or to surface waters shall not cause a condition of contamination, pollution or nuisance as defined in Water Code section 13050.
3. The discharge of wastes not generated by the dairy-related activities at the facility is prohibited except as authorized by the Executive Officer in a discharge authorization letter.

4. The disposal of any mortality (dead animals) in any process wastewater system, liquid manure or other facilities within the regulated CAFO is prohibited.
5. The discharge of process wastewater to a land application area before, during or after a storm event that would result in runoff of the applied water is prohibited.
6. The discharge of dairy waste or process wastewater to surface waters from cropland is prohibited. Irrigation supply water that comes into contact or is blended with waste or process wastewater shall be considered wastewater under this prohibition.
7. The discharge of storm water to surface waters from a land application area where manure or process wastewater has been applied is prohibited unless the land application area has been managed according to an approved Nutrient Management Plan and EWMP.
8. The discharge of wastes, including manure, process wastewater and/or storm water runoff from manured areas, to property not owned or controlled by the Discharger, except as authorized by this Order, is prohibited.
9. Temporary waste storage areas shall be designed and constructed in a manner to prevent runoff and leachate from entering surface or groundwater.
10. Waste storage or disposal facilities shall not be built within 400 feet of a public drinking water well.
11. Confined animals are prohibited from entering or directly contacting any surface water. CCR, title 27, § 22561, 40 C.F.R. § 122.42(e). The Discharger must prevent animals confined at the CAFOP from entering any surface water.
12. The disposal of manure to any land within Chino Basin (Chino-North, Chino-East, and Chino-South Groundwater Management Zones) is prohibited unless a plan, acceptable to the Executive Officer, is implemented that offsets the effects of such application on the underlying groundwater management zone. The Optimum Basin Management Plan, discussed in the Fact Sheet, addresses the discharge of wastes from CAFOPs within the Chino Basin area. Continued, effective implementation of the Optimum Basin Management Plan is an acceptable offset to manage CAFOP waste discharges within the Chino Basin area.

13. Manure originating from outside of the Chino Basin is prohibited from being applied to land within the Chino Basin.
14. The application of manure, process wastewater, and/or storm water runoff from manured areas, on land in the San Jacinto River Basin that overlie groundwater management zones lacking assimilative capacity for TDS and/or nitrate-nitrogen is prohibited. This prohibition shall apply unless a plan, acceptable to the Executive Officer, is implemented that ultimately offsets the effects of such application on the underlying groundwater management zone according to the requirements of Section IV.J. below.
15. The discharge of any substances in concentrations that are toxic to animal or plant life is prohibited.

## B. EFFLUENT LIMITATIONS AND DISCHARGE SPECIFICATIONS

### 1. Technology-based Effluent Limitations (TBELs)

Discharges of waste in storm water runoff from production areas and in process wastewater are authorized only under the following conditions:

- a. The principal cause of the discharge is due to a precipitation event;
- b. Containment structures have been designed, constructed, operated and maintained to contain all manure, litter, process wastewater, and the runoff and the direct precipitation from all rainfall events up to and including a 25-year, 24-hour rainfall event from the production area<sup>9</sup>;
- c. All provisions of an Engineered Waste Management Plan (EWMP), approved by the Executive Officer, are fully implemented; and
- d. The operations at the facility are conducted according to the additional measures required by 40 C.F.R. § 412.37(a) and (b) and according to the requirements of this Order and the Monitoring and Reporting Program (Attachment B).

### 2. Water Quality-Based Effluent Limitations (WQBELs)

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See Glossary for the definition of Production Area

Water quality-based effluent limitations are included in Section IV. These consist of limitations designed to cause the Discharger to attain waste load allocations for CAFOs found in adopted Total Maximum Daily Loads (TMDLs).

**C. RECLAMATION SPECIFICATIONS [Not Applicable]**

**D. RECEIVING WATER LIMITATIONS**

**1. Surface Water Limitations**

- a. The discharge of wastes from the regulated facilities to surface waters shall not cause or contribute to an exceedance of any applicable water quality objectives in the receiving waters specified in the Basin Plan.
- b. The discharge of wastes shall not cause receiving waters to contain floating materials, foam, or scum in quantities that cause nuisance or adversely affect beneficial uses.
- c. The discharge of wastes shall not cause bottom deposits in the receiving waters to the extent that such deposits cause nuisance or adversely affect beneficial uses.
- d. The discharge of wastes shall not cause receiving waters to contain suspended material in concentrations that cause nuisance or adversely affect beneficial uses of receiving waters.
- e. The discharge of wastes shall not cause an individual pesticide or combination of pesticides to be present in concentrations that adversely affect beneficial uses of receiving waters.
- f. The discharge of wastes shall not cause bioaccumulation of pesticides, fungicides, or other toxic pollutants in bottom sediments or in aquatic life to levels which are harmful to human health or aquatic organisms.

**2. Groundwater Limitations**

The discharge of wastes to the ground shall not cause or contribute to an exceedance of any applicable water quality objectives specified in the Basin Plan.

### **III. GENERAL PROVISIONS**

#### **A. GENERAL**

1. This Order expires on March 15, 2024. However, coverage under the Order shall continue in force and effect until a new order replaces this Order. Only those Dischargers authorized to discharge under this Order are covered if this Order is continued. Upon reissuance of a new order, the Dischargers shall file a new application not more than 45 days following the effective date of the new order and obtain a new authorization to discharge from the Executive Officer.
2. The Executive Officer shall, if necessary, specify any additional conditions necessary to protect the beneficial uses of the receiving waters in the Discharge Authorization Letter, and shall specify the Self-Monitoring Program for the proposed discharge in accordance with this Order. If the Executive Officer includes additional conditions, a draft Discharge Authorization Letter will be posted for public comment 30-days prior to the final letter being issued. The Discharger shall comply with all the requirements of this Order and the terms and conditions of the final Discharge Authorization Letter. The authorization to discharge may be terminated or revised by the Executive Officer at any time. The Authorization Letter shall be incorporated as terms and conditions of the Order for the Discharger.
3. The Discharger shall give advance notice to the Regional Board of any planned changes in the permitted facility or activity that may result in noncompliance with this Order.
4. The provisions of this Order are severable, and if any provision of this Order, or the application of any provisions of this Order to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this Order shall not be affected thereby.
5. Failure to comply with provisions or requirements of this Order, or violation of other applicable laws or regulations governing discharges from the facility, may subject the Discharger to administrative or civil liabilities, criminal penalties, and/or other enforcement remedies to ensure compliance. Additionally, certain violations may subject the Discharger to civil or criminal enforcement from appropriate local, State, or federal law enforcement entities.
6. In the event the Discharger does not comply or will be unable to comply for any reason, with any prohibition, discharge limitation, or receiving water limitation of this Order, the Discharger shall notify the Regional Board by

telephone (951) 782-4130. Notification must be provided within 24 hours of having knowledge of noncompliance where it may endanger public health or the environment. The Discharger shall confirm this notification in writing within five days, unless Regional Board staff waives the written notification. The written notification shall state the nature, time, duration, and cause of noncompliance, and shall describe the measures being taken to remedy the current noncompliance and, prevent recurrence including, where applicable, a schedule of implementation. All other noncompliance should be reported in the Annual Report. Also see Standard Provisions, Attachment A, Section V.E.

7. This Order shall serve as a general NPDES permit pursuant to Section 402 of the Federal CWA and amendments thereto, which shall become effective upon its adoption provided the Regional Administrator of the USEPA has no objection. If the Regional Administrator objects to its issuance, the Order shall not serve as a general NPDES permit until such objection is withdrawn.
8. The Executive Officer shall determine whether the proposed discharge is eligible for coverage under this order, after which, the Executive Officer may:
  - a. Authorize the proposed discharge by transmitting a discharge authorization letter to the Discharger authorizing the discharge under the conditions of this Order and any other conditions consistent with this Order that are necessary to protect the beneficial uses of the receiving waters; or,
  - b. Require the Discharger to submit a report of waste discharge to obtain individual waste discharge requirements prior to any discharge to waters within the Regional Board's jurisdiction.
9. All discharges from the facility must comply with the lawful requirements of municipalities, counties, drainage districts, and other local agencies regarding discharges of storm water to storm drain systems or other courses under their jurisdiction.
10. The Discharger must comply with all Federal, State, County and local laws and regulations pertaining to the discharge of wastes from the facility.
11. The Discharger must comply with all requirements of this Order and, in addition, all terms, conditions, and limitations specified in the discharge authorization letter issued by the Executive Officer.

## **B. MONITORING AND REPORTING**

1. The Discharger must comply with the Monitoring and Reporting Program requirements in Attachment B, as later amended or revised, of this Order.

## **C. REOPENER PROVISIONS**

1. This Order may be modified, revoked and reissued, or terminated for cause. The filing of a request by a Discharger for modification, revocation and reissuance, or termination of this Order or a notification of planned changes or anticipated noncompliance does not stay any permit condition.
2. If more stringent applicable water quality standards are promulgated or approved pursuant to Section 303 of the Federal CWA, or amendments thereto, the Regional Board may revise and modify this Order in accordance with such standards.
3. This Order may be reopened to address any changes in State or Federal statutes, plans, policies or regulations that would affect the requirements for the discharges covered by this Order including newly adopted TMDLs.

## **IV. SPECIAL PROVISIONS**

### **A. REQUIREMENTS FOR DISCHARGES FROM CONTAINMENT STRUCTURES**

1. Containment structures must be designed, constructed, operated and maintained to contain all manure, litter, process wastewater, and the runoff and the direct precipitation from all rainfall events up to and including a 25-year, 24-hour rainfall event from the production area.
2. New wastewater containment facilities constructed after the effective date of this Order must be lined with, or underlain by, soils which contain at least 10% clay and not more than 10% gravel or artificial materials of equivalent impermeability.
3. A level marker shall be placed within each pond or impoundment. The markers must individually or in combination indicate the minimum capacity necessary to contain the runoff and direct precipitation from a 25-year, 24-hour rainfall event.



- a. Indicators on a level marker for the minimum capacity must be placed by a licensed surveyor or similarly-qualified person.
  - b. The Discharger must confirm in the facility's annual report that the markers are valid indicators of the required minimum capacity.
4. Following a storm event, the Discharger must initiate substantive work to restore the minimum holding capacity of containment structures within 48 hours. No work is necessary if observations show that containment structures will restore their minimum holding capacity within 48 hours with no intervention by the operator. The minimum holding capacity is represented by the minimum freeboard indicated by a valid marker in Provision IV.A.3.
5. The Discharger must use effective measures to monitor and control threats to the integrity of containment structures. Such threats include but are not limited to burrowing rodents, penetration or displacement by plant roots, and erosion.
6. Containment structures must be equipped with an emergency outlet (e.g. spillway or overflow pipe) to prevent catastrophic failure of the structure in the event of overflow.
7. Containment structures and manured areas at CAFOs in operation on November 27, 1984, shall be protected from inundation or washout by overflow from any stream channel during 20-year peak stream flows. Facilities existing before November 27, 1984 that are protected against 100-year peak stream flows shall continue to be provided such protection. New facilities (built after November 27, 1984) shall be protected from 100-year peak stream flows (CCR title 27, § 22562(c)).
8. No containment structures shall be constructed of manure and manure shall not be used to improve or raise existing containment structures.
9. Manure scraped from the corrals shall be removed from the facility within 180 days. Any manure remaining at the facility after 180 days of being scraped from the corrals is considered to be disposal of manure and is prohibited. A manifest of the manure hauled away (Form 4) shall be prepared and submitted with the annual report in accordance with Monitoring and Reporting Program (Attachment B).

10. Prior to transferring manure, litter or process wastewater to other persons, the Discharger shall provide the recipient of the manure, litter or process wastewater with the most current nutrient analysis of the manure. The analysis provided must be consistent with the requirements of 40 C.F.R. part 412, and, in addition, must include analysis for constituents specified in Attachment B. The CAFO operators shall collect representative samples of manure at least once per calendar year during a corral cleaning event, analyze for nutrients (nitrate-nitrogen and phosphorus), and retain the records for five years.
11. All surface drainage from outside of the facility (such as, but not limited to, from streets or neighboring property) shall be diverted away from any manured areas unless drainage from the manured areas are fully contained on site.
12. Chemicals and other contaminants handled on-site shall not be disposed of in any manure, litter, process wastewater, or storm water storage or treatment system unless specifically designed to treat such chemicals and other contaminants.

#### B. REQUIREMENTS FOR DISCHARGES FROM NON-PRODUCTION AREAS

1. The Discharger must implement effective measures to prevent storm water from contacting manure, feed, and other potential sources of pollutants in non-production areas where storm water runoff is conveyed off-site. The Discharger must:
  - a. Divert storm water runoff away from areas where potential pollutants may be mobilized and carried off-site.
  - b. Implement effective housekeeping.
  - c. Not allow track-out of manure and other potential pollutants from the production area onto non-production areas or off-site.
2. The Discharger must implement effective measures to identify and eliminate the discharge of pollutants in non-storm water from non-production areas of the facility.

### C. ENGINEERED WASTE MANAGEMENT PLAN

1. The Discharger must control the discharge of waste from production and non-production areas according to an Engineered Waste Management Plan that has been approved by the Executive Officer and prepared according to this Order. Where there is a conflict between the approved plan and the requirements of this Order, this Order shall prevail.
2. Except for inconsequential grammatical corrections, updates to the Discharger's name and contact information, and technical corrections, an approved Engineered Waste Management Plan may not be amended without the approval of the Executive Officer.
3. A copy of the approved Engineered Waste Management Plan must be maintained on-site and the person responsible for the operation of the dairy must be familiar with its content. The approved plan must be made available to Regional Board, State Board, USEPA staff and/or their authorized representatives (including an authorized contractor acting as their representative), upon request.
4. Engineered Waste Management Plans must be prepared by, or under the direction of, a registered professional engineer or other similarly-qualified individual in conformance with California Code of Regulations (CCR), title 27, division 2, chapter 7, subchapter 2, article 1. The registered professional engineer shall affix their stamp and signature to the plan.
5. Upon completion of construction of all structures identified in the approved Engineered Waste Management Plan, the Discharger must submit a certification from the engineer or the similarly-qualified individual responsible for the preparation of the plan. The certification must establish that all structures have been constructed according to the specifications in the plan.
6. Engineered Waste Management Plans must be updated where there is a substantial change in a facility's operations that may affect the capacity of containment structures to discharge according to the requirements of this Order.

7. Engineered Waste Management Plans must fully and accurately represent all structures, controls, and practices necessary to allow a discharge of waste from production areas in accordance with the requirements of this Order.
8. An Engineered Waste Management Plan must include:
  - a. Specifications for the location and construction of containment structures;
  - b. Specifications for the placement of overflow outlets and minimum capacity markers;
  - c. Controls to prevent manure, litter, and process wastewater from being applied or accumulate closer than 100-feet to any down-gradient surface water, open tile line intake structures, sinkholes, well heads, or other conduits to surface or groundwater.
  - d. Controls to prevent erosion of soil that may diminish the capacity of containment structures;
  - e. A site plan depicting a through d above; and
  - f. Calculations for the volume of containment structures
  - g. Procedures for restoring the minimum holding capacity represented by the minimum freeboard indicated by a valid marker in Provision IV.A.3.; and
  - h. A schedule of operation and maintenance practices necessary to maintain compliance with this Order and the Engineered Waste Management Plan.
9. The Executive Officer is authorized to, with written notice, direct a Discharger to amend the facility's Engineered Waste Management Plan to correct or clarify the contents of the plan or to comply with the requirements of this Order. A directive must be complied with by a deadline specified in the notice. The Executive Officer is authorized to waive Provision IV.C.4. to allow a Discharger to make amendments where technical expertise is not needed.

10. A new or amended Engineered Waste Management Plan will be subject to public review for 30 days prior to its approval by the Executive Officer.

#### D. NUTRIENT MANAGEMENT PLAN

1. The application of manure and other dairy-related waste to cropland at the dairy facility must be carried out in accordance with this Order and a nutrient management plan that has been approved by the Executive Officer. Where there is a conflict between the approved plan and the requirements of this Order, this Order shall prevail.
2. A copy of the approved nutrient management plan must be maintained on-site and the person responsible for the operation of the dairy must be familiar with its content. The approved plan must be made available to Regional Board, State Board, USEPA staff and/or their authorized representatives (including an authorized contractor acting as their representative), upon request.
3. Except for inconsequential grammatical corrections and technical corrections, an approved nutrient management plan may not be altered without the approval of the Executive Officer.
4. Nutrient management plans must be prepared by a Certified Nutrient Management Planner meeting competency and knowledge requirements established by the Natural Resource Conservation Service (NRCS).
5. Nutrient management plans must be in substantial conformance with NRCS Conservation Practices Standard 590<sup>10</sup>.
6. The nutrient management plan must specify application rates and controls for manure, litter, and process wastewater applied to land. The controls must minimize the transport of wastewater, phosphorous and nitrogen to waters of the state.
  - a. Application rates must be informed by annual analysis of nitrogen and phosphorous in the applied manure and by an analysis of nitrogen and phosphorous in the land's soil. The analysis of soil must be performed a minimum of once every five years.

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<sup>10</sup> Available at: [https://www.nrcs.usda.gov/Internet/FSE\\_DOCUMENTS/stelprdb1192371.pdf](https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb1192371.pdf)

- b. Application rates must take into consideration the nutrient needs of cover crops and harvested crops and consider other sources of nutrients other than applied manure and other dairy-related wastes.
  - c. Manure, litter, and process wastewater shall not be applied, or allowed to accumulate, closer than 100 feet to any down-gradient surface waters, open tile line intake structures, sinkholes, production well heads, monitoring wells, or other similar conduits to surface or ground waters.
- 7. The Executive Officer is authorized to, with written notice, direct a Discharger to amend the facility's nutrient management plan to reflect substantial changes to operations, to correct or clarify the contents of the plan, or to comply with the requirements of this Order<sup>11</sup>. A directive must be complied with by a deadline specified in the notice. The Executive Officer is authorized to waive Provision IV.D.4. to allow amendments where technical expertise is not needed.
- 8. A new or amended nutrient management plan will be subject to public review for 30 days prior to its approval by the Executive Officer.

#### E. ANIMAL MORTALITIES

- 1. Animal mortalities shall be handled in such a way as to prevent the discharge of pollutants to waters of the State.
- 2. All dead animals shall be disposed of off-site within three (3) days according to local and state regulations.
- 3. Records of mortality management shall be kept for five years.

#### F. SPECIAL STUDIES

[This Section is being kept as a placeholder.]

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<sup>11</sup> See 40 C.F.R. § 122.42(e)(6)(iii) for a list of changes that would constitute a substantial change.

## G. REGION-WIDE SALT AND NUTRIENT MANAGEMENT REQUIREMENTS

The following requirements apply to all Dischargers and their dairies and related facilities in the Santa Ana Region subject to this Order:

1. If not prohibited, a Discharger may apply, or cause to be applied, manure and dairy-related waste to cropland not owned or controlled by them only with the written permission of the operator or land owner receiving the waste for beneficial agricultural use or a valid exemption issued in accordance with Riverside County Ordinance 427.
  - a. The Discharger must provide a copy of the written permission or a valid exemption to the Regional Board within 60 days of the date of their discharge authorization letter.
  - b. The written permission must include:
    - i. The signature of the agricultural operator or land owner;
    - ii. Valid contact information for the agricultural operator or land owner. Persons enrolled under a conditional waiver of waste discharge requirements for agricultural discharges may use the unique identifier assigned under that program for their contact information;
    - iii. The assessor's parcel number(s) of the land and county where the waste is authorized to be applied;
    - iv. The expiration date of the written permission, if applicable. If there is no expiration, this must be indicated; and
    - v. Any conditions on the timing, quantity, or limits of waste application imposed by the agricultural operator or landowner, including specification of dates during which manure may be applied; upper limits on the quantity of waste permitted; specified application rates; and excluded areas of the property.
  - c. The Discharger must notify the Regional Board in writing where an agricultural operator or land owner rescinds or amends their written



permission. The notification must be provided within 30-days of the Discharger becoming aware of the rescission or amendment.

- d. If a written permission is amended or new letter is obtained, the Discharger must provide a copy of the amended or new permission to the Regional Board within 60-days of its date.
- e. The Discharger must include, in their Annual Report, a confirmation that the written permission(s) in Regional Board records is valid and in full effect.

#### **H. BACTERIAL INDICATOR TMDLs REQUIREMENTS FOR CHINO BASIN**

The following requirements of this Subsection IV.H. shall apply only to those Dischargers and their dairies and related facilities that are tributary to the Middle Santa Ana River:

- 1. The Discharger must implement, or cause to be implemented on their behalf, the water quality monitoring plan approved by the Regional Board on June 29, 2007 in Resolution No. R8-2007-0046, as subsequently amended or revised.
  - a. The Discharger must submit, or cause to be submitted on their behalf, the results of the water quality monitoring to the Regional Board by May 31 of each year. The Discharger may satisfy this provision through cooperation with the Middle Santa Ana River TMDL Task Force.
  - b. The results of the water quality monitoring must include an analysis designed to demonstrate achievement, or progress towards achievement, of the CAFO bacterial indicator waste load allocations pursuant to the Middle Santa Ana River Bacterial Indicator TMDLs.
  - c. If the analysis of the water quality monitoring results is inconclusive or reveals opportunities for improvements to the monitoring plan, the Discharger, in cooperation with other stakeholders, must include recommendations to improve the effectiveness of the monitoring program in the annual report.

- d. If the analysis of the water quality monitoring results does not indicate that the CAFO waste load allocations are being met; that waste load allocations are not likely to be met by December 31, 2025; and that water quality objectives are not being attained, the Discharger, in cooperation with other stakeholders, must propose improvements to watershed-wide projects or programs that may improve water quality.
- e. After December 31, 2025, if the Discharger does not comply with the provisions of this Subsection IV.H.1., the Discharger must immediately comply with the following water quality-based effluent limit during *wet weather conditions* (November 1 through March 31):

*Escherichia coli* waste load allocation (WLA): The 5-sample, 30-day logarithmic mean of *Escherichia coli* in discharges from the facility must be less than 113 organisms/100 mL and not more than 10% of the samples may exceed 212 organisms/100 mL for any 30-day period.

Water quality objectives for water-contact recreation are temporarily-suspended in freshwater streams which have had their streambed or banks engineered so that they have been armored and made resistant to erosion. The temporary suspension applies if the average vertical flow velocity is greater than 8 feet per second; if the product of stream depth and average flow velocity is greater than 10 square feet per second; or if site-specific, alternative flow criteria has been approved by the Regional Board and the criteria is met. Suspension of water quality objectives for water-contact recreation in the receiving water is deemed to indicate that the wet-weather waste load allocation at the Discharger's outfall is also suspended. Unless measured flow indicates otherwise, water quality objectives are presumed restored 24 hours after the end of the storm event which produced the runoff.

- 2. If the Discharger does not comply with the requirements of Subsections IV.A. and IV.B., the Discharger must immediately comply with the following water quality-based effluent limit during *dry-weather conditions* (April 1 through October 31):

*Escherichia coli* WLA: The 5-sample, 30-day logarithmic mean of *Escherichia coli* in discharges from the facility must be less than 113 organisms/100 mL and not more than 10% of the samples may exceed 212 organisms/100 mL for any 30-day period.

#### I. SALT MANAGEMENT REQUIREMENTS FOR CHINO BASIN

The following requirements of this subsection IV.I. shall apply only to those Dischargers and their dairies and related facilities that overlie the Chino Basin and the groundwater management zones located there:

1. The Discharger must cause, or have caused on their behalf, an effective program that offsets the addition of dissolved solids (salt) in discharges of waste to the Chino Basin groundwater management zones from the Discharger's overlying facilities. The program is subject to the approval of the Regional Board. The program is currently being carried out through the Optimum Basin Management Program. The Regional Board expects that continued implementation of the Optimum Basin Management Program, or an approved alternative, will provide the required salt offset.
2. The Discharger must perform an evaluation, or have an evaluation performed on their behalf, of the offset program in Provision IV.I.1. above.
  - a. The evaluation must assess the effectiveness of the program to remove dissolved solids from the underlying groundwater management zone at a rate that equals the rate of dissolved solids added in discharges from dairies and related facilities. Facilities may be evaluated collectively or individually as necessary.
  - b. The evaluation must be based on a reliable combination of theoretical and empirical data using published and generally-accepted methods.
  - c. The Discharger must submit, or cause the submission on their behalf, a report on the results of the evaluation to the Regional Board by January 31 of each year for the previous calendar year. The Chino Basin Watermaster currently provides the evaluation report annually.

## J. SALT AND NUTRIENT REQUIREMENTS FOR SAN JACINTO BASIN

The following requirements of this subsection (IV.J) shall apply only to those Dischargers and their dairies and related facilities that overly the San Jacinto River Basin and the groundwater management zones located there:

1. The Discharger must perform, or have performed on their behalf, groundwater monitoring of wells under their ownership or control to evaluate the potential impact of dairy operations on the underlying groundwater.
2. To the extent practicable, the Discharger must:
  - a. reduce manure and wastewater application to croplands;
  - b. reduce salt content in the source water;
  - c. implement on-site wastewater treatment processes;
  - d. consider implementing regional wastewater treatment systems; and
  - e. participate in local groundwater improvement projects.
3. The Discharger must implement, or cause to be implemented on their behalf, the Lake Elsinore/Canyon Lake Nutrient TMDLs water quality monitoring plan approved by the Regional Board on March 3, 2006 in Resolution No. R8-2006-0031, as subsequently amended or revised.
  - a. The Discharger must submit, or cause to be submitted on their behalf, the results of the water quality monitoring plan to the Regional Board by August 15 of each year. The Discharger may satisfy this provision through cooperation with the Lake Elsinore/Canyon Lake TMDL Task Force.
  - b. The results of the water quality monitoring plan must include an analysis designed to demonstrate achievement, or progress towards achievement, of the CAFO waste load allocation for Canyon Lake and the water quality objectives of the lakes.
  - c. If the analysis of the water quality monitoring results is inconclusive or reveals opportunities for improvements to the monitoring plan, the

Discharger, in cooperation with other stakeholders, must include recommendations to improve the effectiveness of the monitoring program in the annual report.

- d. If the analysis of the water quality monitoring results does not indicate that the CAFO waste load allocation is being met and that water quality objectives are not being attained, the Discharger, in cooperation with other stakeholders, must propose improvements to watershed-wide projects or programs that may improve water quality.
- e. After December 31, 2020, if the Discharger does not comply with the provisions of this Subsection IV.J.3., the Discharger must comply with the following water quality-based effluent limits:

Total Phosphorous WLA: Discharges from CAFOs must not transport more than 132 kg/year of total phosphorous to Canyon Lake, based on a 10-year running average.

Total Nitrogen WLA: Discharges from CAFOs must not transport more than 1,908 kg/year of total nitrogen to Canyon Lake, based on a 10-year running average.

## **V. DETERMINING COMPLIANCE**

A. Compliance determination with the terms of this Order shall be based on the following:

- 1. Periodic inspections by Regional Board staff and/or USEPA or its authorized representatives;
- 2. Evaluation of the Annual Report of Animal Waste Discharge and Annual Summary Report of CAFO Storm Water Management Structure Inspections submitted according to the Monitoring and Reporting Program (Attachment B);
- 3. Evaluation of Workplans and other reports required for compliance with the TMDLs, salt and nutrient management; and
- 4. Any other information deemed necessary by the Executive Officer.

**ATTACHMENT A**  
**Standard Provisions**  
**For**  
**Order No. R8-2018-0001**  
**NPDES Permit No. CAG018001**

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## **I. STANDARD PROVISIONS – PERMIT COMPLIANCE**

### **A. Duty to Comply**

1. The Discharger must comply with all of the conditions of Order No. R8-2018-0001. Any noncompliance constitutes a violation of the CWA and the Water Code and is grounds for enforcement action, for permit termination, revocation and reissuance, or modification, or denial of a permit renewal application. [40 C.F.R. § 122.41(a)].
2. The Discharger shall comply with effluent standards or prohibitions established under Section 307(a) of the CWA for toxic pollutants within the time provided in the regulations that establish these standards or prohibitions, even if Order No. R8-2018-0001 has not been modified to incorporate the requirement. [40 C.F.R. § 122.41(a)(1)].

### **B. Need to Halt or Reduce Activity Not a Defense**

It shall not be a defense for a Discharger in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of Order No. R8-2018-0001. [40 C.F.R. § 122.41(c)].

### **C. Duty to Mitigate**

The Discharger shall take all reasonable steps to minimize or prevent any discharge or disposal in violation of Order No. R8-2018-0001 that has a reasonable likelihood of adversely affecting human health or the environment. [40 C.F.R. § 122.41(d)].

### **D. Proper Operation and Maintenance**

The Discharger shall at all times properly operate and maintain all facilities, systems of treatment and control mechanisms (and related appurtenances) which are installed or used by the Discharger to achieve compliance with the conditions of Order No. R8-2018-0001 and the discharge authorization letter from the Executive Officer. Proper operation and maintenance also include regular maintenance and inspection of all systems, record keeping and adequate laboratory controls and appropriate quality assurance procedures. This provision requires the operation of backup or auxiliary facilities or similar systems that are installed by a Discharger only when necessary to achieve compliance with the conditions of Order No. R8-2018-0001. [40 C.F.R. § 122.41(e)].

### **E. Property Rights**

1. Order No. R8-2018-0001 does not convey any property rights of any sort or any exclusive privileges. [40 C.F.R. § 122.41(g)].
2. Order No. R8-2018-0001 does not authorize the commission of any act causing injury to persons or property or invasion of other private rights, or any

infringement of state or local law or regulations nor guarantee the Discharger a capacity right in the receiving waters. [40 C.F.R. § 122.5(c)]

## **F. Inspection and Entry**

The Discharger shall allow the Regional Board, State Board, USEPA and/or their authorized representatives (including an authorized contractor acting as their representative), upon the presentation of credentials and other documents, as may be required by law, to [40 C.F.R. § 122.41(i)][Water Code section 133839c]:

1. Enter upon the Discharger's premises where a regulated facility or activity is located or conducted, or where records are kept under the conditions of Order No. R8-2018-0001 [40 C.F.R. § 122.41(i)(1)];
2. Have access to and copy, at reasonable times, any records that must be kept under the conditions of Order No. R8-2018-0001 [40 C.F.R. § 122.41(i)(2)];
3. Inspect and photograph, at reasonable times, any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under Order No. R8-2018-0001 [40 C.F.R. § 122.41(i)(3)]; and
4. Sample or monitor, at reasonable times, for the purposes of assuring Order compliance or as otherwise authorized by the CWA or the Water Code, any substances or parameters at any location [40 C.F.R. § 122.41(i)(4)].

## **G. Bypass**

### **1. Definitions**

- a. "Bypass" means the intentional diversion of waste streams from any portion of a treatment facility. [40 C.F.R. § 122.41(m)(1)(i)].
  - b. "Severe property damage" means substantial physical damage to property, damage to the treatment facilities, which causes them to become inoperable, or substantial and permanent loss of natural resources that can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production. [40 C.F.R. § 122.41(m)(1)(ii)].
2. Bypass not exceeding limitations - The Discharger may allow any bypass to occur which does not cause exceedances of effluent limitations, but only if it is for essential maintenance to assure efficient operation. These bypasses are not subject to the provisions listed in Standard Provisions – Permit Compliance I.G.3 and I.G.5, below. [40 C.F.R. § 122.41(m)(2)].
  3. Prohibition of bypass. Bypass is prohibited, and the Regional Board may take enforcement action against a Discharger for bypass, unless [40 C.F.R. § 122.41(m)(4)(i)]:

- a. Bypass was unavoidable to prevent loss of life, personal injury, or severe property damage [40 C.F.R. § 122.41(m)(4)(i)(A)];
  - b. There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass that occurred during normal periods of equipment downtime or preventive maintenance [40 C.F.R. § 122.41(m)(4)(i)(B)]; and
  - c. The Discharger submitted notice to the Regional Board as required under Standard Provisions – Permit Compliance I.G.5 below [40 C.F.R. § 122.41(m)(4)(i)(C)].
4. The Regional Board may approve an anticipated bypass, after considering its adverse effects, if the Regional Board determines that it will meet the three conditions listed in Standard Provisions – Permit Compliance I.G.3 above. [40 C.F.R. § 122.41(m)(4)(ii)].
5. Notice
  - a. Anticipated bypass. If the Discharger knows in advance of the need for a bypass, it shall submit a notice, if possible, at least 10 days before the date of the bypass. [40 C.F.R. § 122.41(m)(3)(i)].
  - b. Unanticipated bypass. The Discharger shall submit notice of an unanticipated bypass as required in Standard Provisions - Reporting V.E below (24-hour notice). [40 C.F.R. § 122.41(m)(3)(ii)].

#### **H. Upset**

Upset means an exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limitations because of factors beyond the reasonable control of the Discharger. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation. [40 C.F.R. § 122.41(n)(1)].

1. Effect of an upset. An upset constitutes an affirmative defense to an action brought for noncompliance with such technology-based permit effluent limitations if the requirements of Standard Provisions – Permit Compliance I.H.2, below are met. No determination made during administrative review of claims that noncompliance was caused by upset, and before an action for noncompliance, is final administrative action subject to judicial review. [40 C.F.R. § 122.41(n)(2)].

2. Conditions necessary for a demonstration of upset. A Discharger who wishes to establish the affirmative defense of upset shall demonstrate, through properly signed, contemporaneous operating logs or other relevant evidence that [40 C.F.R. § 122.41(n)(3)]:
  - a. An upset occurred and that the Discharger can identify the cause(s) of the upset [40 C.F.R. § 122.41(n)(3)(i)];
  - b. The permitted facility was, at the time, being properly operated [40 C.F.R. § 122.41(n)(3)(ii)];
  - c. The Discharger submitted notice of the upset as required in Standard Provisions – Reporting V.E.2.b, below (24-hour notice) (40 C.F.R. § 122.41(n)(3)(iii)); and
  - d. The Discharger complied with any remedial measures required under Standard Provisions – Permit Compliance I.C, above. (40 C.F.R. § 122.41(n)(3)(iv).)
3. Burden of proof. In any enforcement proceeding, the Discharger seeking to establish the occurrence of an upset has the burden of proof. (40 C.F.R. § 122.41(n)(4).)

## **II. STANDARD PROVISIONS – PERMIT ACTION**

### **A. General**

Order No. R8-2018-0001 may be modified, revoked and reissued, or terminated for cause. The filing of a request by the Discharger for modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance does not stay any order condition. [40 C.F.R. § 122.41(f)].

### **B. Duty to Reapply**

If the Discharger wishes to continue an activity regulated by Order No. R8-2018-0001 after its expiration date, the Discharger must obtain a new permit. [40 C.F.R. § 122.41(b)]. However, coverage under the Order shall continue in force and effect until a new order replaces Order No. R8-2018-0001. Only those Dischargers authorized to discharge under the expiring Order are covered by the continued order. Upon reissuance of a new Order, the Dischargers shall file a new application within 45 days of the effective date of the new order and obtain a new authorization to discharge from the Executive Officer.

### **C. Transfers**

Order No. R8-2018-0001 is not transferable to any person except after notice to the Regional Board and with written authorization from the Executive Officer. The Regional Board may require modification or revocation and reissuance of the Order

to change the name of the Discharger and incorporate such other requirements as may be necessary under the CWA and the Water Code. [40 C.F.R. § 122.41(l)(3)] [40 C.F.R. § 122.61].

### **III. STANDARD PROVISIONS – MONITORING**

- A. Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity. [40 C.F.R. § 122.41(j)(1)].
- B. Monitoring results must be conducted according to test procedures under Part 136, unless other test procedures have been specified in Order No. R8-2018-0001. [40 C.F.R. § 122.41(j)(4)] [40 C.F.R. § 122.44(i)(1)(iv)].

### **IV. STANDARD PROVISIONS – RECORDS**

#### **A. Records Retention**

The Discharger shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by Order No. R8-2018-0001, and records of all data used to complete the application for Order No. R8-2018-0001, for a period of at least five (5) years from the date of the sample, measurement, report or application. This period may be extended by request of the Regional Board Executive Officer at any time. [40 C.F.R. § 122.41(j)(2)].

#### **B. Records of monitoring information shall include:**

- 1. The date, exact place, and time of sampling or measurements [40 C.F.R. § 122.41(j)(3)(i)];
- 2. The individual(s) who performed the sampling or measurements [40 C.F.R. § 122.41(j)(3)(ii)]
- 3. The date(s) analyses were performed [40 C.F.R. § 122.41(j)(3)(iii)];
- 4. The individual(s) who performed the analyses [40 C.F.R. § 122.41(j)(3)(iv)];
- 5. The analytical techniques or methods used [40 C.F.R. § 122.41(j)(3)(v)]; and
- 6. The results of such analyses [40 C.F.R. § 122.41(j)(3)(vi)].

#### **C. Claims of confidentiality for the following information will be denied [40 C.F.R. § 122.7(b)]:**

- 1. The name and address of any permit applicant or Discharger [40 C.F.R. § 122.7(b)(1)]; and

2. Permit applications and attachments, permits and effluent data [40 C.F.R. § 122.7(b)(2)].

## **V. STANDARD PROVISIONS – REPORTING**

### **A. Duty to Provide Information**

The Discharger shall furnish to the Regional Board, State Board, or USEPA within a reasonable time, any information which the Regional Board, State Board, or USEPA may request to determine whether cause exists for modifying, revoking and reissuing, or terminating Order No. R8-2018-0001 or to determine compliance with Order No. R8-2018-0001. Upon request, the Discharger shall also furnish to Regional Board, State Board, USEPA staff and/or their authorized representatives (including an authorized contractor acting as their representative) copies of records required to be kept by Order No. R8-2018-0001. [40 C.F.R. § 122.41(h)] [Water Code 13267].

### **B. Signatory and Certification Requirements**

1. All applications, reports, or information submitted to the Regional Board, State Board, and/or USEPA shall be signed and certified in accordance with Standard Provisions – Reporting V.B.2, V.B.3, V.B.4, and V.B.5, below. [40 C.F.R. § 122.41(k)].
2. All permit applications shall be signed by a general partner or the proprietor, respectively. [40 C.F.R. § 122.22(a)(2)].
3. All reports required by Order No. R8-2018-0001 and other information requested by the Regional Board, State Board, or USEPA shall be signed by a person described in Standard Provisions – Reporting V.B.2, above, or by a duly authorized representative of that person. A person is a duly authorized representative only if:
  - a. The authorization is made in writing by a person described in Standard Provisions – Reporting V.B.2, above [40 C.F.R. § 122.22(b)(1)];
  - b. The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity such as the position of plant manager, operator of a well or a well field, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters for the company (a duly authorized representative may thus be either a named individual or any individual occupying a named position) [40 C.F.R. § 122.22(b)(2)]; and
  - c. The written authorization is submitted to the Regional Board and State Board [40 C.F.R. § 122.22(b)(3)].

4. If an authorization under Standard Provisions – Reporting V.B.3, above is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization satisfying the requirements of Standard Provisions – Reporting V.B.3, above must be submitted to the Regional Board and State Board prior to or together with any reports, information, or applications, to be signed by an authorized representative. [40 C.F.R. § 122.22(c)].
5. Any person signing a document under Standard Provisions – Reporting V.B.2, or V.B.3, above shall make the following certification:

“I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.” [40 C.F.R. § 122.22(d)].

### **C. Monitoring Reports**

1. Monitoring results shall be reported at the intervals specified in the Monitoring and Reporting Program (Attachment B) in Order No. R8-2018-0001. [40 C.F.R. § 122.22(l)(4)].
2. Monitoring results must be reported on a Self-Monitoring Report (SMR) form or forms provided or specified by the Regional Board or State Board for reporting results of any surface water discharges, manure nutrient monitoring and manure use or disposal practices. [40 C.F.R. § 122.41(l)(4)(i)].
3. If the Discharger monitors any pollutant more frequently than required by Order No. R8-2018-0001 using test procedures approved under Part 136, or as specified in Order No. R8-2018-0001, the results of this monitoring shall be included in the calculation and reporting of the data submitted in the SMR or manure reporting form specified by the Regional Board. [40 C.F.R. § 122.41(l)(4)(ii)].
4. Calculations for all limitations, which require averaging of measurements, shall utilize an arithmetic mean unless otherwise specified in Order No. R8-2018-0001. [40 C.F.R. § 122.41(l)(4)(iii)].

### **D. Compliance Schedules**

Reports of compliance or noncompliance with, or any progress reports on, interim and final requirements contained in any compliance schedule of Order No. R8-2018-

0001, shall be submitted no later than 14 days following each schedule date. [40 C.F.R. § 122.41(l)(5)].

#### **E. Twenty-Four Hour Reporting**

1. The Discharger shall report any noncompliance that may endanger public health or the environment. Any information shall be provided orally within 24 hours from the time the Discharger becomes aware of the circumstances. A written submission shall also be provided within five (5) days of the time the Discharger becomes aware of the circumstances. The written submission shall contain a description of the noncompliance and its cause; the period of noncompliance, including exact dates and times, and if the noncompliance has not been corrected, the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance. [40 C.F.R. § 122.41(l)(6)(i)].
2. The following shall be included as information that must be reported within 24 hours under this paragraph [40 C.F.R. § 122.41(l)(6)(ii)]:
  - a. Any unanticipated bypass that exceeds any effluent limitation in Order No. R8-2018-0001. [40 C.F.R. § 122.41(l)(6)(ii)(A)].
  - b. Any upset that exceeds any effluent limitation in Order No. R8-2018-0001. [40 C.F.R. § 122.41(l)(6)(ii)(B)].
3. The Regional Board may waive the above-required written report under this provision on a case-by-case basis if an oral report has been received within 24 hours. [40 C.F.R. § 122.41(l)(6)(iii)].

#### **F. Planned Changes**

1. The Discharger shall give notice to the Regional Board as soon as possible of any planned physical alterations or additions to the permitted facility. Notice is required under this provision only when [40 C.F.R. § 122.41(l)(1)]:
  - a. The alteration or addition to a permitted facility may meet one of the criteria for determining whether a facility is a new source in 40 C.F.R. § 122.29(b) [40 C.F.R. § 122.41(l)(1)(i)]; or
  - b. The alteration or addition could significantly change the nature or increase the quantity of pollutants discharged. This notification applies to pollutants that are not subject to effluent limitations in Order No. R8-2018-0001 [40 C.F.R. § 122.41(l)(1)(ii)]; or
  - c. The alteration or addition results in a significant change in the Discharger's manure use or disposal practices, and such alteration, addition, or change may justify the application of permit conditions that are different from or absent in the existing permit, including notification of additional use or



disposal sites not reported during the permit application process or not reported pursuant to an approved Nutrient Management Plan [40 C.F.R. § 122.41(l)(1)(iii)].

2. Any other business operations being conducted on the facility that are not related to the operation of the dairy or wastes that are imported from off-site sources must be covered under a separate individual permit.

#### **G. Anticipated Noncompliance**

The Discharger shall give advance notice to the Regional Board of any planned changes in the permitted facility or activity that may result in noncompliance with the requirements of Order No. R8-2018-0001. [40 C.F.R. § 122.41(l)(2)].

#### **H. Other Noncompliance**

The Discharger shall report all instances of noncompliance not reported under Standard Provisions – Reporting V.C, V.D, and V.E, above at the time monitoring reports are submitted. The reports shall contain the information listed in Standard Provision – Reporting V.E above. [40 C.F.R. § 122.41(l)(7)].

#### **I. Other Information**

When the Discharger becomes aware that it failed to submit any relevant facts in a permit application or submitted incorrect information in a permit application or in any report to the Regional Board, State Board, or USEPA, the Discharger shall promptly submit such facts or information. [40 C.F.R. § 122.41(l)(8)].

### **VI. STANDARD PROVISIONS – ENFORCEMENT**

The Regional Board is authorized to enforce the terms of this permit under several provisions of the Water Code, including, but not limited to, sections 13268, 13385, 13386, and 13387.

### **VII. ADDITIONAL PROVISIONS – NOTIFICATION LEVELS**

#### **A. Non-Municipal Facilities**

Existing manufacturing, commercial (i.e. dairies, heifer or calf ranches), mining, and silvicultural Dischargers shall notify the Regional Board as soon as they know or have reason to believe [40 C.F.R. § 122.42(a)]:

1. That any activity has occurred or will occur that would result in the discharge, on a routine or frequent basis, of any toxic pollutant that is not limited in Order No. R8-2018-0001, if that discharge will exceed the highest of the following "notification levels" [40 C.F.R. § 122.42(a)(1)]:
  - a. 100 micrograms per liter (µg/L) [40 C.F.R. § 122.42(a)(1)(i)];

- b. 200 µg/L for acrolein and acrylonitrile; 500 µg/L for 2,4-dinitrophenol and 2-methyl-4,6-dinitrophenol; and 1 milligram per liter (mg/L) for antimony [40 C.F.R. § 122.42(a)(1)(ii)];
  - c. Five (5) times the maximum concentration value reported for that pollutant in the Report of Waste Discharge [40 C.F.R. § 122.42(a)(1)(iii)]; or
  - d. The level established by the Regional Board in accordance with 40 C.F.R. § 122.44(f) [40 C.F.R. § 122.42(a)(1)(iv)].
- 2. That any activity has occurred or will occur that would result in the discharge, on a non-routine or infrequent basis, of any toxic pollutant that is not limited in Order No. R8-2018-0001, if that discharge will exceed the highest of the following "notification levels" [40 C.F.R. § 122.42(a)(2)]:
  - a. 500 micrograms per liter (µg/L) [40 C.F.R. § 122.42(a)(2)(i)];
  - b. 1 milligram per liter (mg/L) for antimony [40 C.F.R. § 122.42(a)(2)(ii)];
  - c. Ten (10) times the maximum concentration value reported for that pollutant in the Report of Waste Discharge [40 C.F.R. § 122.42(a)(2)(iii)]; or
  - d. The level established by the Regional Board in accordance with 40 C.F.R. § 122.44(f) [40 C.F.R. § 122.42(a)(2)(iv)].

**B. Publicly-Owned Treatment Works (POTWs) (Not Applicable)**

**ATTACHMENT B**  
**Monitoring & Reporting Program**  
**For**  
**Order No. R8-2018-0001**  
**NPDES Permit No. CAG018001**

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Section 122.48 (40 CFR § 122.48) requires that all NPDES permits specify monitoring and reporting requirements. Specific record-keeping, monitoring, and reporting requirements applicable to CAFOs are specified in Section 122.41, 122.42(e)(2)-(4) and 412. California Water Code Sections 13267 and 13383 also authorize the Regional Board to require technical and monitoring reports. This Monitoring and Reporting Program (MRP) establishes monitoring and reporting requirements, which implement the Federal and California regulations.

## **I. GENERAL MONITORING PROVISIONS**

- A. All monitoring data must be maintained for at least five years and must be made available to Regional Board, State Board, USEPA staff and/or their authorized representatives (including an authorized contractor acting as their representative), upon request.
- B. Dischargers must inspect water lines, including drinking water or cooling water lines, daily and document records of those inspections.
- C. All containment structures, including, but not limited to, ponds, berms, and wastewater distribution systems (pumps, pipes, and other mechanical devices) must be inspected at least once each week during the entire year and at least once each 24-hour period during a storm event in which rainfall exceeds 0.5 inches in 24 hours. The findings of these inspections must be documented on a completed CAFO Weekly Storm Water Management Structure Inspections Log Sheet (Form 1). If sufficient space is not available on the form provided, the Discharger must provide supplemental attachment sheets, as needed. Information documented on this form and any attachments must include:
  - 1. An estimate of the freeboard<sup>1</sup> for each pond or impoundment as indicated by the required depth marker.
  - 2. Any action taken to correct deficiencies noted as a result of facility inspections. Deficiencies not corrected within 30 days must be accompanied by an explanation of the factors preventing immediate correction.
  - 3. The approximate time of each storm-related discharge that results in an off-property discharge of storm water commingled with process wastewater and/or manure, along with its approximate duration.
- D. Any deficiencies found as the result of visual inspections of containment structures or water lines must be corrected as soon as possible. Records must document any actions taken to correct deficiencies. Records indicating deficiencies that are not corrected within 30-days must include an explanation of the factors that prevented immediate correction.

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<sup>1</sup> Freeboard of a pond or impoundment is the vertical separation between the liquid level and the lowest elevation of the containment or impoundment that allows an overflow or outflow from the pond or impoundment.

- E. The Discharger(s) must record each manure-hauling event on a completed Manure Tracking Manifest Form (Form 4).
- F. The Discharger must retain for five years records of nutrient analysis for manure. The Discharger must make these records available on request by the Regional Board, USEPA, and its authorized representatives.

## **II. MONITORING LOCATIONS**

A representative grab sample of the discharge must be collected for any discharge of wastes from the waste containment structures to surface waters. Each discharge event must be sampled and the samples must be collected within the first hour of discharge or soon thereafter.

## **III. INFLUENT MONITORING REQUIREMENTS [NOT APPLICABLE]**

## **IV. EFFLUENT MONITORING REQUIREMENTS**

The samples collected according to Section II above must be analyzed for total dissolved solids (filterable residue), *Escherichia coli*, total nitrogen, total phosphorus and total suspended solids.

## **V. WHOLE EFFLUENT TOXICITY TESTING REQUIREMENTS [NOT APPLICABLE]**

## **VI. LAND DISCHARGE MONITORING REQUIREMENTS**

**Land Application System Monitoring:** The Discharger must conduct inspections of wastewater distribution systems on an as-needed basis, at least as frequently as cited in Section I. Any leaks or other operational problems must be corrected promptly. Records of the inspections and corrective actions must be included in the annual report.

## **VII. RECLAMATION MONITORING REQUIREMENTS [NOT APPLICABLE]**

## **VIII. RECEIVING WATER MONITORING REQUIREMENTS [NOT APPLICABLE]**

## **IX. OTHER MONITORING REQUIREMENTS**

- A. The Dischargers must collect a representative sample of manure, at least on an annual basis, during a corral cleaning event. The Discharger must have the sample analyzed for nitrate (as nitrogen), sodium, chloride, calcium, sulfate, potassium, total phosphorus, and total dissolved solids (filterable residue). Sample results must be retained for at least five years and must be provided to representatives of the Regional Board or USEPA upon request. The most recent manure nutrient analysis must be provided to the manure haulers.
- B. Dischargers subject to an approved Nutrient Management Plan must periodically inspect equipment used for land application of manure, litter, or process wastewater

- C. The Dischargers that overlie the San Jacinto River Basin and the groundwater management zones located there must perform, or have performed on their behalf, groundwater monitoring of wells under their ownership or control to evaluate the potential impact of dairy operations on the underlying groundwater.
- D. The Dischargers that are tributary to the Middle Santa Ana River must implement, or cause to be implemented on their behalf, the water quality monitoring plan approved by the Regional Board on June 29, 2007 in Resolution No. R8-2007-0046, as subsequently amended or revised.
  - 1. The Discharger must submit, or cause to be submitted on their behalf, the results of the water quality monitoring to the Regional Board by May 31 of each year.
  - 2. The results of the water quality monitoring must include an analysis designed to conclusively demonstrate achievement, or progress towards achievement, of the CAFO bacterial indicator waste load allocations pursuant to the Middle Santa Ana River Bacterial Indicator TMDLs.
  - 3. If the analysis of the water quality monitoring results is inconclusive or reveals opportunities for improvements to the monitoring plan, the Discharger, in cooperation with other stakeholders, must include recommendations to improve the effectiveness of the monitoring program in the annual report.

## **X. RECORD KEEPING REQUIREMENTS**

- A. The Discharger must maintain records of the following on site according to the requirements of this Order:
  - 1. Records of mortality management (Provision IV.E.)
  - 2. Records of nutrient analysis of transferred manure (Provision IV.A.10.)
  - 3. Records of inspections of containment structures and corrective actions (Forms 1 and 2) (Provisions I.A. and VI of Attachment B)
  - 4. Records of inspections of water lines (Provision I.B. of Attachment B)
  - 5. Records of manure hauling events (Form 4) (Provision IV.A.9. and Provision I.C. of Attachment B)
  - 6. Analyses of samples of discharges to surface water (Provision II of Attachment B)
  - 7. Annual Reports (Form 3) (Provision XI.A.3. of Attachment B)

8. Records of inspections of land application equipment as part of an NMP (Provision IX. B. of Attachment B)
9. Letters of Permission or valid exemptions pursuant to Riverside County Ordinance 427 (Provision IV.G.1.)

## **XI. REPORTING REQUIREMENTS**

### **A. General Monitoring and Reporting Requirements/Self-Monitoring Reports**

1. The Discharger must comply with Standard Provisions (Attachment A) related to monitoring, reporting, and recordkeeping.
2. At any time during the term of this Order, the State Board or the Regional Board may notify the Discharger to electronically submit reports and notices required by this Order. Until such notification is given, the Discharger must submit a hard copy of the reports and notices.
3. By January 15 of each year, the Discharger must submit an Annual Report of all previous year activities at the facility. Annual Reports must be submitted as indicated below or using an electronic method, specified by the Executive Officer, after the Executive Officer notifies the Discharger to do so in a written Notice. The Annual Report must include the following:
  - a. A cover letter that clearly identifies violations of the Order; discusses corrective actions taken or planned; and the proposed time schedule for corrective actions. Identified violations must include a description of the requirement that was violated and a description of the violation;
  - b. A completed Summary Report of Weekly Storm Water Management Structure Inspections Form (Form 2);
  - c. Completed Annual Report Form (Form 3);
  - d. Sampling and analyses results of any surface discharges and manure nutrient analyses;
  - e. Confirmation that written permission from agricultural operators or landowners of cropland where the Discharger's manure waste is applied is valid and in full effect;
  - f. The Discharger's confirmation that markers in containment structures are valid indicators of the required minimum capacity (See Section IV.A.); and
  - g. Completed Manure Tracking Manifest(s) (Form 4).

4. The Discharger must notify the Regional Board by telephone within 24 hours of any unauthorized discharge of wastes. This notification must be followed by a written report which must be submitted to the Regional Board within two weeks of the discharge. The written report must contain:
  - a. The approximate date and time of the discharge;
  - b. The estimated flow rate and duration of the discharge;
  - c. The specific type and source of the waste discharges (e.g., overflow from holding pond, rainfall runoff from manure storage areas, etc.); and
  - d. A time schedule and a plan to implement necessary corrective actions to prevent the recurrence of the discharge.
5. All reports must be signed by a responsible officer or duly authorized representative of the Discharger(s) and must be submitted under penalty of perjury.

**B. Self-Monitoring Reports (SMRs) (see Section A, above)**



## Form 1: CAFO Weekly Storm Water Management Structure Inspections Log Sheet

Reporting Period: \_\_\_\_\_

<b>Facility Information</b> (Please make corrections directly on this form)
Operator's Name:
Facility Name:
Facility Address:

Instructions: Use this form to keep track of weekly visual inspections of your manure, litter, and process wastewater impoundments; storm water diversion devices; runoff diversion structures; and devices channeling contaminated storm water. Document the findings of daily storm event inspections. List the structure items that need to be inspected below (refer to your Engineered Waste Management Plan).


Keep track of your inspections in the following table by completing one row each week when you inspect your process wastewater and storm water containment structures. Provide the following information: date of inspection, initials of the person performing the inspection, check "OK" box if no problems were found, use the "Notes" column to describe problems, if you find any, and how they were fixed, record the estimate of the wastewater containment pond(s) freeboard, fill in the "Date Corrected" column with the date when you correct the problem. If a deficiency takes more than 30-days to correct, indicate the factors that prevented immediate correction.

Reporting Period: \_\_\_\_\_

Facility Name: \_\_\_\_\_

Week	Date	Initials	OK(?)	Notes (Indicate any problems and how they were remedied.)	Waste Pond Freeboard	Date Corrected
1						
2						
3						
4						
5						
6						
7						
8						

Reporting Period: \_\_\_\_\_

Facility Name: \_\_\_\_\_

Week	Date	Initials	OK(?)	Notes (Indicate any problems found and how they were remedied.)	Waste Pond Freeboard	Date Corrected
9						
10						
11						
12						
13						
14						
15						
16						
17						

Reporting Period: \_\_\_\_\_

Facility Name: \_\_\_\_\_

Week	Date	Initials	OK(?)	Notes (Indicate any problems found and how they were remedied.)	Waste Pond Freeboard	Date Corrected
18						
19						
20						
21						
22						
23						
24						
25						
26						

Reporting Period: \_\_\_\_\_

Facility Name: \_\_\_\_\_

Week	Date	Initials	OK(?)	Notes (Indicate any problems found and how they were remedied.)	Waste Pond Freeboard	Date Corrected
27						
28						
29						
30						
31						
32						
33						
34						
35						

Reporting Period: \_\_\_\_\_

Facility Name: \_\_\_\_\_

Week	Date	Initials	OK(?)	Notes (Indicate any problems found and how they were remedied.)	Waste Pond Freeboard	Date Corrected
36						
37						
38						
39						
40						
41						
42						
43						
44						

Reporting Period: \_\_\_\_\_

Facility Name: \_\_\_\_\_

Week	Date	Initials	OK(?)	Notes (Indicate any problems found and how they were remedied.)	Waste Pond Freeboard	Date Corrected
45						
46						
47						
48						
49						
50						
51						
52						

**Form 2: Summary Report of Weekly Storm Water Management Structure Inspections**

Reporting Period: January 1, 20\_\_ through December 31, 20\_\_

<b>Facility Information</b> (Please make corrections directly on this form)
Operator's Name
Facility Name
Facility Address

Was the CAFO Weekly Storm Water Management Structure Inspections Log Sheet completed for the entire year? Yes ☐ No ☐  
If No, please explain why the log sheet was not completed for the entire year.

Were water lines inspected daily? Yes ☐ No ☐  
Do the level markers in all containment structures correctly indicate the minimum capacity to contain the runoff and direct precipitation from a 25-year, 24-hour storm event? Yes ☐ No ☐  
Were there any discharges from the facility during the year? Yes ☐ No ☐

If Yes, please provide: the date of discharge, how it was discovered (was it during a routine site inspection?), how long did the discharge last, and how it was stopped.

Date of incident	How was it discovered?	How long did it last and volume?	How was it stopped?

**Certification:**

*I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.*

Name of person making this report (please print): \_\_\_\_\_  
Title: \_\_\_\_\_  
Signature: \_\_\_\_\_  
Date: \_\_\_\_\_



**Form 3:**

**ANNUAL REPORT FORM**

Reporting Period: January 1, 20\_\_ through December 31, 20\_\_  
Report Due Date: January 15, 20\_\_

<b>FACILITY INFORMATION</b> (Please make any corrections directly on this form)
CAFO Operator's Name
CAFO Facility Name
Facility Address
Mailing Address
Telephone Number

<b>ANIMAL POPULATION</b> (Please provide the number of animals in each category)
Milking Cows _____ Dry Cows _____ Heifers _____ Calves _____
Others (specify type and number) _____

<b>MANURE INFORMATION</b>	Units Used : Tons _____ Cubic Yards _____
Manure Produced _____ Manure Spread on Cropland at Facility _____	
Manure Spread on Other Cropland _____	
Manure Stockpiled on Site as of 12/31/ _____	
Manure Hauled Away (Also provide Manure Tracking Manifests, Form 4) _____	
Has the most current nutrient analysis been provided to the recipient of the manure? Yes _____ No _____ N/A _____	
Was Manure Amount Calculated Using the Following Factors? Yes _____ No _____	
1 Milking cow produces approximately 4.1 tons of manure per year	
1 Dry cow produces approximately 4.1 tons of manure per year	
1 Heifer produces approximately 1.5 tons of manure per year	
1 Calf produces approximately 0.6 tons of manure per year	
*1 ton of corral manure equals 2.32 cubic yards and 1 cubic yard of corral manure equals 0.43 tons	

**NUTRIENT MANAGEMENT PLAN (NMP) AND NUTRIENT ANALYSIS**

NMP is Certified      Yes \_\_\_\_\_      No \_\_\_\_\_

**CROP GROWING ACTIVITY**

Number of cropland acres where manure has been applied (Cropland is contiguous to the dairy, where manure was applied and a crop was harvested).

Cropland acres: \_\_\_\_\_ No. of plantings per year:      One \_\_\_\_ Two \_\_\_\_ Three \_\_\_\_

Type of crops grown:

Sudan grass \_\_\_\_\_ Alfalfa \_\_\_\_\_ Winter wheat \_\_\_\_\_

Barley \_\_\_\_\_ Bermuda grass \_\_\_\_\_ corn \_\_\_\_\_ Oats \_\_\_\_\_ Turf Grass \_\_\_\_\_

Vegetables \_\_\_\_\_ Others \_\_\_\_\_

Actual crop yields \_\_\_\_\_

Manure application rates \_\_\_\_\_

Amount of manure spread on each field \_\_\_\_\_

Number of Milkings per day (Dairies only):      One \_\_\_\_\_ Two \_\_\_\_\_ Three \_\_\_\_\_

**COMMENTS:**

**CERTIFICATION:**

*I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.*

Name of person making this report (please print): \_\_\_\_\_

Signature: \_\_\_\_\_

Date: \_\_\_\_\_

Title: \_\_\_\_\_

**Form 4**

**Manure Tracking Manifest**

**INSTRUCTIONS:**

1. Complete one manifest for each hauling event and for each destination. A hauling event may last for several days, as long as the manure is being hauled to the same destination.
2. If there are multiple destinations, complete a separate form for each destination.
3. The CAFO operator must obtain the signature of the hauler upon completion of each manure hauling event.
4. The CAFO operator shall submit manure tracking manifest(s) with the Annual Report to Regional Board.

**OPERATOR'S INFORMATION**

CAFO Operator's Name

CAFO Facility Name

Facility Address

Mailing Address

Telephone Number

**MANURE INFORMATION**

Manure analyzed for nutrients? Yes ☐ No ☐

Most current nutrient analysis of manure provided to the recipient of the manure? Yes ☐ No ☐

**MANURE HAULER INFORMATION**

Name and Address of Hauling Company

Phone Number:

Contact Person Name:

**MANURE DESTINATION INFORMATION**

Hauled to (please check):

- ☐ Composting Facility
- ☐ Regional Treatment Facility
- ☐ Croplands in Riverside County
- ☐ Croplands in San Bernardino County
- ☐ Croplands in other Counties \_\_\_\_\_
- ☐ Out of State

**Amount delivered:** Tons or Cubic Yards  
(Please enter the amount in the box below and circle the appropriate units)

Dates Hauled:

Destination of Haul: \_\_\_\_\_

GPS Coordinates of Destination

Latitude: \_\_\_\_\_

Longitude: \_\_\_\_\_

Destination Receiver of Manure: \_\_\_\_\_

Written permissions or exemptions from the recipient of the manure are valid and in full effect and have been provided to the Regional Board: ☐

Approximate Acreage (If Destination is Cropland) \_\_\_\_\_

Crop(s) Grown on Cropland \_\_\_\_\_

**CERTIFICATION:**

*I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.*

Operator's Signature: \_\_\_\_\_ Date: \_\_\_\_\_

Hauler's Signature: \_\_\_\_\_ Date: \_\_\_\_\_

## NOTICE OF INTENT

TO COMPLY WITH THE TERMS AND CONDITIONS OF THE GENERAL PERMIT TO DISCHARGE  
WASTES FROM CONCENTRATED ANIMAL FEEDING OPERATIONS (DAIRIES AND RELATED FACILITIES)  
(Order No. R8-2018-0001, NPDES No. CAG018001)

**PERMITTEE** (Person/Agency Responsible for Discharge)

Owner/Operator Name: \_\_\_\_\_

Mailing Address: \_\_\_\_\_  
Street City State ZIP

Contact Person: \_\_\_\_\_ Phone (\_\_\_\_) \_\_\_\_\_

E-mail \_\_\_\_\_

**FACILITY (Physical Address)**

Name: \_\_\_\_\_

Location: \_\_\_\_\_  
Street City State ZIP

Contact Person: \_\_\_\_\_ Phone (\_\_\_\_) \_\_\_\_\_

**FACILITY INFORMATION**

Latitude: \_\_\_\_\_ Longitude: \_\_\_\_\_

Topographic Map of Facility \_\_\_\_ Yes \_\_\_\_ No

Total area (acres) \_\_\_\_\_ Cropland (acres) \_\_\_\_\_ Corrals (acres) \_\_\_\_\_

Disposal/Pasture (acres) \_\_\_\_\_ Number of acres contributing drainage \_\_\_\_\_

**ANIMAL POPULATION** (specify number)

Milking Cows \_\_\_\_\_ Dry Cows \_\_\_\_\_ Heifers \_\_\_\_\_

Calves \_\_\_\_\_ Other (specify type) \_\_\_\_\_

**MANURE, LITTER AND/OR WASTEWATER PRODUCTION AND USE**

How much manure, litter, and wastewater is produced annually? \_\_\_\_\_ tons \_\_\_\_\_ gallons

If land applied, how many acres of land under the control of permittee are available for applying  
manure/litter/wastewater? \_\_\_\_\_ acresHow many tons of manure or litter or gallons of wastewater produced will be transferred annually to other  
persons? \_\_\_\_\_ tons \_\_\_\_\_ gallons**TYPE OF CONTAINMENT AND CAPACITY**

Holding Ponds (gallons) \_\_\_\_\_ Evaporation Ponds (gallons) \_\_\_\_\_

**ATTACHMENT C**California Regional Water Quality Control Board  
Santa Ana Region

Lagoons (gallons) \_\_\_\_\_ Other (specify type) \_\_\_\_\_

**TYPE OF STORAGE**

Anaerobic Lagoon:	Total number of days _____	Total capacity _____
Storage Lagoon:	Total number of days _____	Total capacity _____
Evaporation Pond:	Total number of days _____	Total capacity _____
Aboveground Storage Tanks:	Total number of days _____	Total capacity _____
Belowground Storage Tanks:	Total number of days _____	Total capacity _____
Roofed Storage Shed:	Total number of days _____	Total capacity _____
Concrete Pad:	Total number of days _____	Total capacity _____
Impervious Soil Pad:	Total number of days _____	Total capacity _____
Other (specify):	Total number of days _____	Total capacity _____

**NUTRIENT MANAGEMENT PLAN (NMP)**

Will you comply with an existing, approved NMP for this facility? \_\_\_\_\_ Yes \_\_\_\_\_ No

Date of last approved review/revision of the NMP Date: \_\_\_\_\_

Are you submitting a new or amended NMP for approval for this facility? \_\_\_\_\_ Yes \_\_\_\_\_ No

Is the new or amended NMP enclosed? \_\_\_\_\_ Yes \_\_\_\_\_ No

If no, please explain \_\_\_\_\_

**ENGINEERED WASTE MANAGEMENT PLAN (EWMP)**

Will you comply with an existing, approved EWMP for this facility? \_\_\_\_\_ Yes \_\_\_\_\_ No

Date of last approved review/revision of the EWMP Date: \_\_\_\_\_

Are you submitting a new or amended EWMP for approval for this facility? \_\_\_\_\_ Yes \_\_\_\_\_ No

Is the new or amended EWMP enclosed? \_\_\_\_\_ Yes \_\_\_\_\_ No

If no, please explain \_\_\_\_\_

**CERTIFICATION:**

*I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations*

\_\_\_\_\_  
SIGNATURE OF OWNER OF FACILITY\_\_\_\_\_  
PRINT OR TYPE NAME\_\_\_\_\_  
TITLE AND DATE\_\_\_\_\_  
SIGNATURE OF OPERATOR OF FACILITY\_\_\_\_\_  
PRINT OR TYPE NAME\_\_\_\_\_  
TITLE AND DATE

**ATTACHMENT D**

**FACT SHEET**

**For**

**General Waste Discharge Requirements and National Pollutant Discharge Elimination  
System (NPDES) Permit, NPDES NO. CAG018001**

**For**

**Concentrated Animal Feeding Operations (Dairies and Related Facilities)**

**Order No. R8-2018-0001**

## **I. INTRODUCTION**

This Fact Sheet provides the legal basis and the technical rationale for requirements specified in Order No. R8-2018-0001, General NPDES Permit No. CAG018001.

This Order has been prepared under a standardized format to accommodate a broad range of discharge requirements for dischargers in California. Unless a section or subsection of this Order is specifically identified as “not applicable”, the section or subsection is fully applicable to the Dischargers. Only those sections or subsections of this Order that are specifically identified as “not applicable” have been determined to not apply to the Dischargers.

## **II. FEDERAL CLEAN WATER ACT AND CONCENTRATED ANIMAL FEEDING OPERATIONS (CAFOS)**

The requirements specified in this Order are based on the federal Clean Water Act (CWA) and its implementing regulations contained in the Code of Federal Regulations (C.F.R.); the California Water Code (Water Code) and its implementing regulations; and plans and policies adopted by the State Water Resources Control Board (State Board) and the Santa Ana Regional Water Quality Control Board (Regional Board), including the Water Quality Control Plan for the Santa Ana River Basin (Basin Plan).

In 1972, the Clean Water Act established the National Pollutant Discharge Elimination System (NPDES) permit program for point source discharges. Chapter 5.5, Division 7 of the California Water Code incorporates requirements necessary for the state to implement portions of the Clean Water Act, including the NPDES permit program. The State Board and the nine regional water quality control boards are the permitting authorities that administer the NPDES permit program in California with the approval of the U.S. Environmental Protection Agency (USEPA).

The NPDES program allows the permitting authority to issue a permit for the discharge of any pollutant or combination of pollutants. 33 U.S.C. § 1342(a)(1). The CWA prohibits the discharge of pollutants to surface waters. 33 U.S.C. § 1311. If a facility requests a permit, it can discharge in accordance with the permit conditions and will be treated as a discharge from a point source. 33 U.S.C. §§ 1342, 1362(14).

It is appropriate to regulate CAFOs under an NPDES permit. Federal regulations define Animal Feeding Operations (AFOs) as operations where animals have been, are, or will be stabled or confined and fed or maintained for a total of 45 days or more in any 12-month period, and where vegetation is not sustained in the confinement area during the normal growing season. 40 C.F.R. § 122.23(b)(1)(i). Federal regulations define a CAFO as any AFO that either meets a certain animal population threshold, or, regardless of population, is determined to be a significant contributor of pollutants to waters of the United States by the appropriate authority. 40 C.F.R. § 122.23(b)(4) & (6). Section 502 of the CWA states that all CAFOs from which

pollutants are or may be discharged are point sources and thus are subject to NPDES permitting requirements.

When considering designating an AFO as a CAFO, as the result of being a significant contributor of pollutants, the appropriate authority must consider certain factors. These factors include, in part, the location of the AFO relative to surface waters, the slope, rainfall and other factors that increase the likelihood or frequency of discharges, and the impact of the aggregate amount of waste discharged from multiple AFOs in the same geographic area.

The Regional Board, as the designated authority, has determined that it is appropriate to designate all AFOs with a herd size of more than 20 cows or 50 heifers or calves within the Region as significant sources of pollutants subject to waste discharge requirements. The discharge of wastes from the AFOs within the Region are to waterbodies that are tributary to the Santa Ana River or the San Jacinto River. Therefore, the acronym "CAFO" will be used to describe all facilities regulated under Order No. R8-2018-0001.

Water Code Section 13263(i) and 40 C.F.R. § 122.28 allow the Regional Board to issue general permits to regulate discharges of wastes that meet the following criteria.

- a. Waste discharges involving the same or substantially similar types of operations;
- b. Discharge the same types of wastes;
- c. Require the same or similar operating conditions;
- d. Require the same or similar monitoring; and
- e. Are more appropriately regulated under a general permit rather than an individual permit.

The discharges regulated by Order No. R8-2018-0001 satisfy the criteria in 40 C.F.R. § 122.28 and the Water Code. As such, this Order is being issued as a general NPDES permit.

CAFO facilities within the region have been regulated under a general NPDES permit since 1994. Currently, the CAFOs are regulated under General NPDES No. CAG018001, Order No. R8-2013-0001, adopted by the Regional Board on June 7, 2007. Order No. R8-2013-0001 expired on June 7, 2018. Order No. R8-2018-0001 renews the expired General NPDES permit.

### **III. APPLICABLE FEDERAL AND STATE CAFO REGULATIONS**

The USEPA enacted CAFO regulations in 1976, 2003, 2008, and 2012. The 1976, 2003 and the 2008 regulations were challenged in the U.S. District and/or Appellate courts. The revised CAFO regulations issued by the USEPA in 2003, 2008 and 2012 were in response to the various court decisions. On July 19, 2012, the USEPA issued its final rule revising the CAFO permit regulations. The CAFO regulations are contained in 40 C.F.R. §§122.21, 122.23, 122.28, 122.42, 122.62 and 412.



The 2003 rule required all CAFOs to apply for an NPDES permit whether or not they discharged unless a “no potential to discharge” determination was approved by the permitting authority. The Second Circuit court vacated the 2003 rule’s “duty to apply” and held that the permitting authority cannot require the CAFOs to apply for a permit based on a “potential to discharge.” In this decision, the Second Circuit upheld USEPA’s exclusion of agricultural storm water runoff from the NPDES permit requirements. This decision also indicated that the Nutrient Management Plans that were required under the 2003 rules were essentially “effluent limits” that required the permitting authority’s review to determine compliance with the permit.

On November 20, 2008, the USEPA published the 2008 rule that required among other things: (1) a Nutrient Management Plan with the NPDES permit application for any application of manure and/or process wastewater to cropland. The Plan must be incorporated into the permit as enforceable effluent limitations; and (2) all CAFOs that “propose to discharge” must apply for an NPDES permit unless a voluntary certification is made by the CAFO that the facility is designed, constructed, operated and maintained to prevent any discharge. This 2008 rule essentially established a “duty to apply” liability scheme. The 2008 rule was petitioned by a number of the industry groups.

These petitions were consolidated and on March 15, 2011, the Court of Appeals for the Fifth Circuit issued its ruling regarding the 2008 rule. It held that the USEPA has no authority to require a CAFO without a discharge to apply for an NPDES permit. Furthermore, the Court also invalidated the “duty to apply” liability scheme.

On July 19, 2012, USEPA issued its final rule to revise the CAFO permit regulation. In the 2012 rule, the USEPA removed the requirement that CAFOs that “propose to discharge” must seek NPDES permit coverage. This Order implements the federal CWA, USEPA regulations, and state laws and regulations applicable to CAFOs.

This General NPDES permit does not require CAFOs that do not discharge to surface waters to seek NPDES permit coverage. However, CAFO operations could adversely impact surface and groundwater quality. Those CAFOs that discharge pollutants to surface waters but do not get coverage under this General NPDES Permit, alternatively must obtain individual waste discharge requirements pursuant to state law. At the October 26, 2012 Regional Board meeting, Regional Board staff discussed the status of the dairy permit and the trade associations representing the CAFOs expressed their support for reissuance of the existing permit as a general NPDES permit.

Title 27 of the California Code of Regulations, Division 2, Subdivision 1, Chapter 7, Subchapter 2, Article 1 prescribes minimum standards for discharges of animal waste at confined animal facilities to protect both surface and ground water. Section 22562 of Title 27 also requires CAFOs to design and construct retention ponds to retain all facility wastewater generated, together with all precipitation on, and drainage through, manured areas during a 25-year, 24-hour storm. The retention ponds are to be lined with, or underlain by, soils which contain at least 10 percent clay and not more than 10 percent gravel or artificial materials of equivalent impermeability. Title 27, section 22562(d). In addition, there are flood protection requirements for CAFOs. Title 27, section 22562(c).

#### IV. DAIRY WASTES AND THEIR IMPACTS ON WATER QUALITY

According to Regional Board records of Annual Reports submitted for the 2017 reporting period, there are approximately 109 dairy related AFOs in the Santa Ana Region. Of these, 84 are in the Santa Ana River Basin and 25 are in the San Jacinto River Basin. There are approximately 126,000 animals on dairy facilities in the Region. These animals consist of 67,000 milking cows; 11,400 dry cows; 31,500 heifers; 13,000 calves; and 3,100 others (beef cows, bulls, horses, etc.).

CAFO operations produce wastes consisting of manure and urine excreted by the animals, wastewater from the milk barn, litter and storm water runoff through manured areas. These wastes generally contain high levels of bacteria; nutrients (including nitrogen, phosphorus, potassium and ammonia compounds); salts (total dissolved solids, TDS); hormones; and biochemical and chemical oxygen demands (indicators of decomposable materials).

A study conducted by the University of California Committee of Experts for the Central Valley Region recommends using an average nitrogen excretion rate of 462 grams/head/day for lactating cows and 195 grams/head/day for dry cows<sup>1</sup>. An adult cow typically spends 305 days per year lactating and 60 days per year dry<sup>2</sup>. Therefore, 1,000 adult cows will produce approximately 339,000 pounds (169.5 tons) of nitrogen per year. Between 20% and 40% of nitrogen from wastewater and manure in storage lagoons and corrals is emitted to the atmosphere as ammonia<sup>3</sup>. Additional emissions will occur as part of land application of wastewater and manure.

In addition to nitrogen, the average adult dairy cow will excrete 427 pounds per year of salts as sodium, potassium, and chloride<sup>4</sup>. The total excreted salts are typically 50% higher and up to 100% higher than the combination of sodium, potassium and chloride<sup>5</sup>. Assuming typical conditions of 50%, 1,000 adult cows will produce approximately 641,000 pounds (320 tons) of salt per year in addition to nitrogen. Unlike nitrogen, no losses occur with these salts in the handling of manure or wastewater.

If nutrients and decomposable materials from the CAFOs enter waterways, they can deplete dissolved oxygen which could adversely impact aquatic life. High bacteria levels could impact recreational activities and ammonia could cause aquatic toxicity. Bacteria, salts and nitrates in the dairy wastes could infiltrate into groundwater from waste containment facilities. In groundwater, nitrate levels can increase to unhealthy levels, which can cause Blue Baby Syndrome, a potentially fatal blood disorder, if the water is consumed.

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<sup>1</sup> Committee of Experts on Dairy Manure Management, 2003. *Managing dairy manure in the central valley of California*, University of California, Division of Agriculture and Natural Resources, September 2003 (revised June 2005).

<sup>2</sup> *Ibid.*

<sup>3</sup> *Ibid.*

<sup>4</sup> *Ibid.*

<sup>5</sup> *Ibid.*

Dairies also produce atmospheric emissions. Dairy wastewater is generally stored in waste storage lagoons or other containment structures. Bacterial decomposition of wastes in the storage lagoons also produces methane and ammonia gas. This Order does not regulate the operation of new sources of atmospheric emissions.

Discharges to waters of the U.S. from the CAFOs can occur in storm water runoff from the production area or from the land application area<sup>6</sup>. Discharges to groundwater can occur in wastewater and precipitation that percolates into the soil underlying waste containment structures and waste stockpiles at the facility. Proper management of wastes from CAFOs is essential to protect surface and groundwater resources of the Region. If left unregulated, these discharges of wastes in storm water runoff and wastewater from CAFOs in the Chino Basin (Chino-North, Chino-East, and Chino-South Groundwater Management Zones) have a potential to affect Chino Creek, Mill Creek and Reach 3 of the Santa Ana River. Pursuant to CWA section 303(d), these surface waterbodies are listed as impaired due, in part, to bacterial indicators.

The Chino Basin was once considered to have the highest concentration of dairy animals in the world, with approximately 350 dairies and over 300,000 animals<sup>7</sup>. During the past 20 years, however, the dairies have been steadily leaving this area. According to the dairy operators' 2017 annual reports, there are currently 84 facilities in the Chino Basin with a total of 78,000 animals. Although the waste loading from the dairies has decreased significantly, historic application of manure and process wastewater to the ground in the Chino Basin has resulted the accumulation of salts in the underlying soils and groundwater. The result has been significant groundwater degradation, specifically due to high levels of total dissolved solids (TDS) and nitrate.

There are an additional 25 CAFO facilities in the San Jacinto River Basin, with a total of 48,000 animals. Wastes from CAFOs in the San Jacinto River Basin have a potential to affect the San Jacinto River, Canyon Lake and Lake Elsinore if left unregulated. Canyon Lake and Lake Elsinore are included on the CWA section 303(d) list of impaired water bodies due to nutrients. Nitrate and phosphorus from various sources, including CAFOs, is considered to be the primary cause of algae blooms in Lake Elsinore, the largest natural freshwater lake in Southern California. These algae blooms deplete oxygen in the lake, creating fish kills and other conditions that affect the recreational uses of the lake and aesthetics of the area. Excessive nutrient discharges to Canyon Lake have also resulted in algae blooms and reduced oxygen levels.

Prior to 1994, Regional Board's regulatory approach was to issue individual waste discharge requirements. However, frequent changes in the herd size, location, and operators or owners of such facilities combined with the related demand for permit rescission and issuance far exceeded the available staff resources. Therefore, in 1994, the Regional Board adopted Order No. 94-7, the first general NPDES for these facilities. Order No. 94-7 was replaced by Order No. 99-11 which was later replaced by Order No. R8-2013-0001. Order No. R8-2013-0001 expired on June 1, 2018. Adoption

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<sup>6</sup> Land application area is any area under the control of a CAFO owner or operator where manure, bedding, or process water is applied. 40 C.F.R. § 122.23(b)(3).

<sup>7</sup> Santa Ana Watershed Planning Agency, 1974. Dairy waste management. Albert A. Webb Associates, March 1974.

of Order No. R8-2018-0001 is an appropriate way to continue regulatory oversight of the CAFOs within the Region.

## **V. PERMIT COVERAGE/NOTIFICATION REQUIREMENTS**

The purpose of this Order is to regulate the discharge of pollutants from CAFOs so that the water quality standards of receiving waters are attained and maintained. To obtain coverage under this Order, the Discharger must submit a completed Notice of Intent (NOI) form, an Engineered Waste Management Plan (EWMP) for all facilities where the herd is kept, a Nutrient Management Plan (NMP) if the facility is proposing to apply CAFO biomass to cropland owned or controlled by the Discharger, and the first annual fee. All facilities currently regulated under Order No. R8-2013-0001 have approved EWMPs and NMPs (where applicable). These plans need to be updated only if there are substantial changes in its operations that affect the Discharger's ability to comply with this Order or if the Discharger does not intend to implement them.

## **VI. DISCHARGE DESCRIPTION**

(See Section IV, above)

### **A. Description of Wastewater and Biosolids Treatment or Controls [Not Applicable]**

### **B. Discharge Points and Receiving Waters**

The CAFO facilities within the Region are located either within the Santa Ana River Basin or the San Jacinto River Basin. Discharges from these facilities could impact Santa Ana River and its tributaries, San Jacinto River, Canyon Lake, Lake Elsinore and the groundwater management zones within these areas.

### **C. Summary of Existing Requirements and Self-Monitoring Report (SMR) Data**

Order No. R8-2013-0001, which this Order replaces, prohibited discharges to surface waters other than from facilities designed and maintained to contain process wastewater, including runoff and direct precipitation resulting from a 25-year, 24-hour storm event, or equivalent. In addition, Order No. R8-2013-0001 required the Dischargers to develop and implement an EWMP and an NMP, where applicable. The Dischargers were also required to submit an Annual Report.

### **D. Compliance Summary**

The Annual Reports submitted by the Dischargers indicate that the CAFOs within the Region are mostly in compliance with the permit requirements.

The Dischargers have submitted EWMPs and those who land-apply CAFO biomass have also submitted their NMPs.

#### **E. Planned Changes**

Any change in ownership of the facility and changes in the herd size, treatment and containment systems and cropland acreage could trigger a need to update the EWMPs and the NMPs.

### **VII. APPLICABLE PLANS, POLICIES, AND REGULATIONS**

#### **A. Legal Authorities**

(See Sections II and III for applicable state and federal laws and regulations)

#### **B. California Environmental Quality Act (CEQA)**

This Order is both an NPDES permit, issued pursuant to federal law, and waste discharge requirements (WDRs), pursuant to State law. This Order only regulates existing facilities that are currently regulated under the 2013 General Permit (Order No. R8-2013-0001). California Code of Regulations, Title 14, Section 15301 exempts existing facilities from CEQA requirements.

Furthermore, the action to adopt an NPDES permit is exempt from the provisions of CEQA, Public Resources Code sections 21000-21177, under Water Code Section 13389. Requirements for “new sources” as defined in Section 306 of the CWA are not covered by the exemption. A “new source” must demonstrate that it qualifies as an existing facility under the CEQA Guidelines to be considered for coverage under this Order.

Food and Agricultural Code Section 33487 exempts state agencies from any requirement to prepare a CEQA document for CAFOs under the following circumstances: (1) when the dairy will be constructed and operated in accordance with the minimum standards in Chapter 5 of the Food and Agricultural Code; (2) where the applicable local agencies have completed all necessary reviews and approvals including that required by CEQA; and (3) where a permit for construction was issued by a local agency on or after the effective date of Food and Agricultural Code section 33487 and construction has begun.

As such, the issuance of this Order complies with CEQA requirements.

#### **C. Basin Plan**

The Regional Board adopted a revised Water Quality Control Plan for the Santa Ana Region (Basin Plan) that became effective on January 24, 1995 (Resolution No. 94-1). The Basin Plan designates beneficial uses, establishes water quality objectives, and contains implementation programs and policies to achieve those objectives for all waters in the Santa Ana Region. Sections I.M.30 and 31 of the Order list the

designated beneficial uses of the receiving waters that could be impacted by the CAFO discharges.

On January 22, 2004, the Regional Board adopted Resolution No. R8-2004-0001, amending the existing Basin Plan for the Santa Ana River Basin. The amendment (TDS/Nitrogen Basin Plan Amendment) included revised groundwater sub-basin boundaries (now called groundwater management zones), revised TDS and nitrate-nitrogen quality objectives for groundwater, revised TDS and nitrogen waste load allocations (WLAs) and changes to specific surface water objectives. The changes to surface water objectives include revised TDS and nitrogen objectives, revised reach designations and revised beneficial use designations. This Order implements relevant provisions of the approved N/TDS Basin Plan Amendment.

As part of the update of the TDS/Nitrogen Management plan in the Basin Plan, the Chino Basin Watermaster and the Inland Empire Utilities Agency (IEUA) proposed that alternative, less stringent TDS and/or nitrate-nitrogen water quality objectives be adopted for the Chino-North and Cucamonga Groundwater Management Zones. These proposals were based on additional consideration of the factors specified in Water Code section 13241 and the requirements of the State's antidegradation policy (State Board Resolution No. 68-16). Since the less stringent objectives would allow a lowering of water quality, the aforementioned agencies were required to demonstrate that their proposed objectives would protect beneficial uses, and that water quality consistent with maximum benefit to the people of the state would be maintained.

Appropriate beneficial use protection/maximum benefit demonstrations were made by the Chino Basin Watermaster/Inland Empire Utilities Agency (IEUA) to justify alternative "maximum benefit" objectives for the Chino-North and Cucamonga Groundwater Management Zones. These "maximum benefit" proposals entail commitments by the agencies to implement specific projects and programs. While these agencies' efforts to develop these proposals indicate their interest to proceed with these commitments, unforeseen circumstances may impede or preclude progress. To address this possibility, the 2004 Basin Plan Amendment includes both the "antidegradation" and "maximum benefit" objectives for the subject waters. Fulfillment of the commitments by the agencies equates to maximum benefit, and the "maximum benefit" objectives included in the Basin Plan Amendment for these waters apply for regulatory purposes. Failure to fulfill the commitments, as determined by the Regional Board in its discretion, means that the prerequisite "maximum benefit" has not been provided and that accordingly the "antidegradation" objectives for these waters will apply. To date, these agencies have been implementing the commitments necessary to demonstrate maximum benefit, so the maximum benefit water quality objectives apply for regulatory purposes of this Order.

The application of the "maximum benefit" objectives relies on implementation of a specific program of projects and requirements, which are a part of the Chino Basin Optimum Basin Management Program (OBMP), by the Chino Basin Watermaster and the IEUA. The OBMP was developed by the Watermaster under the supervision of the

San Bernardino County Superior Court. The OBMP is a comprehensive, long-range water management plan for the Chino Basin, including the Chino-North and Cucamonga Groundwater Management Zones. The OBMP includes the use of recycled water for basin recharge, initially in the Chino-North Groundwater Management Zone. The OBMP also includes the capture and recharge of increased quantities of storm water runoff, recharge of imported water when its TDS concentrations are low, improvement of water supply by desalting poor quality groundwater, and enhanced wastewater pollutant source control programs. The OBMP seeks to provide enhanced yield for the Chino Basin and to provide reliable water supplies for development expected to occur within the Basin. The OBMP also includes management activities that would result in the hydraulic isolation of Chino Basin groundwater from the Orange County Management Zone, thus insuring the protection of downstream beneficial uses and water quality. Wastewater discharges and some manure from CAFOs in the Chino Basin have been factored into the OBMP.

Order No. 99-11 was adopted by the Regional Board with a prohibition on the disposal of manure in the Chino Basin through land application. The use of manure as a fertilizer was also prohibited in the Chino Basin “unless a plan, acceptable to the Executive Officer, is implemented which mitigates the effects of that use on the underlying groundwater sub-basin”. This prohibition was necessitated in part by the lack of assimilative capacity of the underlying groundwater and by the lack of progress in developing a program to offset salt loading from dairies.

Shortly after adopting Order No. 99-11, the Regional Board adopted Cease and Desist Order (CDO) No. 99-65. CDO No. 99-65 modified the prohibition in Order No. 99-11 to allow the land application of manure at agronomic rates provided that progress was being made “toward the construction and operation of a second desalter within the Chino Basin”. Among other things, CDO No. 99-65 established time schedules for the affected Dischargers to comply with other requirements of Order No. 99-11.

When the maximum benefit objectives were adopted by the Regional Board with Resolution No. 2004-0001, they effectively created assimilative capacity in the groundwater management zones where the remaining dairies are located. This assimilative capacity, as noted above, is generally conditioned upon the success of the OBMP. Among its accomplishments, the OBMP has since resulted in the construction and operation of a second desalter in the Chino Basin. This second desalter, along with the assimilative capacity, allowed the Regional Board to approve nutrient management plans for dairies in the Chino Basin shortly after the General CAFO Permit, Order No. 2007-0001, was adopted.

#### **D. National Toxics Rule (NTR) and California Toxics Rule (CTR). [Not applicable]**

USEPA adopted the National Toxics Rule (NTR) on December 22, 1992, and later amended it on May 4, 1995 and November 9, 1999. About forty criteria in the NTR applied in California. On May 18, 2000, USEPA adopted the California Toxics Rule (CTR). The CTR promulgated new toxics criteria for California and, in addition, incorporated the previously adopted NTR criteria that were applicable in the state. The CTR was amended on February 13, 2001. The CTR and NTR contain water

quality criteria for priority pollutants in discharges to surface water. However, the *Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California* adopted by the State Water Resources Control Board (State Implementation Policy or SIP) states that the Policy does not apply to regulation of storm water discharges. The Regional Board believes that compliance with Water Quality Standards through implementation of BMPs is appropriate for regulating dairy discharges. The USEPA articulated this position on the use of BMPs in storm water permits in the policy memorandum entitled, "Interim Permitting Approach for Water Quality-Based Effluent Limitations in Storm Water Permits" (61 FR 43761, August 9, 1996). The USEPA also has articulated this position with respect to implementing TMDLs in their policy memorandum entitled *Establishing Total Maximum Daily Load (TMDL) Wasteload Allocations (WLAs) for Storm Water Sources and NPDES Permit Requirements Based on those WLAs*, November 22, 2002. This Order is consistent with the SIP and the USEPA's November 22, 2002 memorandum.

**E. State Implementation Policy. [Not Applicable]**

(See Section D above)

**F. Alaska Rule**

(See Finding I.X.41. of the Order)

**G. Antidegradation Policy**

Federal regulations at 40 C.F.R. § 131.12 requires that State water quality standards include an antidegradation policy consistent with the federal policy. The State Water Board established California's antidegradation policy in State Board Resolution 68-16, which incorporates the requirements of the federal antidegradation policy. Resolution 68-16 requires that existing quality of waters be maintained unless degradation is justified based on specific findings.

The federal anti-degradation policy as set forth in 40 C.F.R. § 131.12 and the state's antidegradation policy as set forth in State Board Resolution No. 68-16, "Statement of Policy with Respect to Maintaining High Quality Waters in California" are applicable to NPDES permitting process, including permit renewals. The federal policy only applies to surface water quality and it protects existing beneficial uses, includes special provisions for waters designated as an "outstanding natural resource" and establishes baseline water quality as the best water quality that existed since the adoption of the policy in 1975.

The State anti-degradation policy is more inclusive. It is applicable to both surface and groundwaters; incorporates the federal policy, protects existing and reasonable potential beneficial uses and establishes the baseline water quality as the best water quality that existed since 1968, unless subsequent lowering was due to regulatory action consistent with Resolution No. 68-16.



The state has developed guidance for the implementation of its anti-degradation policy in the Administrative Procedures Manual, APU Number 90-004 and in a February 16, 1995 Questions and Answers document<sup>8</sup>. The USEPA has provided guidance through its “Questions and Answers on Antidegradation” and Guidance on implementing the Antidegradation Provisions of 40 C.F.R. § 131.12”<sup>9, 10</sup>. The State Board also published an October 7, 1987 legal memorandum, “Federal Antidegradation Policy”<sup>11</sup>. The following antidegradation analysis is based on these regulations and guidance documents.

An antidegradation analysis is required if the proposed action (in this case renewal of the NPDES permit) causes a lowering of water quality in “high quality” receiving waters. “High quality waters” are those where the baseline water quality is better than the prescribed water quality objective. The baseline water quality is the best quality of the receiving water that has existed since 1968, minus any degradation due to regulatory action consistent with state and federal anti-degradation policies.

Based on the water quality objectives and the existing water quality, there are three tiers to be considered with respect to water quality objectives and existing water quality in applying federal antidegradation principles:

1. Tier I: Existing water quality is lower than the water quality objectives.
2. Tier II: Where the baseline water quality is better than the water quality objectives (high quality waters).
3. Tier III: Specially designated as “Outstanding National Resource Waters” (there are no Tier 3 waters within the Santa Ana Region; Lake Tahoe and Mono Lake are the two Tier III waterbodies in California).

For Tier I (where the existing water quality is lower than the water quality objectives) or Tier III (outstanding national resource waters) waterbodies, if the proposed discharge causes a lowering of the existing water quality, that discharge should be prohibited.

For Tier II (high quality waters, where the baseline water quality is better than the prescribed water quality objective), any lowering of water quality has to be consistent with the maximum benefit to the people of the state.

Generally, a lowering of water quality is triggered by:

1. New discharges;
2. Expansion of existing facilities;
3. Reduction in the level of treatment for an existing discharge;
4. Relocation of outfalls; and/or

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<sup>8</sup> [http://www.waterboards.ca.gov/water\\_issues/programs/npdes/docs/apu\\_90\\_004.pdf](http://www.waterboards.ca.gov/water_issues/programs/npdes/docs/apu_90_004.pdf)

<sup>9</sup> Water Quality Standards Handbook, Second Draft, USEPA, June 1989

<sup>10</sup> All these documents are available at: [http://www.waterboards.ca.gov/water\\_issues/programs/npdes/docs/apu\\_90\\_004.pdf](http://www.waterboards.ca.gov/water_issues/programs/npdes/docs/apu_90_004.pdf)

<sup>11</sup> Available at: [http://www.waterboards.ca.gov/water\\_issues/programs/npdes/docs/apu\\_90\\_004.pdf](http://www.waterboards.ca.gov/water_issues/programs/npdes/docs/apu_90_004.pdf) (Some of the State Board decisions related to antidegradation is also available at this website.)

5. Substantial increases in mass emissions of pollutants.

For high quality waters, if a discharge of waste would lower the baseline water quality, then antidegradation requirements must be met. Resolution 68-16 establishes a two-step process to comply with the policy. In the first step, an antidegradation analysis should demonstrate: (1) beneficial uses would continue to be protected; (2) the established water quality objectives would be met; and (3) any lowering of water quality would be consistent with maximum benefit to the people of California. In the second step, any discharges to high quality waters must implement best practicable treatment or control to assure that a pollution or nuisance will not occur and to assure the highest water quality consistent with maximum benefit to the people of California. Best practicable treatment or control means levels that can be achieved using best efforts and reasonable control methods.

The proposed Order does not permit new discharges; the level of waste treatment required under the proposed Order is not any less stringent than the existing Order; the outfalls are not being relocated; and the Order does not authorize any increases in mass emissions of pollutants. In fact, there is approximately a 25% reduction in the mass emissions from the previously permitted discharges due to a reduction in the total number of animals at the dairies.

This Order covers only existing facilities. Although these facilities may change ownership and the herd size may vary, the overall waste load is not increasing. The waste load has been steadily decreasing as these operators relocate their facilities outside of the Region. It is anticipated that this trend will continue. The proposed Order merely renews the general NPDES permit for existing dairies within the Santa Ana Region. It is not applicable to any new facilities.

Order No. R8-2013-0001, the existing NPDES permit for the CAFOs in the Region, regulated 127 CAFO facilities with a total animal population of 172,000. According to Annual Reports submitted by the dairy operators for 2017, the number of CAFOs has been reduced to 109 and the total animal population has reduced to 126,000. Any new discharges that will result in additional waste loads will not be able to seek coverage under this general permit. Those discharges will need to be addressed under an individual permit and an appropriate antidegradation analysis may need to be conducted at that time.

There are no high-quality waters in the San Jacinto Watershed, and as such the antidegradation policy does not apply to discharges in that area. Dischargers in the San Jacinto Watershed are required to meet the applicable water quality objectives, or more stringent limitations if such limitations could be met by the use of "best efforts."

A full antidegradation analysis may not be necessary in this case for the following reasons.

1. The permit is only applicable to existing facilities. There is no reason to believe that existing water quality will be lowered due to the proposed action, namely

renewal of an existing NPDES permit for a reduced number of existing facilities. There is a substantial reduction in the number of animals and consequently in the mass emissions of pollutants. As such, the discharges from the existing CAFOs are not expected to lower water quality in the receiving waters. According to APU 90-004, "if the Regional Board has no reason to believe that existing water quality will be reduced due to the proposed action, no antidegradation analysis is required." (APU 90-004, Page 2).

2. With respect to surface waters, a discharge is allowed only in case of severe storm events (25-year, 24-hour storm or higher intensity storms). Therefore, any reduction in water quality from such a discharge will be temporary and will not result in any long-term deleterious effects on water quality as the discharges will cease after the storm event. (APU 90-004, Page 2, Item 2). No antidegradation analysis is required.
3. The CAFOs regulated by this Order are located either within the upper Santa Ana Basin (Chino Basin) or the San Jacinto Watershed. During the adoption of the water quality objectives for some of the groundwater management zones within these basins, a maximum benefit analysis was conducted for the Chino North and San Jacinto upper pressure groundwater management zones. The maximum benefit programs include implementation strategies for the Chino Basin and the San Jacinto upper pressure ground water management zones that are outlined in Tables 5-8a and 5-11, respectively, of the Basin Plan. The Chino Basin Optimum Basin Management Program and Hemet/San Jacinto Water Management Plan are designed to address water quality problems from various types of discharges into these groundwater management zones. The Program and Plan have been approved by their respective agencies and have been adequately subjected to environmental and economic analyses in an environmental impact report. The Program and Plan consider all discharges and offset programs to prevent water quality degradation and/or to restore water quality. As such, a separate analysis is not necessary during this permit renewal process<sup>12</sup>.

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<sup>12</sup> State Water Resources Control Board. Administrative Procedures Update No. 90-004, effective date: July 2, 1990 (p 2, item 4).

The CAFOs regulated by this Order are located within the following groundwater management zones (see Table 1, below):

**Table 1**  
**Location of Dairies and the Respective Groundwater Management Zones**

Groundwater Management Zone	Number of Dairies	Max Benefit?	High Quality Water?
San Jacinto Upper Pressure	7	Yes <sup>13</sup>	No
San Jacinto Lower Pressure	1	No	No
Lakeview/Hemet North	16	No	No
Menifee	1	No	No
Elsinore	1	No	No
Chino North	79	Yes	Yes for TDS. No for NO <sup>3</sup> -N
Chino South	1	No	No
Chino East	1	No	No
Prado Basin (Wetland)	1	No	No
Arlington	1	No	No

(The table above only identifies high quality waters that are listed in the Basin Plan.)

Table 1 indicates that 86 dairies in the region are located within a groundwater management zone for which a complete “maximum benefit analysis”, including anti-degradation analysis, has been completed. The Chino Basin Optimum Basin Management Program includes specific programs and projects that the Chino Basin Watermaster and the Inland Empire Utilities Agency are required to implement. The Optimum Basin Management Program also considered waste discharges from the CAFOs in Chino Basin. The dairies that are located within other groundwater management zones are prohibited from discharging wastes into those basins that would lower the water quality unless a program is being developed that would offset all discharges of waste exceeding the water quality objective.

There are a number of operating and proposed offset programs to address salt and nutrient problems in the groundwaters of the region. In the Chino Basin area, there are two desalters operated by the Chino Basin Desalter Authority. The Chino Basin

<sup>13</sup> The Regional Board approved the Maximum Benefit Analysis for this groundwater management zone; other approvals are pending for this Analysis.

Desalter Authority is a Joint Exercise of Powers Agency formed between Jurupa Community Services District, the Santa Ana River Water Company, the Cities of Chino, Chino Hills, Norco and Ontario, Western Municipal Water District and the Inland Empire Utilities Agency. The Chino Desalters pump groundwater from lower Chino Basin, purify it through reverse osmosis or ion exchange processes, and distribute the product water to member agencies. The brine wastes from the treatment processes are discharged into a regional brine line where they are ultimately conveyed to the ocean. Chino Desalter I extracts groundwater from 14 wells and has a treatment capacity of 14.2 million gallons per day. Chino Desalter II pumps water from 8 wells and has a capacity of 10 million gallons per day. The Regional Board considers these desalters as acceptable offset projects for waste discharges to the various groundwater management zones where the CAFO facilities are located.

The CAFO facilities within the Chino Basin area, represented by the Chino Basin Overlying Agricultural Pool, are signatories to an agreement: "Agreement Regarding an Alternative Water Supply Source for the Replenishment Obligation of the Chino Basin Desalter", July 10, 1996. This is an agreement between the Regional Board, the Chino Basin Watermaster, the Chino Basin Appropriative Pool, the Chino Basin Overlying (Agricultural) Pool and the Chino Basin (Non-Agricultural) Pool. This agreement mandates salt offset requirements on the Overlying Agricultural Pool members.

The Arlington Desalter extracts and treats groundwater from the Arlington Groundwater Management Zone. There are no operating dairies that impact this Zone.

Eastern Municipal Water District (Eastern) operates two desalters in the San Jacinto watershed: (1) Perris I; and (2) Menifee. These facilities have a combined capacity of 8 million gallons per day. Eastern is also proposing to construct another desalter, Perris II, with a design capacity of 5.4 million gallons per day.

On behalf of the CAFO operators in the San Jacinto Basin, the Western Riverside County Agriculture Coalition has submitted a Dairy Salt Offset Proposal to Eastern Municipal Water District<sup>14</sup>. The proposed Order requires the Dischargers to participate in the offset programs for any discharge of wastes in excess of the water quality objectives to these basins as further discussed in Section VII.

The second step of an anti-degradation analysis, the Regional Board must consider best practicable treatment or control (BPTC) of the discharge necessary to avoid a pollution or nuisance and to maintain the highest water quality consistent with the maximum benefit to the people of the State. In considering BPTC, costs for the treatment or control should be considered. The analysis must compare the proposed method to existing proven technology; evaluate performance data, and compare alternative methods of treatment or control. The Regional Board must also consider USEPA-promulgated best available technology economically achievable

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<sup>14</sup> Dairy Salt Offset Proposal to EMWD, by the Western Riverside County Agriculture Coalition (by Pat Boldt, WRCAC Executive Director)

(BAT). The USEPA had not promulgated any BAT that is applicable to groundwater protection for the CAFOs. Nevertheless, the state's Anti-Degradation Policy applies to both surface and groundwater.

The proposed Order requires the Dischargers to continue to maintain and properly operate the existing waste containment structures. One option to ensure groundwater protection from these waste ponds is to fully line these ponds with impermeable liners, such as high-density polyethylene liners (HDPE) or clay liners. Regional Board staff has considered cost estimates for projects within the region.

Approximately ten years ago, the Natural Resources Defense Council (NRDC) sued Glenn Gorzeman Dairy and entered into a settlement agreement that included stipulations for lining the dairy's ponds. According to information provided by Mr. Gorzeman to Board staff, the total cost of the liner installation was approximately \$200,000. Mr. Gorzeman indicated that, due to the financial burden from this requirement, the dairy could not continue in business. The dairy discontinued its operations within two to three years of lining the ponds.

Western United Dairymen indicated that the approximate cost of HDPE liners today is \$100,000 to \$200,000 (depending upon the size of the ponds) and the additional cost of cleaning the existing ponds and lining them would be from \$100,000 to \$150,000. Consequently, the total cost of retrofitting the existing ponds with liners (or installing new ponds with liners) would be from \$200,000 to \$350,000.

A cost estimate of liners was conducted by Washington State University<sup>15</sup>. The cost of constructing a lagoon with a liner and, if native soil is unsuitable to support the liner, imported fill, ranges between \$90,000 to \$625,000. This cost does not include the cost of cleaning existing lagoons and regrading.

The dairies are currently under financial distress and uncertainty due to global competition for commodities, fluctuation in global demand, and reduced federal price supports<sup>16, 17, 18</sup>. The added cost of such a regulatory requirement would force many dairies to entirely discontinue their operations. This would have economic impacts such as loss of local and state jobs, energy and environmental concerns related to long distance hauling of dairy products, and loss of tax revenue for local municipalities.

For reasons explained above, the Dischargers' participation in the salt offset programs should be considered as best practicable controls under the circumstances. The dairies are also implementing other control measures such as

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<sup>15</sup> Liu, Q., Shumway, C.R., Myers Collins, K. 2003. The economics of dairy nutrient management. Washington State University Cooperative Extension. Available at:

<https://research.wsulibs.wsu.edu:8443/xmlui/bitstream/handle/2376/5261/EB1947E.pdf?sequence=1>

<sup>16</sup> Haldon, H. 2017. Got milk? Too much of it say U.S. dairy farmers. The Wall Street Journal, May 20, 2017. Available at: <https://www.wsj.com/articles/got-milk-too-much-of-it-say-u-s-dairy-farmers-1495278002>

<sup>17</sup> Smith, T. 2018. As milk prices decline, worries about dairy farmer suicides rise. National Public Radio (NPR), February 27, 2018. Available at: <https://www.npr.org/2018/02/27/586586267/as-milk-prices-decline-worries-about-dairy-farmer-suicides-rise>

<sup>18</sup> Loughton, C. 2018. Challenging outlook for dairy industry. Farm Credit East. January 16, 2018. Available at: <https://www.farmcrediteast.com/knowledge-exchange/Blog/todays-harvest/2018-dairy-webinar-outlook>

reduced application of manure and process wastewater to cropland according to their Nutrient Management Plans and better control of source water through substitution of low-quality groundwater with higher-quality recycled water. These controls are being implemented and carefully monitored to ensure water quality protection.

The Chino Basin Watermaster, the Inland Empire Utilities Agency, Eastern Municipal Water District, Western Municipal Water District and other water purveyors and stakeholders in the region carry out regular monitoring of the groundwater management zones indicated in Table 1, above, and other groundwater management zones within the region. These are watershed-based comprehensive monitoring programs.

During the triennial review of the Basin Plan, all the monitoring information that is generated is considered to determine water quality trends. These triennial reviews include a comprehensive review of all monitoring data using sophisticated computer modeling programs. The implementation plan in the Basin Plan describes actions by various entities necessary to enhance and/or maintain water quality in the region. The triennial review also considers the existing control measures and evaluates the need for any additional control measures to ensure continued protection of water quality consistent with the adopted water quality objectives. These monitoring programs, control measures and continued evaluation of the effectiveness of these programs should ensure protection of ground and surface water quality in the region.

The monitoring programs, control measures and offset programs described above should ensure that any degradation of high quality waters is consistent with the antidegradation policies, that there is no degradation of other groundwater management zones, and any degradation of surface waters will be temporary and will not result in any long-term deleterious effects.

A technical report, *Addressing Nitrate in California's Drinking Waters*, was submitted to the Legislature in February 2013<sup>19</sup>. The report was based on a study conducted by the University of California, Davis with a focus on Tulare Lake Basin and Salinas Valley Groundwater. The report describes recommendations to address nitrate in groundwater. The Santa Ana Regional Water Quality Control Board has been implementing a number of the recommendations. One of the recommendations (Recommendation 6) in this Report is for the Water Boards to define and identify nitrate high-risk areas in order to prioritize regulatory oversight and assistance efforts in these areas. The Santa Ana Regional Board has been implementing such a program. The proposed Order requires participation in groundwater monitoring and reporting programs under Section IV.J. designed to continue such identification and remedial activities.

As discussed above, the discharges covered by this Order are not permitted to adversely affect water quality and therefore are consistent with the antidegradation provisions of 40 C.F.R. § 131.12 and State Board Resolution No. 68-16.

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<sup>19</sup> Harter, T. *et al*, 2012. Addressing nitrate in California's drinking water. Center for Watershed Sciences, University of California, Davis, January, 2012. Available at: <http://groundwaternitrate.ucdavis.edu/files/138956.pdf>

## **H. Anti-Backsliding Requirements**

Sections 402(o)(2) and 303(d)(4) of the CWA and federal regulations at 40 C.F.R. § 122.44(l) prohibit backsliding in NPDES permits. Federal regulations limit the circumstances under which modified or reissued NPDES permits may set less stringent effluent limitations than required by previous permits. 40 C.F.R. §§ 122.44(1), 122.62. The Water Quality Act of 1987 includes provisions intended to clarify the Clean Water Act's anti-backsliding requirements. Clean Water Act § 402(o), 33 U.S.C. § 1342(o).

The anti-backsliding provisions generally prohibit relaxation of effluent limitations previously established on the basis of best professional judgment. CWA § 402(o)(J); 33 U.S.C. § 1342(o)(l). But the prohibition does not apply if any of five listed exceptions is applicable. CWA § 402(o)(2), 33 U.S.C. § 1342(o)(2). These anti-backsliding provisions require effluent limitations in a reissued permit to be as stringent as those in the previous permit, with some exceptions where limitations may be relaxed. Other standards and conditions (such as monitoring requirements) must be as stringent as those in the previous permit, unless there is a material and substantial change in circumstances that would constitute cause under 40 C.F.R. § 122.62. 40 C.F.R. § 122.44(l). As described below, all effluent limitations in this Order are at least as stringent as those in the previous Order.

The Dischargers in the Prado Basin Management Zone were required to demonstrate that the Chino Basin Optimum Basin Management Program addressed the discharges from the CAFOs. The Chino Basin Optimum Basin Management Program includes specific programs and projects that the Chino Basin Watermaster and the Inland Empire Utilities Agency are required to implement in collaboration with other entities. These programs are being implemented by these agencies. Order No. R8-2007-0001 required the Dischargers to develop and submit a plan. There were 14 CAFOs located in this area at the time the 2007 Order was adopted. These CAFOs developed and submitted a plan as required; however, there is now only one active dairy in the Prado Basin Management Zone.

Order No. R8-2013-0001 prohibited the discharge of wastes from the CAFOs containing TDS and/or nitrogen concentrations in excess of the underlying groundwater management zone objectives for those constituents unless adequately offset to the satisfaction of the Executive Officer. The CAFO dischargers, in collaboration with other stakeholders in the area, have implemented salt and nutrient offset programs and other control measures consistent with the 2013 Permit requirements. This Order requires the Dischargers to continue to implement those programs, evaluate their effectiveness, and to participate in the monitoring programs to ensure that the control measures that are being implemented are protective of water quality objectives. These requirements are fully explained in Section VIII of the Fact Sheet and they are at least as stringent as the 2013 Permit requirements. As such, the provisions in the 2013 Permit are consistent with the anti-backsliding requirements.



## **I. Impaired Water Bodies on CWA 303(d) List and TMDL Implementation**

The CAFO facilities within the Region are located either in the Santa Ana River or the San Jacinto River watersheds. Waste discharges from the CAFOs have a potential to impact the Santa Ana River, Reach 3, Chino Creek, Cucamonga Creek/Mill Creek, Lake Elsinore and Canyon Lake, which are listed as impaired, under Section 303(d) of the CWA. The Santa Ana River, Reach 3, is impaired due to pathogens (bacteria); Chino Creek and Cucamonga/Mill Creek are impaired due to pathogens and nutrients; Lake Elsinore is impaired due to nutrients, and toxic constituents; and Canyon Lake is impaired due to pathogens and nutrients.

Federal regulations require that a total maximum daily load (TMDL) be established for 303(d) listed waterbodies for each pollutant of concern. The Regional Board adopted TMDLs for indicator bacteria for Middle Santa Ana River Watershed and nutrient TMDLs for Canyon Lake/Lake Elsinore. Federal regulation requires NPDES permits to include effluent limits that are “consistent with the assumptions and requirements of any available waste load allocation (WLA) for the discharge.” 40 C.F.R. § 122.44(d)(1)(vii)(B). The following is a detailed discussion of the WLAs and TMDLs and how this Order implements the approved TMDLs.

Pursuant to 40 C.F.R. § 122.44(k)(3), best management practices are the tools used to implement the TMDLs in this Order. The tasks identified below are based on the TMDL implementation plans. These tasks were identified during the development of the TMDLs as necessary steps to meet the WLAs specified in the TMDLs by the deadlines specified in the TMDLs.

### **1. Middle Santa Ana River Watershed Bacterial Indicator TMDLs**

Pursuant to the Middle Santa Ana River Watershed Bacterial Indicator TMDLs (Resolution No. R8-2005-0001), the following WLAs apply to CAFO facilities in the Middle Santa Ana River Watershed that drain, directly or indirectly, to Chino Creek, Cucamonga/Mill Creek and/or the Santa Ana River, Reach 3. The allocations apply to these CAFO facilities as a group.

- a. **Dry Summer Conditions:** April 1 through October 31, compliance needs to be achieved as soon as possible, but no later than December 31, 2015.

#### **Escherichia coli WLA**

5-sample/30-day Logarithmic Mean less than 113 organisms/ 100mL, and not more than 10% of the samples exceed 212 organisms/100mL for any 30-day period.

These WLAs are applicable to dry weather conditions. The Order prohibits any discharge of wastes to surface waters during dry weather conditions. Federal regulations at 40 C.F.R. § 122.47(a)(1) state, “Any schedules for compliance under this section shall require compliance as soon as possible, but not later than the applicable statutory deadline under the CWA.” As such, the Order requires immediate compliance with the above WLAs.

- b. Wet Winter Conditions:** November 1 through March 31, compliance needs to be achieved as soon as possible, but no later than December 31, 2025.

*Escherichia coli* WLA

5-sample/30-day Logarithmic Mean less than 113 organisms/ 100mL, and not more than 10% of the samples exceed 212 organisms/100mL for any 30-day period.

The Order includes specific implementation activities, source controls, monitoring requirements, and annual progress reports. Since the final compliance date is beyond the expiration date of this Permit, these interim measures are designed to meet the WLAs by the schedules specified in the TMDLs. In addition to the CAFOs, there are other stakeholders who are collaborating in the implementation of this TMDL. A number of these tasks are collaborative efforts of all stakeholders.

**c. TMDL Monitoring Requirements and Control Measures**

1) Watershed-wide Bacterial Indicator TMDL Water Quality Monitoring Program:

Pursuant to Task 3 of the Middle Santa Ana River Watershed Bacterial Indicator TMDLs, CAFO facilities were required to propose a watershed-wide monitoring program that will provide data necessary to review and update the Middle Santa Ana River Bacterial Indicator TMDLs by November 30, 2007. Data to be collected and analyzed were to be used to determine compliance with the TMDLs and WLAs for bacterial indicators.

On behalf of specific dischargers named in the Bacterial Indicator TMDLs, including CAFO operators, the middle Santa Ana River TMDL Task Force submitted a monitoring program for Regional Board consideration. The Regional Board approved the proposed monitoring program on June 29, 2007 (Resolution No. R8-2007-0046). The Taskforce continues to implement this approved bacterial indicator TMDL monitoring program. The Order requires the Dischargers to continue their participation in all activities related to the Middle Santa Ana River Watershed Bacterial Indicator TMDL implementation.

2) Agricultural/CAFO Discharges

Pursuant to Task 5 of the Middle Santa Ana River Watershed Bacterial Indicator TMDLs, CAFO facilities were required to develop an Agricultural Source Evaluation Plan (AGSEP) for bacteria specific to CAFOs by November 30, 2007. These plans were to include steps needed to identify specific activities, operations, and processes that contribute bacterial indicators to Middle Santa Ana River Watershed waterbodies with a schedule for completion of each of the steps identified.

Irrigated agricultural operators and CAFO operators submitted the final AGSEP in March 2008. Regional Board approved the AGSEP in April 2008.

The Dischargers started implementing and monitoring of AGSEP in the winter of 2009 and the final AGSEP report was submitted in July 2009. Implementation of the plan included a wet weather monitoring program that was also completed in 2009.

The agricultural dischargers developed an Agricultural Bacteria Source Management Plan under Task 5.2. In October 2012, Regional Board staff completed the task of identifying non-CAFO agricultural operators. The CAFO facilities continue to cooperate in the TMDL Taskforce activities related to the Middle Santa Ana River Bacterial Indicator TMDL including the watershed wide monitoring program since 2007.

The CAFO Dischargers in the middle Santa Ana River Watershed are required to submit interim reports that include an evaluation of the effectiveness of their bacteria source control measures and progress towards meeting the WLAs. This report is mandated by this Order but may be prepared and submitted in collaboration with the TMDL Taskforce.

## **2. Lake Elsinore and Canyon Lake Watershed – Nutrient TMDLs**

Pursuant to the Lake Elsinore and Canyon Lake Nutrient TMDLs (Resolution No. R8-2004-0037), the following WLAs apply to CAFO facilities in the San Jacinto River watershed that drain, directly and indirectly, to San Jacinto River, Salt Creek and/or Canyon Lake. The allocations apply to these CAFO facilities as a group.

- a. **Total Phosphorous WLA:** Compliance needs to be achieved as soon as possible, but no later than December 31, 2020.

132 kilograms/year (10-year running average)

- b. **Total Nitrogen WLA:** Compliance needs to be achieved as soon as possible, but no later than December 31, 2020.

1,908 kilograms/year (10-year running average)

c. **TMDL Monitoring Requirements**

1. **Nutrient TMDL Water Quality Monitoring Program**

Pursuant to Task 4 of the Lake Elsinore/Canyon Lake Nutrient TMDLs, (Resolution No. R8-2004-0037), CAFO facilities were required to develop and implement a watershed-wide, Canyon Lake in-lake and Lake Elsinore in-lake nutrient monitoring program to develop data necessary to review and update the Nutrient TMDLs. Data so developed could also be used for determination of compliance with the TMDLs and WLAs for nitrogen and phosphorus.

On behalf of specific dischargers named in the Nutrient TMDLs including dairy operators, the Lake Elsinore and San Jacinto Watershed Authority submitted a

monitoring program for Regional Board consideration. The Regional Board approved the proposed monitoring program on March 3, 2006 (Resolution No. R8-2006-0031) and was later modified in March 2011 (Resolution No. R8-2011-0023) and October 2012 (Resolution No. R8-2012-0052). This Order requires the dairy operators, in collaboration with other stakeholders, to continue to implement the updated Nutrient TMDL monitoring program.

## 2. Agricultural/CAFO Discharges – Nutrient Reduction Plan

Pursuant to Task 5 of the Lake Elsinore/Canyon Lake Nutrient TMDLs, CAFO facilities were required to develop Agricultural Nutrient Management Plan (AgNMP) specific to CAFOs by September 30, 2007. These plans were to include steps needed to identify nutrient sources and to develop nutrient reduction strategies, including time schedules for implementation.

A coalition of CAFO operators and farmers in the San Jacinto River Basin have formed the Western Riverside County Agricultural Coalition (WRCAC). WRCAC submitted a plan for development of Agricultural Nutrient Management Plan (AgNMP) for Regional Board consideration. The Regional Board approved the proposed plan in November 2007 in Resolution No. R8-2007-0083. A draft AgNMP was submitted in December 2011 for Regional Board comments. Regional Board provided comments in a letter dated May 16, 2012. Final AgNMP was due on July 21, 2012. Because the stakeholders conducted additional model analysis to identify appropriate nutrient control measures, an extension to the AgNMP was granted to WRCAC. In January 2013, the Municipal Separate Storm Sewer System (MS4) permittees, in collaboration with other non-agricultural stakeholders, submitted a revised final Comprehensive Nutrient Reduction Plan.

Non-point source agricultural dischargers are regulated under Order No. R8-2016-0003, *Conditional Waiver of Waste Discharge Requirements for Discharges from Agricultural Operations in the Watersheds of the San Jacinto River and its Tributaries, and Canyon Lake and Lake Elsinore and their Tributaries, Collectively "The San Jacinto River Watershed", Riverside County (CWAD)*, adopted on June 3, 2015. This Order continues the Regional Board's efforts for agricultural dischargers to collectively develop solutions to control pollutants in the San Jacinto River watershed through vehicles such as the AgNMP. Dairy operators are not part of the non-point source agricultural dischargers. However, the TMDL provisions of this Order allow dairy operators to comply through cooperative monitoring and other actions coordinated with agricultural, municipal and other stakeholders.

## 3. Lake Elsinore In-Lake Sediment Nutrient Reduction Plan

Pursuant to Task 9 of the Lake Elsinore/Canyon Lake Nutrient TMDLs, CAFO facilities were required to develop a proposed plan and schedule for in-lake sediment nutrient reduction for Lake Elsinore by March 31, 2007. The proposed plan was to include an evaluation of the applicability of various in-lake treatment

technologies to prevent the release of nutrients from lake sediments to support development of a long-term strategy for control of nutrients from the sediment. The submittal was also to contain a proposed sediment nutrient monitoring program to evaluate the effectiveness of any strategies that were to be implemented.

This task has been completed and approved by the Regional Board in November 2007 (Resolution No. R8-2007-0083).

#### 4. Canyon Lake In-Lake Sediment Treatment Evaluation

Pursuant to Task 10 of the Lake Elsinore/Canyon Lake Nutrient TMDLs, CAFO facilities were required to develop a proposed plan for evaluating in-lake sediment nutrient treatment strategies for Canyon Lake by March 31, 2007. The proposed plan was to include an evaluation of the applicability of various in-lake treatment technologies to prevent the release of nutrients from lake sediments in order to develop a long-term strategy for control of nutrients from the sediment. The submittal was also to contain a proposed sediment nutrient monitoring program to evaluate the effectiveness of any strategies that are implemented.

This task has been completed through a Proposition 50 grant obtained by the San Jacinto River Watershed Council. The final report was submitted to the Regional Board on August 3, 2007. Draft Canyon Lake sediment reduction plan was submitted to the Regional Board in December 2011 (as part of Comprehensive Nutrient Reduction Plan (CNRP)<sup>20</sup> and AgNMP submittal). Regional Board provided comments on CNRP and AgNMP in March 2012 and May 2012, respectively. Final revised CNRP has been submitted in Jan 2013 and was approved by the Regional Board (Resolution No. R8-2013-0044).

#### 5. Canyon Lake and Lake Elsinore in-lake Model Updates

Pursuant to Task 11 of the Lake Elsinore/Canyon Lake Nutrient TMDLs, CAFO facilities were required to develop a proposal and schedule for updating the existing Lake Elsinore/San Jacinto River Nutrient Watershed Model and the Canyon Lake and Lake Elsinore in-lake models by March 31, 2007. The plan and schedule was to consider additional data and information generated from the respective TMDL monitoring programs. In order to facilitate any needed update of the numeric targets and/or the TMDLs/WLAs, the proposed schedule was to take into consideration the Regional Board's triennial review schedule.

This plan was approved by Regional Board in November 2007 (Resolution No. R8-2007-0083). A Model update was submitted in August 2011.

#### 6. Other Lake Elsinore/Canyon Lake TMDL Activities

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<sup>20</sup> The Riverside County stormwater co-permittees have submitted for Regional Water Board approval, a Comprehensive Nutrient Reduction Plan (CNRP) that provides a plan and a schedule for how the co-permittees will achieve compliance with the Lake Elsinore/Canyon Lake Nutrient TMDLs and WLA. The AgNMP was developed in coordination with the CNRP.

The CAFO operators in the San Jacinto watershed are pursuing a number of other options. These include conducting pilot studies to determine the effectiveness of those control measures, including waste-to-energy projects. If the pilot projects prove successful, some of these projects could be implemented to address any adverse impacts from CAFO discharges to surface and groundwaters. Further, the CAFO operators, as part of the larger watershed-wide stakeholder group, are working with Regional Board staff on a revision to the TMDLs. Revisions to the TMDLs are likely to result in changes to the CAFOs' TMDL Waste Load Allocations and TMDL compliance dates.

## **J. Plain Language**

California Government Code Section 6219(a) states that "Each department, commission, office, or other administrative agency of state government shall write each document that it produces in plain, straightforward language, avoiding technical terms as much as possible, and using a coherent and easily readable style." This requirement is more commonly known as the State's "plain language requirement". Order No. R8-2018-0001 and this Fact Sheet have been prepared with careful consideration of the plain language requirement.

There are a variety of indicators for measuring the 'readability' of a document. These indicators include the Flesch Kincaid Reading Ease, Flesch Kincaid Grade Level, and the Gunning Fog Score. These first two indicators are widely available in common word-processing software and were applied to the Order and Fact Sheet. The results indicate that a person that has achieved a college sophomore level of education should be able to readily understand these documents. Given the technical and legal subject matter, the readability of the Order and this Technical Report is appropriate and satisfies the State plain language requirement.

## **K. Other Plans, Policies and Regulations [Not Applicable]**

## **VIII. RATIONALE FOR EFFLUENT LIMITATIONS AND DISCHARGE SPECIFICATIONS**

Wastes from CAFOs contain high concentrations of salts (total dissolved solids and nitrates). These wastes originate from the excretion of manure in corrals and milk barns. Wash water that is discharged from the milk barn as a result of milk barn and cow cleaning operations contains approximately 10 percent of the daily manure excreted from a cow. Wash water is flushed from the milk barn, generally into on-site wastewater containment ponds. Also, rainfall runoff that contacts manure in the corrals carries manure from the corrals into the wastewater containment ponds.

Previous studies conducted by the Regional Board have shown that cow manure produced in the Region contains approximately 160 pounds of salt per (dry) ton of manure (110 pounds of salt per ton of manure @ 33% moisture)<sup>21</sup>. In addition, the Regional Board's 1990 report, "Dairies and Their Relationship to Water Quality Impacts

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<sup>21</sup> Santa Ana Watershed Planning Agency, 1974. Dairy waste management. Albert A. Webb Associates, March 1974.

in the Chino Basin", (1990 Dairy Report) showed that the use of manure as a fertilizer results in two to four times more salt reaching groundwater (up to 10 times more non-nitrate salts) than the use of non-manure commercial fertilizers<sup>22</sup>. For this reason, it is vital to make sure that all applications of manure and process wastewater to land are regulated, so they will not adversely impact the quality of groundwater and surface water in the Region.

The 1990 Dairy Report mostly dealt with dairies in the Chino Basin area. However, the recommendations for the dairy regulatory program in that report are equally applicable to dairies in the San Jacinto watershed. Most elements of the dairy regulatory program recommendations in the Report have been implemented through the 1994 (Order No. 94-7), 1999 (Order No. 99-11), 2007 (Order No. R8-2007-0001), and 2013 (Order No. R8-2013-0001) general NPDES permits. The recommendations in the 1990 Dairy Report include the following:

1. Prohibit the discharge of dairy wastes to land unless an acceptable offset program is developed and implemented to offset the impacts of salt and nutrient discharges. (Offset programs have been developed and the CAFOs are participating in those programs.)
2. Control the discharge of dairy wastes to surface waters by requiring the CAFOs to properly design, construct, operate and maintain waste containment structures that are designed to contain a 25-year, 24-hour storm runoff along with process wastewater. (Staff developed requirements for the design of Engineered Waste Management Plans. All CAFOs in the region have developed and implemented Engineered Waste Management Plans. Staff also developed a Weekly Inspection Log that the CAFOs are required to complete and submit to the Regional Board with the annual report.)
3. Monitor the impact of dairy waste discharges on surface and groundwaters. (The CAFOs are participating in comprehensive monitoring programs to determine the impacts of their discharges on surface and groundwaters.)
4. Regulate land application at agronomic rates. (All CAFOs that apply dairy biomass to land have developed and implemented Nutrient Management Plans. Staff developed a tracking system to track manure application, Form 3.)
5. Track manure management. (Staff developed a Manure Tacking Manifest and an Annual Report Form to collect information about manure management and overall dairy operations.)
6. Encourage Innovative approaches to dairy waste management. (Regional Board staff has helped the dairy industry to obtain grants for research projects to better manage their waste products.)

The proposed Order requires the CAFOs to continue their participation in the salt and nutrient offset programs, in the monitoring programs, and to manage storm water and process wastewater in accordance with the requirements of their approved Engineered Waste Management Plans, and land application in accordance with the approved Nutrient Management Plans. In addition, there are requirements to comply with CAFO waste load allocations.

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<sup>22</sup> [http://www.waterboards.ca.gov/santaana/water\\_issues/programs/dairies/docs/chino\\_dairies.pdf](http://www.waterboards.ca.gov/santaana/water_issues/programs/dairies/docs/chino_dairies.pdf)

Provisions II. A. 13 & 15 in the proposed Order prohibits the discharge of dairy biomass unless an offset program to offset the impacts of salt and nutrient discharges is implemented. In accordance with the requirements in the 2013 Permit, the Dischargers, in collaboration with other stakeholders in the area, have developed and implemented an offset program in the Chino Basin. They are in the process of developing an offset program in the San Jacinto River Basin.

Salt and nutrient management in dairy biomass (manure, litter, bedding, and process wastewater) continues to be a major challenge for dairy waste management. The Chino Basin Optimum Basin Management Program addresses salt and nutrient management programs in the Chino Basin, where 72% of the CAFOs are located. The offset programs in the Chino Basin have been implemented and appear to be working well.

In the San Jacinto Basin, Eastern Municipal Water District has two operating desalters and an additional one is proposed. Studies have been completed in the area to evaluate options for salt and nutrient management in the basin and to develop comprehensive management programs. The Dischargers in the San Jacinto area, in collaboration with the San Jacinto Resource Conservation District, developed a "Final Workplan to Offset the Impacts of Dairy Process Wastewater Discharge and Manure Land Application within the San Jacinto River Basin" (Final Workplan). The San Jacinto Watershed Integrated Regional Dairy Management Plan (San Jacinto Plan) was developed as a subset of this Final Workplan.

The Final Workplan and the San Jacinto Plan were developed to assist dairy operators in the San Jacinto watershed in their efforts to implement management practices necessary to help solve groundwater, surface water, air quality, TMDL and salt and nutrient offsets to meet regulatory requirements. These Plans recognize a number of control practices that each dairy facility should be able to implement in addition to participating in local groundwater improvement projects.

The USDA-ARS Salinity Laboratory<sup>23</sup> conducted a pilot nutrient management project on a San Jacinto dairy (Transport and Fate of Nutrients and Indicator Microorganisms at a Dairy Lagoon Water Application Site by Scott Bradford, March 2011) to investigate the efficacy of implementing an NMP that included applying dairy wastewater to cropland. The study demonstrated that with carefully controlled water application and selection of appropriate crops, very little leaching of the salts occurred below the root zone. However, the salts remain stored in the vadose zone where infiltrating precipitation can eventually carry the salt into the groundwater. This process can take decades, depending on the soil chemistry, precipitation events, soil transmissivity, and depth to groundwater. In the Chino Basin, the process has been estimated to take between 10 and 50 years<sup>24</sup>.

Extensive computer modeling studies on TDS and nitrate have been conducted to determine acceptable salt loading rates to groundwater from various sources,

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<sup>23</sup> <http://nepis.epa.gov/Adobe/PDF/P100DOTV.pdf>

<sup>24</sup> Santa Ana Watershed Planning Agency, 1974. Dairy waste management. Albert A. Webb Associates, March 1974.



including CAFOs. These studies are the basis of the TDS and nitrogen management plan presented in the 1995 Water Quality Control Plan for the Santa Ana River Basin (Basin Plan) and its most recent amendment (Regional Board Resolution No. R8-2004-0001, hereinafter referred to as the Basin Plan Amendment).

The State Board approved the Basin Plan Amendment on September 30, 2004. The groundwater components of the amendment became effective upon approval by the Office of Administrative Law (OAL) on December 23, 2004. The USEPA approved the surface water standards and related provisions of the Amendment on June 20, 2007. The Basin Plan Amendment incorporates an updated TDS and Nitrogen Management Plan for the Santa Ana Region, which includes revised groundwater sub-basin boundaries (referred to as groundwater management zones), revised TDS and nitrate-nitrogen quality objectives for groundwater, revised TDS and nitrogen WLAs and changes to specific surface waters; including revised reach designations, revised TDS and nitrogen objectives and modifications to beneficial use designations.

The Eastern Municipal Water District developed a Salt Management Plan for the San Jacinto Watershed and requested the Regional Board to revise the groundwater objectives for the San Jacinto Upper Pressure Management Zone based on a maximum benefit analysis. On October 29, 2010 the Regional Board approved a Basin Plan amendment (Resolution No. R8-2010-0039) to accommodate this request. On April 23, 2012, the Office of Administrative Law approved this Basin Plan amendment.

As indicated above, the Regional Board is actively involved in managing the TDS and nitrogen issues in the region and the stakeholders are active participants in these efforts.

The previously adopted general waste discharge requirements (Orders No. 99-11 and R8-2013-0001) included three significant changes from the Regional Board's prior CAFO regulatory program. First, they prohibited the disposal of corral manure anywhere in the Region and prohibited the use of corral manure as a fertilizer in any groundwater sub-basin lacking assimilative capacity for salts, including the Chino Basin, thereby prohibiting the application of any corral manure in the Chino Basin for any reason (previously disposal of manure was limited to 4.4 tons/acre on disposal land, and use of corral manure as a fertilizer on cropland was limited to 17.6 tons/acre).

Second, corral manure was required to be hauled from the facility within 180 days of being removed from the corrals, thereby preventing the long-term accumulation of manure stockpiles on-site (before, some facilities were increasingly stockpiling manure on-site rather than hauling it away). Third, CAFOs were required to develop and implement engineered waste management plans (prior to the adoption of these permits comprehensive waste management containment structure design, construction or operation plans for CAFOs did not exist).

As required under the 2007 permit (R8-2013-0001), the Dischargers have developed and implemented EWMPs that are generally consistent with federal and state

regulations [40 C.F.R. § 122.23(b)(7), 40 C.F.R. §§ 122.23(b)(8), 412.2(d) and 412.2(h); and Title 27, California Code of Regulations, section 22562]. In addition, they have also developed NMPs (where applicable) and participated in activities of the taskforces organized to collaboratively implement the TMDLs. These taskforces have developed and implemented a number of monitoring programs and other plans.

#### **A. Chino Basin (Chino-North, Chino-East, and Chino-South Groundwater Management Zones)**

Seventy three percent of the CAFOs in the Region are located in the Chino Basin. Based on data collected from the 2017 CAFO Annual Reports, approximately 186,000 tons of manure were removed from the corrals in the Chino Basin. Of this, at least 7,000 tons (4%) were hauled out of the Region and 179,000 tons (96%) were disbursed inside the Region. Of that applied within the Region, 115,000 tons were applied to cropland and 64,000 tons were sent to composting facilities.

The Chino Basin desalter program is a key feature of the salt management strategy that includes the Optimum Basin Management Plan (OBMP). It is integrated into the OBMP along with other groundwater management activities (enhanced recharge, plume management, monitoring, etc.) to assure water quality enhancement, yield management, hydraulic control, and the maximum beneficial use of the Chino Basin groundwater. Waste discharges (including those from CAFOs) in the Chino Basin have been addressed in this integrated plan. The desalter capacity and groundwater extraction well locations have been established to assure that the total salt removal from the Chino Basin is in sufficient quantity to mitigate all the salt added using recycled water, ongoing discharges (including those from CAFOs), and legacy sources. Currently, there are two desalters in operation in the Chino Basin (Chino I and Chino II).

Currently, there are no dairies in the Chino-South Groundwater Management Zone and the Chino-East Groundwater Management Zone. Since the operation of the hydraulic control wells has reversed the gradient of the Chino-South and Chino-East Groundwater Management Zones to drain towards the Chino-North Groundwater Management Zone, groundwater being intercepted by these wells, and thus hydraulic control is achieved. Since waste discharges from CAFOs within the Chino Basin have been addressed in the OBMP, this order does not restrict discharges to land from these facilities, as long as the Chino Basin Watermaster and IEUA are continuing their efforts of implementing the commitments to meet the max benefit water quality objectives in the Basin Plan Amendment.

#### **B. Prado Basin Management Zone**

Order No. R8-2013-0001 required the CAFO operators to demonstrate by September 2008 that CAFO discharges were addressed by the OBMP facilities and programs. Further, in case the CAFO operators that could not demonstrate that CAFO discharges are addressed by OBMP facilities and programs, they were to formulate and implement an acceptable offset or cease the discharge of wastes in the Prado Basin Management Zone within five years.

CAFO operators in the Prado Basin Management Zone determined that CAFO discharges were not covered under the OBMP facilities and programs. Consequently, they submitted a conceptual workplan to offset the impact of their discharges (March 2009) and the final Work Plan with a proposed time schedule (November 2009).

At the time of adoption of Order No. R8-2013-0001, only one dairy was in the Prado Basin Management Zone.

### **C. San Jacinto River Basin**

Historically, manure has been used to supplement the use of commercial chemical fertilizer on agricultural fields in the San Jacinto River Basin. When the Regional Board prohibited the disposal of corral manure anywhere in the Region and prohibited the use of corral manure as a fertilizer in the Chino Basin, most of the manure produced in the Chino Basin was then hauled to the San Jacinto River Basin for use as fertilizer. Currently, it is estimated that there are about 59,000 acres of land under cultivation in the San Jacinto River Basin<sup>25</sup>.

Basin Plan Amendment (Resolution No. R8-2004-0001) indicates that all the groundwater management zones in the San Jacinto River Basin, except for the Canyon Groundwater Management Zone, lack assimilative capacity for additional salt inputs. In addition, all the groundwater management zones within the San Jacinto River Basin, except for the Canyon and Perris North Groundwater Management Zones, lack assimilative capacity for additional nitrate inputs.

Consequently, discharges of manure, wash water, and storm water to land must be prohibited unless Total Dissolved Solids (TDS) and nitrogen loadings from these discharges are adequately offset. Order No. R8-2007-0001, in part, prohibited the discharge of wastes containing TDS and/or nitrogen concentrations more than the underlying groundwater management zone objectives, unless the discharge of waste is adequately offset to the satisfaction of the Executive Officer.

The Regional Board recognized that it was not feasible for this waste discharge prohibition to be implemented immediately. Therefore, a time schedule for compliance was provided in Order No. R8-2007-0001 that required full compliance with the prohibition by September 6, 2012. Order No. R8-2007-0001 required that the CAFO operators submit a Work Plan to offset the impacts of discharge of process wastewater and land application of manure within the San Jacinto River Basin.

On behalf of CAFO operators and farmers, San Jacinto Basin Resource Conservation District (SJBRC) submitted a conceptual Work Plan on January 2, 2008. The final Work Plan and proposed time schedule was submitted by SJBRC for Regional Board consideration on September 18, 2008. The Regional Board

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<sup>25</sup> Staff Report for the Conditional Waiver of Waste Discharge Requirements, Order No. R8-2016-0003.

approved the final Work Plan and the proposed time schedule on October 29, 2008.

The final Work Plan and its supplement (the San Jacinto Watershed Integrated Regional Dairy Management Plan, IRDMP) provided several recommendations to control and/or offset the discharge of salts and nutrients to the San Jacinto River Basin. Appendix F of the IRDMP contains a report for “Salt Offset Options for the San Jacinto River Basin Dairies” (Salt Offset Options Report). Collectively, the Work Plan, the IRDMP, and the Salt Offset Options Report identify numerous options to address the salt and nutrient loadings into the San Jacinto Basin. While some of these options may not directly pertain to salt and nutrient off-sets, they could be considered as elements of an overall Region-wide plan for water quality improvements. The following recommendations have been implemented:

1. Conducted a pilot study for a Comprehensive Nutrient Management Plan (CNMP) at a San Jacinto dairy facility.
2. Conducted a demonstration project of a Vibratory Shear Enhanced Processing (VESP) system at a San Jacinto dairy facility.
3. Conducted a partial watershed monitoring program for run-off to Mystic Lake.
4. Conducted a Canyon Lake and Lake Elsinore in-lake nutrient monitoring program.
5. Developed a Lake Elsinore in-lake nutrient reduction plan.
6. Conducted a Canyon Lake in-lake sediment treatment evaluation.
7. Developed a CAFO Ag-Nutrient Management Plan to identify nutrient sources and to develop nutrient reduction strategies.
8. Conducted a watershed-wide sampling program for dairy wastewater and manure.
9. Conducted a watershed-wide sampling and analysis program to determine dairy salt loads and to develop a dairy salt load report.
10. Developed and implemented a Nutrient Management Plan (NMP) for specific dairy sites that land apply manure to cropland (9 dairy sites).
11. Developed an Integrated Regional Dairy Management Plan (IRDMP) addressing water quality issues related to dairy wastes including salts, nutrients, and pathogens.
12. Developed a Manure Manifest Tracking System for the San Jacinto Basin for local and imported manure.
13. Developed a manure composting program that could be considered on a regional scale or on a site-specific scale to stabilize raw manure for cropland application and/or export out of the San Jacinto Basin.
14. Developed a program to encourage manure export from the Basin.
15. Started negotiations with other stakeholders, such as Eastern Municipal Water District (EMWD), to reduce salts in dairy source water. Initiated a full-scale demonstration project for conversion of manure waste to diesel fuel at a San Jacinto dairy.

The Salt Offset Options Report states that manure applied to cropland as a fertilizer contributes more than 90% of each dairy's salt and nutrient loads. A limited study at one of the San Jacinto CAFOs by the University of California Riverside, Salinity

Laboratory indicated that a properly managed and implemented Nutrient Management Plan can significantly limit salt to the root zone with little leaching to groundwater. Nine of the San Jacinto dairy facilities are now implementing Nutrient Management Plans for croplands. For manure applied to non-dairy related cropland, farmers in the San Jacinto Basin are required to implement an Agricultural Nutrient Management Plan. In addition, there is an increase in the manure export from some of the dairies to locations outside the region.

To monitor dairy salt and nitrate loading, a dairy sampling program for dairy wastewater and manure has been implemented. In conjunction with this sampling program, a watershed-wide sampling and analysis program for dairy salt loads has been implemented to develop a dairy salt load report.

The IRDMP is considered a working document for the San Jacinto CAFOs. There continues to be additional studies and pilot projects to demonstrate other feasible alternatives to address waste loads in addition to the sixteen control measures (listed above) that have been already implemented. With the implementation of these options and natural recharge, the Groundwater Management Zones have the potential to reduce the concentrations of salt and nutrients.

The Dischargers in the San Jacinto Basin have indicated that the above control measures have reduced the salt and nutrient loadings to the Basin and no further offsets might be needed. The proposed Order includes requirements for the Dischargers to collect and analyze groundwater monitoring data to confirm that discharges from the CAFO facilities have not impacted groundwater quality in the San Jacinto Basin. If these analyses indicate statistically significant impacts from the CAFO discharges, additional control measures must be developed and implemented.

The proposed Order requires the CAFO's in the area to continue to implement the control measures and evaluate their effectiveness in addressing salt and nutrient problems and to propose additional measures, if needed.

As previously noted, Canyon Lake and Lake Elsinore are on the 303(d) list of impaired water bodies due, in part, to the effects of excessive amounts of nutrients, including nitrogen and phosphorous. The TMDL adopted by the Regional Board and approved by USEPA requires the reduction of nutrients from all sources in the watershed, including CAFOs. The Nutrient TMDLs specify CAFO WLAs for both nitrogen and phosphorus. The Dischargers are working with the TMDL taskforces to help implement the TMDLs.

There are a number of other research projects and pilot studies, including a waste-to-energy project, that are being conducted or proposed. The requirements specified in the proposed Order are consistent with the state and federal laws and regulations pertaining to CAFOs. Based on the results of the pilot studies and the research work, these requirements may be revised.

#### **D. Discharge Prohibitions**

The Order includes the following prohibitions:

1. The discharge of wastes to land or to surface waters, including storm water conveyance systems, shall be in accordance with the provisions of this Order. All other discharges of wastes to land and surface waters are prohibited (40 C.F.R. § 412.37(a)).
2. The discharge of wastes to land or to surface waters shall not cause a condition of contamination, pollution or nuisance as defined in Water Code section 13050.
3. The discharge of wastes not generated by the dairy-related activities at the facility is prohibited except with written authorization from the Executive Officer.
4. The disposal of any mortality (dead animals) in any process wastewater system, liquid manure or other facilities within the regulated CAFO is prohibited (40 C.F.R. § 412.37(a)(4)). Mortalities shall be handled in such a way as to prevent the discharge of pollutants to waters of the State. All dead animals shall be disposed of within three days. Records of mortality management shall be kept for five years (40 C.F.R. §§ 122.42(e)(1)(ii) and 412.37(b)(4)).
5. The discharge of process wastewater to a land application area before, during or after a storm event that would result in runoff of the applied water is prohibited.
6. The discharge of wastewater to surface waters from the cropland is prohibited. Irrigation supply water that comes into contact or is blended with waste or process wastewater shall be considered wastewater under this prohibition.
7. The discharge of storm water to surface waters from a land application area where manure or process wastewater has been applied is prohibited unless the land application area has been managed consistent with an approved Nutrient Management Plan.
8. The use of manure to construct containment structures is prohibited.
9. The discharge of wastes, including manure, process wastewater and/or storm water runoff from manured areas, to property not owned or controlled by the Discharger, except as authorized by this Order, is prohibited (40 C.F.R. § 412.31(a)).
10. There shall be no discharge of chemicals, or other wastes that are not associated with the CAFO operations to the waste management facilities and/or the waste handling facilities (40 C.F.R. § 122.42(e)(1)(v)).
11. Temporary waste storage areas shall be designed and constructed in a manner to prevent runoff and leachate from entering surface or groundwater.

12. Waste storage or disposal facilities shall not be built within 400 feet of a public drinking water well.
13. All confined animals shall be prohibited from entering or directly contacting any surface water (Title 27 CCR Section 22561, 40 C.F.R. § 122.42(e)(iv)).
14. The disposal of manure to land within Chino Basin (Chino-North, Chino-East, and Chino-South Groundwater Management Zones) is prohibited. The application of manure, process wastewater, and/or storm water runoff from manured areas, on cropland outside of the Chino Basin that overlie groundwater management zones lacking assimilative capacity for TDS and/or nitrate-nitrogen is also prohibited unless a plan, acceptable to the Executive Officer, is implemented that offsets the effects of such application on the underlying groundwater management zone.
15. Manure applied to non-CAFO related croplands in any area that may affect a groundwater management zone that has TDS and nitrate-nitrogen assimilative capacity shall not exceed agronomic rates. In addition, the manure shall be incorporated into the soil immediately after application. For any application of manure to these croplands in excess of 12 dry tons per acre per year (or 17.5 tons per acre per year @ 33% moisture), an explanation of the type of crop and the number of times it is harvested per year shall also be included in the Annual Report (Form 3).
16. Manure originating from outside of the Chino Basin is prohibited from being applied to land within the Chino Basin.
17. The discharge of any substances in concentrations toxic to animal or plant life is prohibited.
18. The discharge of waste containing TDS and/or Nitrogen concentrations in excess of the underlying groundwater management zone objectives for those constituents is prohibited, unless adequately offset to the satisfaction of the Executive Officer.

#### **E. Technology-Based Effluent Limitations (TBELs)**

##### **1. Scope and Authority**

CWA Section 301(b) and federal regulations 40 C.F.R. § 122.44 require that TBELs be established based on several levels of controls:

- a. Best practicable treatment control technology (BPT) represents the average of the best performance by plants within an industrial category or subcategory. BPT standards apply to toxic, conventional, and non-conventional pollutants.
- b. Best available technology economically achievable (BAT) represents the best existing performance of treatment technologies that are economically

achievable within an industrial point source category. BAT standards apply to toxic and non-conventional pollutants.

- c. Best conventional pollutant control technology (BCT) represents the control from existing industrial point sources of conventional pollutants including BOD, TSS, fecal coliform, pH, and oil and grease. The BCT standard is established after considering the “cost reasonableness” of the relationship between the cost of attaining a reduction in effluent discharge and the benefits that would result, and the cost-effectiveness of additional industrial treatment beyond BPT.
- d. New source performance standards (NSPS) represent the best available demonstrated control technology standards. The intent of NSPS guidelines is to set limitations that represent state-of-the-art treatment technology for new sources.

The CWA requires USEPA to develop Effluent Limitations Guidelines and Standards (ELGs) representing application of BPT, BAT, BCT, and NSPS. Section 402(a)(1) of the CWA and 40 C.F.R. § 125.3 of the NPDES regulations authorize the use of Best Professional Judgment (BPJ) to derive technology-based effluent limitations on a case-by-case basis where ELGs are not available for certain industrial categories and/or pollutants of concern. Where BPJ is used, the permit writer must consider specific factors outlined in 40 C.F.R. § 125.3.

## 2. Applicable Technology-Based Effluent Limitations

The Order requires the Discharger to meet technology-based effluent limitations as per 40 C.F.R. § 412.31. The effluent limitations guidelines do not require numeric effluent limits. In order for treatment controls to reliably meet numeric effluent limits, both the quality and quantity of the effluent should have limited variability. However, the quality and quantity of storm water runoff from dairy facilities vary considerably. The Regional Board has determined that it is not feasible to establish numeric effluent limitations for pollutants in discharges from CAFOs at this time because of this variability. This Order requires the Discharger to develop and implement best management practices (BMPs), including the development and implementation of EWMPs to contain waste and storm water up to and including runoff from the 24-hour, 25-year storm event, consistent with the federal regulations. These and requirements for Nutrient Management Plans and other measures are expected to control and abate the discharge of pollutants to surface waters and achieve compliance utilizing BPT to achieve applicable water quality standards.

Whenever precipitation causes an overflow of manure, litter, or process wastewater, pollutants in the overflow may be discharged from the facility, provided all provisions of an Engineered Waste Management Plan (EWMP), accepted by the Executive Officer, are fully implemented, and:



- a. The production area<sup>26</sup> is designed, constructed, operated and maintained to contain all manure, litter, and process wastewater including the runoff and the direct precipitation from a 25-year, 24-hour rainfall event; and (40 C.F.R. § 412.31(a)(1)(i))
- b. The operations at the facility are conducted in accordance with the additional measures required by 40 C.F.R. § 412.37(a) and (b) with respect to inspection, corrective actions, monitoring and record keeping as specified in the Monitoring and Reporting Requirements of this Order (Attachment B) (40 C.F.R. § 412.31(a)(1)(ii)).

## **F. Water Quality-Based Effluent Limitations (WQBELs)**

### **1. Scope and Authority**

As specified in 40 C.F.R. § 122.44(d)(1)(i), permits are required to include WQBELs for pollutants (including toxicity) that are or may be discharged at levels that cause, have reasonable potential to cause, or contribute to an excursion above any state water quality standard. The process for determining reasonable potential and calculating WQBELs when necessary is intended to protect the designated uses of the receiving water as specified in the Basin Plan, achieve applicable water quality objectives and criteria contained in state plans and policies, and meet water quality criteria contained in the CTR and NTR.

### **2. Applicable Water Quality-based Effluent Limitations (WQBELs)**

- a. Participation in the TMDL taskforces including the monitoring programs, workplan development and implementation activities either by each individual Discharger or by all the Dischargers represented by a trade association shall be considered in assessing compliance with the waste load allocations in the TMDLs.
- b. All Dischargers within the Lake Elsinore and Canyon Lake watershed shall comply with the Lake Elsinore and Canyon Lake Watershed Nutrient TMDL requirements specified in Section IV.J. of the Order.
- c. All Dischargers within the Santa Ana watershed shall comply with the Middle Santa Ana River Bacterial TMDL requirements including the time schedules, Section IV.H. of the Order.

### **3. Applicable Beneficial Uses and Water Quality Criteria and Objectives**

The designated beneficial uses of the receiving waters are listed in Sections I.L. 31 and 32. The requirements specified in this Order are necessary to protect water quality standards in the receiving waters.

### **4. Determining the Need for WQBELs**

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<sup>26</sup> See Glossary for a definition of "production area".

NPDES permits apply to discharges of waste to surface waters. These permits must meet all applicable provisions of sections 301 and 402 of the Clean Water Act. These provisions require controls of pollutant discharges that utilize Best Available Technology and Best Conventional Technology to reduce pollutant and any more stringent controls necessary to meet water quality standards.

Since portions of this order will serve as an NPDES permit and will allow discharges to surface waters that are impaired, albeit only during extreme weather conditions, federal regulations require the order to include WQBELs for those discharges.

The permit requirements are protective of water quality. The only discharges to surface waterbodies, or tributaries thereof, that are permitted are those from rainfall events that cause an overflow from facilities designed, constructed and operated to contain all process wastewater plus the runoff and the direct precipitation (that have been commingled with manure) from a 25-year, 24-hour rainfall event. The water quality standards allow for infrequent excursions consistent with the expected frequency of discharges from dairy facilities. Due to the catastrophic nature of such events and the significant volume of runoff involved, treatment of these discharges to meet numeric effluent limitations would be impractical. If the requirements specified in the order are met, water quality of the Region is not expected to degrade as a result of discharges authorized under this Order.

Therefore, the effluent limitations contained in this Order are narrative and include compliance with TMDL implementation plans. 40 C.F.R. §122.44(k)(3) allows the use of BMPs to control and abate the discharge of pollutants when “numeric effluent limitations are infeasible; or the practices are reasonably necessary to achieve effluent limitations and standards or to carry out the purposes and intent of the CWA.”

Regional Board has adopted TMDLs that address pollutants of concern in the two watersheds where the CAFOs are located: Middle Santa Ana (bacterial indicators) and Lake Elsinore and Canyon Lake (nutrients). These TMDLs include WLAs for CAFOs. Pursuant to the Middle Santa Ana River Bacterial indicator TMDLs CAFO compliance with the Dry Season WLA is to be achieved no later than December 2015.

Compliance with the Middle Santa Ana River Bacterial indicator TMDLs Wet Season WLA is to be achieved by December 2025. Since this Order will expire in December 15, 2023, final effluent limits, based on those allocations that are to be achieved beyond this permit term are not included in this Order. However, control measures are to be implemented for all TMDLs. See Section IV.D. of this Fact Sheet for a more detailed discussion of these TMDLs.

The TMDLs require water quality monitoring to be performed and pollution reduction plans to be developed by specified dates. The TMDL tasks applicable to CAFOs have been incorporated into this Order. CAFO operators can choose

to complete the tasks individually, or they may participate with the stakeholder group (TMDL Taskforces) to achieve compliance with the TMDLs.

5. WQBEL Calculations [Not Applicable]

6. Whole Effluent Toxicity (WET) [Not Applicable]

**G. Final Effluent Limitations [Not Applicable]**

**H. Interim Effluent Limitations [Not Applicable]**

**I. Land Discharge Specifications**

The discharge of waste containing TDS and/or Nitrogen concentrations in excess of the underlying groundwater management zone objectives for those constituents is prohibited, unless adequately offset to the satisfaction of the Executive Officer. Basin Plan Amendment, R8-2004-0001.

**J. Reclamation Specifications [Not Applicable]**

**IX. RATIONALE FOR RECEIVING WATER LIMITATIONS**

**A. Surface Water**

The Order includes receiving water limitation for surface waters based on Basin Plan prohibitions and/or objectives.

**B. Groundwater**

The Order includes prohibitions on discharge of wastes from CAFOs that could adversely impact groundwater based on Basin Plan prohibitions and/or objectives.

**X. RATIONALE FOR MONITORING AND REPORTING REQUIREMENTS**

40 C.F.R. § 122.48 requires all NPDES permits specify recording and reporting monitoring results. Sections 13267 and 13383 of the Water Code authorize the Regional Board to require technical and monitoring reports. The Monitoring and Reporting Program (Attachment B), establishes monitoring and reporting requirements to implement federal and state requirements.

**A. Influent Monitoring [Not Applicable]**

**B. Effluent Monitoring**

To assure compliance with Permit limitations and requirements, the Dischargers are required to sample and analyze any discharge of wastes to surface waters for total

dissolved solids (filterable residue), total coliform bacteria, *E. coli*, total nitrogen, total phosphorus and total suspended solids (40 C.F.R. § 122.44(i)).

### **C. Whole Effluent Toxicity Testing Requirements [Not Applicable]**

Whole effluent monitoring is not required in this Order because there is no indication that discharges contain toxicants that threaten water quality.

### **D. Receiving Water Monitoring [Not Applicable]**

### **E. Other Monitoring Requirements**

This Order requires monitoring to determine compliance with the WLAs in the TMDLs. The nutrient content of manure can vary significantly between dairies due to variations in animal diet and manure handling and storage procedures<sup>27</sup>. Consequently, this Order also requires chemical analysis for manure. The purpose of this chemical analysis is to assist agricultural operators to apply manure to cropland at rates that closely meet the nutrient needs of the specific crop. Monitoring of manure nutrient content is also indicated in 40 C.F.R. § 412.4(c)(3).

## **XI. RATIONALE FOR PROVISIONS**

### **A. Standard Provisions**

Standard Provisions, which in accordance with 40 C.F.R. §§ 122.41 and 122.42, apply to all NPDES discharges and must be included in every NPDES permit, are provided in Attachment A.

### **B. Special Provisions**

#### **1. Reopener Provisions**

This provision is based on 40 C.F.R. Part 123. The Regional Board may reopen the permit to modify permit conditions and requirements. Causes for modifications include the promulgation of new regulations, or adoption of new regulations by the State Board or Regional Board, including revisions to the Basin Plan.

#### **2. Special Studies and Additional Monitoring Requirements**

This Order includes a requirement for the Dischargers to participate in special studies that may be required to determine compliance with the WLAs in the TMDLs.

#### **3. Best Management Practices and Pollution Prevention**

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<sup>27</sup> Pettygrove, G. et al, 2009. *University of California manure technical guide series for crop management professionals*.  
<http://manuremanagement.ucdavis.edu>

In compliance with the CWA and the California Code of Regulations, this Order prohibits discharges to any surface water bodies, or tributary thereof, unless rainfall events cause an overflow of process wastewater from a facility designed, constructed and operated to contain all process wastewater plus the runoff and the direct precipitation (that have been commingled with manure) from a 25-year, 24-hour rainfall event (Title 27, Chapter 7, Subchapter 2, Article 1, Section 22562(a), California Code of Regulations and 40 C.F.R. Part 412). To insure that compliance with these requirements is achieved, all CAFOs are required to develop and implement EWMPs. EWMPs are to be developed in accordance with the Guidelines for the Development of EWMP for CAFOs (Dairies and Related Facilities). It is intended that the guidelines can be revised, as necessary, by the Executive Officer. This Order authorizes the Executive Officer to make necessary revisions to the guidelines.

In March 1999, the United States Department of Agriculture (USDA) and the USEPA finalized their unified national strategy for AFOs. In general, the national strategy recommended the development of nutrient management plans (NMPs) that were intended to bring each CAFO into compliance with the requirements of the CWA and to minimize the impacts to groundwater and surface water from dairy wastes by the implementation of best management practices. In general, a NMP would assure that appropriate dairy wastewater facilities were developed, constructed and maintained to comply with the requirements of the CWA, and that the use and application of wastewater and manure (i.e. nutrient management) was managed to minimize impacts to groundwater and surface water. The most recent revisions to the NPDES and Effluent Limitation Guidelines and Standards for CAFO regulations, published on February 12, 2003, support this national strategy by requiring the CAFOs to develop and implement NMPs.

Consistent with the federal regulations, this Order requires CAFO operators who apply manure, litter, or process wastewater to croplands under their ownership or operational control to develop and fully implement a NMP in addition to the EWMPs. The NMP shall be prepared in accordance with 40 C.F.R. § 122.42(e)(1) and 40 C.F.R. § 412.4, and should follow the guidelines developed by Natural Resources Conservation Service (NRCS), Conservation Practices Standard 590. The Discharger shall also comply with the recordkeeping requirements as described in 40 C.F.R. § 412.37(c). The NMP will be made available for public review for 30 days prior to its approval. If there is no objection after the reviewing period, the Executive Officer will approve the NMP and authorize the Discharger to start implementing the approved NMP within 90 days.

All Dischargers in the Region have complied with the requirements for developing and implementing EWMPs and NMPs.

#### **4. Compliance Schedules**

See Section VII.C.4 of the Order for a more detailed discussion of the compliance schedules.

## **5. Construction, Operation, and Maintenance Specifications**

The Dischargers are required to use qualified professionals for the development and implementation of EWMPs and NMPs.

## **6. Special Provisions for Municipal Facilities (POTWs Only) [Not Applicable]**

## **7. Other Special Provisions [Not Applicable]**

# **XII. PUBLIC PARTICIPATION**

The California Regional Water Quality Control Board, Santa Ana Region (Regional Board) is considering the renewal of waste discharge requirements (WDRs) that will serve as a General National Pollutant Discharge Elimination System (NPDES) permit for CAFOs. A draft of the General NPDES permit with all supporting documentation has been prepared and is available for public review and comments at:

[http://www.waterboards.ca.gov/santaana/water\\_issues/programs/dairies/index.shtml](http://www.waterboards.ca.gov/santaana/water_issues/programs/dairies/index.shtml)

## **A. Notification of Interested Parties**

The Regional Board has notified the Dischargers and interested agencies and persons of its intent to prescribe waste discharge requirements for the discharge and has provided them with an opportunity to submit their written comments and recommendations. Notification was provided through: posting of the Notice of Public Hearing at the Regional Water Board website: <http://www.waterboards.ca.gov/santaana>

## **B. Written Comments**

The staff determinations are tentative. Interested persons are invited to submit written comments concerning this draft Permit. Comments should be submitted either in person or by mail to: Jawed Shami, Regional Water Quality Control Board, 3737 Main Street, Suite 500, Riverside, CA 92501. Comments can also be submitted by email at [Adam.Fischer@waterboards.ca.gov](mailto:Adam.Fischer@waterboards.ca.gov).

### **C. Public Workshop/Hearing**

Status report on the development of a new dairy permit was discussed at the following Regional Board meeting:

Date: **November 3, 2017**  
Time: **9:00am**  
Location: **City Council Chambers of Loma Linda  
25541 Barton Road  
Loma Linda, CA 92354**

First public workshop was held at the following location:

Date: **April 17, 2018**  
Time: **9:00am**  
Location: **City of Norco – City Hall  
2870 Clark Avenue  
Norco, CA**

Second public workshop was held at the following location:

Date: **April 19, 2018**  
Time: **9:00am**  
Location: **Eastern Municipal Water District  
2270 Trumble Road  
Perris, CA**

A third public workshop was held following the public release of a draft Order on July 23, 2018. The workshop was held at the following location:

Date: **August 20, 2018**  
Time: **9:00am**  
Location: **Eastern Municipal Water District  
2270 Trumble Road  
Perris, CA**

All comments received during the public workshops and the comment period have been considered in the formulation of the final draft presented to the Board for its consideration.

The Regional Board will hold a public hearing for consideration of the final draft Permit during its regular Board meeting on the following date and time and at the following location.

Date: **December 7, 2018**  
Time: **9:00 a.m.**

**Location: City Council Chambers of Loma Linda  
25541 Barton Road  
Loma Linda, CA**

Interested persons are invited to attend the public workshop and the hearing. At the public workshop and the hearing, the Regional Board will hear testimony, if any, pertinent to the discharge, the draft Permit and related documents. Oral testimony will be heard; however, for accuracy of the record, important testimony should be in writing.

Additional workshops and/or public hearing may also be scheduled if the Regional Board, stakeholders or Regional Board staff determines a need for them. Please refer to the following website for most recent information regarding public workshops and public hearing. You may also contact Jawed Shami at 951-782-3288 (Jawed.Shami@waterboards.ca.gov).

Please be aware that dates and venues may also change. Our Web address is <http://www.waterboards.ca.gov/santaana> where you can access notices of public workshops and hearing and the board meeting agenda, including any changes in dates and locations.

#### **D. Waste Discharge Requirements Petitions**

Any aggrieved person may petition the State Water Resources Control Board to review the decision of the Regional Board regarding the adopted permit. The petition must be submitted within 30 days of the Regional Board's action to the following address:

State Water Resources Control Board  
Office of Chief Counsel  
P.O. Box 100, 1001 I Street  
Sacramento, CA 95812-0100

#### **E. Information and Copying**

All documents related to this Order, any comments received, and other information are on file and may be inspected at the address above any time between 8:30 a.m. and 4:45 p.m., Monday through Friday. Copying of documents may be arranged through the Regional Board by calling (951) 782-4130.

#### **F. Register of Interested Persons**

Any person interested in being placed on the mailing list for information regarding the NPDES permit should contact the Regional Board, reference this Permit, and provide a name, address, and phone number.

#### **G. Additional Information**



Requests for additional information or questions regarding this Order should be directed to Jawed Shami at (951) 782-3288 ([Jawed.Shami@waterboards.ca.gov](mailto:Jawed.Shami@waterboards.ca.gov)).

**ACRONYMS AND ABBREVIATIONS**

**AB, Assembly Bill**

**AFO, Animal Feeding Operations**

**AgNMP, Agricultural Nutrient Management Plan**

**AGSEP, Agricultural Source Evaluation Plan**

**APU, Administrative Procedures Manual**

**ARS, Agricultural Research Services**

**BAT, Best Available Technology**

**BCT, Best Conventional Pollutant Control Technology**

**BMP, Best Management Practices**

**BOD, Biological Oxygen Demand**

**BPJ, Best Professional Judgment**

**BPT, Best Practicable Control Technology**

**CAFO, Concentrated Animal Feeding Operations**

**CCR, California Code of Regulations**

**CEQA, California Environmental Quality Act**

**CFR, Code of Federal Regulations**

**CIWQS, California Integrated Water Quality System**

**CNRP, Comprehensive Nutrient Reduction Plan**

**CTR, California Toxics Rule**

**CWA, Federal Clean Water Act**

**CWC, California Water Code**

**ELG, Effluent Limitations, Guidelines and Standards**

**EWMP, Engineered Waste Management Plan**

**GPS, Global Positioning System**

**IEUA, Inland Empire Utilities Agency**

**IRDMP, Integrated Regional Dairy Management Plan**

**MRP, Monitoring and Reporting Program**

**N/TDS, Nitrogen/Total Dissolved Solids**

**NMP, Nutrient Management Plan**

**NOI, Notice of Intent**

**NOT, Notice of Termination**

**NPDES, National Pollutant Discharge Elimination System**

**NRCS, Natural Resources Conservation Service**

**NSPS, New Source Performance Standards**

**NTR, National Toxics Rule**

**OAL, Office of Administrative Law**

**OBMP, Optimum Basin Management Plan**

**PBMZ, Prado Basin Management Zone**

**POTW Publicly Owned Treatment Works**

**PTP, Pollutant Trading Plan**

**REC-1, Water Contact Recreation**

**RWD, Report of Waste Discharge**

**RWQCB, Regional Water Quality Control Board**

**SJBRCD, San Jacinto Basin Resource Conservation District**

**SMR, Self-Monitoring Report**

**SWRCB, State Water Resources Control Board**

**TBEL, Technology-Based Effluent Limitations**

**TDS, Total Dissolved Solids**

**TMDL, Total Maximum Daily Load**

**TSS, Total Suspended Solids**

**USC, United States Code**

**USDA, United States Department of Agriculture**

**USEPA, United States Environmental Protection Agency**

**WDR, Waste Discharge Requirements**

**WET, Whole Effluent Toxicity**

**WLA, Waste Load Allocations**

**WQBEL, Water Quality-Based Effluent Limitations**

**WRCAC, Western Riverside County Agricultural Coalition**

## NOTICE OF TERMINATION

TO COMPLY WITH THE TERMS AND CONDITIONS OF THE GENERAL PERMIT TO DISCHARGE  
WASTES FROM CONCENTRATED ANIMAL FEEDING OPERATIONS (DAIRIES AND RELATED FACILITIES)  
(Order No. R8-2018-0001, NPDES No. CAG018001)

## PERMITTEE (Person/Agency Responsible for the Discharge)

Owner/Operator Name: \_\_\_\_\_

Mailing Address: \_\_\_\_\_

Street City State ZIP

Contact Person: \_\_\_\_\_ Phone (\_\_\_\_) \_\_\_\_\_

## FACILITY (Physical Address)

Name: \_\_\_\_\_

Location: \_\_\_\_\_

Street City State ZIP

Contact Person: \_\_\_\_\_ Phone (\_\_\_\_) \_\_\_\_\_

## BASIS FOR TERMINATION

1. **Facility Closed:** The facility is closed and all CAFO (Dairies and Related Facilities) activities terminated.

Date of closure \_\_\_\_/\_\_\_\_/\_\_\_\_

2. **Facility Cleaning:**

Have all ponds/wastewater holding lagoons been drained, scrapped, and solids removed? Yes \_\_\_\_ No \_\_\_\_

Has all manure been removed from Corrals (please provide manure tracking manifests)? Yes \_\_\_\_ No \_\_\_\_

Has all stockpiled manure been removed (please provide manure tracking manifests)? Yes \_\_\_\_ No \_\_\_\_

3. **New Facility Operator.** Is there a new operator at this facility? Yes \_\_\_\_ No \_\_\_\_

Date facility was transferred to new operator \_\_\_\_/\_\_\_\_/\_\_\_\_

Have you notified the new operator, in writing, of the NPDES Permit requirements?  
(If so, please provide a copy of notification) Yes \_\_\_\_ No \_\_\_\_

Have you provided a copy of EWMP and NMP (if applicable) to the new operator? Yes \_\_\_\_ No \_\_\_\_

Please provide new operator's Name, Address, and Phone number \_\_\_\_\_

## CERTIFICATION:

*I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. I believe that the information submitted is true, accurate and complete. I am also aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment. I also understand that the submittal of this Notice of Termination does not release the facility operator from liability for any violations of Order No. R8-2018-0001.*

SIGNATURE OF OWNER OF FACILITY

SIGNATURE OF OPERATOR OF FACILITY

PRINT OR TYPE NAME

PRINT OR TYPE NAME

TITLE AND DATE

TITLE AND DATE

## ATTACHMENT G

### Glossary For Order No. R8-2018-0001 NPDES Permit No. CAG018001

#### GLOSSARY

This Glossary has been prepared for the convenience of the reader. This Glossary is not an exhaustive catalog of terminology used in this Order. Additional terminology is defined in the Clean Water Act, USEPA regulations, and the California Water Code; all such terms not appearing below are incorporated into this Permit by reference.

**Basin Plan** – The Water Quality Control Plan for the Santa Ana River Basin (1995) and subsequent amendments.

**Beneficial Uses** – The uses of water necessary for the survival or well-being of man, plants, and wildlife. These uses of water serve to promote the tangible and intangible economic, social, and environmental goals. “Beneficial Uses” that may be protected against include, but are not limited to: domestic, municipal, agricultural and industrial supply; power generation; recreation; aesthetic enjoyment; navigation; and preservation and enhancement of fish, wildlife, and other aquatic resources or preserves. Existing beneficial uses are uses that were attained in the surface or groundwater on or after November 28, 1975; and potential beneficial uses are uses that would probably develop in future years through the implementation of various control measures. “Beneficial Uses” are equivalent to “Designated Uses” under federal law (California Water Code Section 13050(f)). Beneficial Uses for the Receiving Waters are identified in the Basin Plan.

**Best Management Practices (BMPs)** – Also known as storm water control measures. BMPs means schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce the pollution of waters of the United States. BMPs also include treatment requirements, operating procedures and practices to control plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage (40 CFR § 122.2).

**Bioaccumulate** – The progressive accumulation of contaminants in the tissues of organisms to a higher concentration than in the surrounding environment.

Bioaccumulation may occur through any route, including respiration, ingestion, or direct contact with contaminated water, sediment, pore water, or dredged material. Bioaccumulation occurs with exposure and is independent of the trophic level of the organism.

**California Toxics Rule** – Numeric water quality criteria for certain Priority Toxic Pollutants and other water quality standards provisions promulgated by the USEPA for waters in the state of California. The California Toxics Rule is found in 40 CFR § 131.

**Clean Water Act Section 402(p)** – The federal statute, codified at 33 USC 1342(p), requiring municipal and industrial Co-permittees to obtain NPDES permits for their discharges of storm water.

**Clean Water Act Section 303(d)-Listed Water Body** – An impaired water body; a water body in which water quality does not meet applicable water quality standards and/or is not expected to meet water quality standards, even after the application of technology-based pollution controls required by the CWA.

**Contamination** – An impairment of the quality of waters of the State by waste to a degree which creates a hazard to the public health through poisoning or through the spread of disease. "Contamination" includes any equivalent effect resulting from the disposal of waste whether or not waters of the State (inclusive of waters of the U.S.) are affected. (California Water Code Section 13050(k))

**Co-permittee(s)** – Entities regulated under Phase 1 municipal separate storm sewer system permits, inclusive of the Principle Co-permittee.

**Criteria** – The numeric values and the narrative standards that represent contaminant concentrations that are not to be exceeded in the receiving environmental media (surface water, groundwater, sediment) to protect beneficial uses.

**Dry Weather** – Weather in which there is no precipitation.

**Duly Authorized Representative (DAR)** – All reports required by this permit, and other information by the Executive Officer shall be signed by the legally responsible party (LRP) or by a duly authorized representative of that person. A person is a duly authorized representative only if:

- The authorization is made electronically submitted by either a principal executive officer or ranking elected official; and,
- The authorization specifies either an individual or a position having

responsibility for the overall operation of the regulated activity such as a position of plant manager, superintendent, position of equal responsibility, or an individual or position having overall responsibility for environmental matters for the municipality (A duly authorized representative may thus be either a named individual or any individual occupying a named position).

**Effluent** – Any discharge of water containing pollutants either to the receiving water or beyond the property boundary controlled by the discharger.

**Effluent Limit/Limitation** – Means any restriction on quantities, discharge rates, and concentrations of pollutants which are discharged from point sources into Waters of the United States, waters of the “contiguous zone,” or the ocean. (40 CFR §122.2)

**Emergency** – A sudden, unexpected occurrence, involving a clear and imminent danger, demanding immediate action to prevent or mitigate loss of, or damage to, life, health, property, or essential public services (Public Resources Code Section 21060.3).

**Environmentally Sensitive Area (ESA)** – An area in which plant or animal life or their habitats are either rare or especially valuable because of their special nature or role in an ecosystem and which would be easily disturbed or degraded by human activities and developments (Public Resources Code Section 30107.5). These areas include, but are not limited to: water bodies designated with the RARE beneficial use in the Basin Plan (Water Quality Control Plan for the Santa Ana River Basin [1995] and amendments); an area designated in the Ocean Plan as an Area of Special Biological Significance; Marine Protected Areas designated as such pursuant to the Marine Life Protection Act; a water body listed as being impaired pursuant to CWA Section 303(d); areas designated as preserves or their equivalent under the Natural Communities Conservation Program (Multiple Species Habitat Conservation Plan, MSHCP) within the Cities and Counties of Orange, Riverside and San Bernardino; or any area designated as such by a public agency with designation powers.

**Executive Officer** – The Executive Officer of the Santa Ana Regional Water Quality Control Board or delegated staff.

**Hazardous Substance** – Any substance that poses a threat to human health or the environment due to its toxicity, corrosiveness, ignitability, explosive nature or chemical reactivity; any substance designated under 40 CFR §116 pursuant to Section 311(b)(2) of the Clean Water Act (40 CFR § 122.2).

**Illicit Discharge** – Any discharge to a municipal separate storm sewer that is not

composed entirely of storm water. This does not include discharges that occur pursuant to an NPDES permit, other than the MS4 Permit, and discharges resulting from fire-fighting activities (40 CFR § 122.26(b)(2)).

**Impaired Water Body** – Section 303(b) of the CWA requires each of California's Regional Water Quality Control Boards to routinely monitor and assess the quality of waters of their respective regions. If this assessment indicates that Beneficial Uses are not met, then that water body must be listed under Section 303(d) of the CWA as an Impaired Water Body.

**Impervious Surface** – That part of a developed parcel that has been modified to reduce the land's natural ability to absorb and hold rainfall. It includes hard surfaces which cause water to run off the surface in greater quantities or at an increased rate of flow from the flow that existed under natural conditions prior to development. For example, common impervious surfaces include, but are not limited to, rooftops, walkways, patios, courtyards, driveways, parking lots, storage areas, concrete or asphalt paving, gravel roads, or any cleared, graded, graveled, paved, or compacted surfaces, or other surfaces which similarly impede the natural infiltration of surface water into the soil.

**Infiltration** – The flow of water into the soil by crossing the soil surface.

**Legally Responsible Person (LRP)** – For a municipality: a principal executive officer or ranking elected official. The LRP designates the duly authorized representative.

**Load Allocations (LA)** – Distribution or assignment of TMDL pollutant loads to entities or sources for existing and future nonpoint sources, including background loads.

**Monitoring and Reporting Period** – For purposes of this Order, the monitoring and reporting period is the calendar year from January 1 to December 31 with a reporting deadline of the following January 15<sup>th</sup> of each year for Annual Reports.

**Municipal Storm Water Conveyance System** – (See Municipal Separate Storm Sewer System or MS4).

**Municipal Separate Storm Sewer System (MS4)** – A conveyance or system of conveyances designed to collect and/or transport urban runoff (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels, or storm drains): (i) Owned or operated by a State, city town, borough, county, parish, district, association, or other public body (created by or pursuant to State law) having jurisdiction over disposal of sewage, industrial wastes, storm water, or other wastes; (ii) Designated or used for collecting or conveying storm water; (iii) Which is not a combined sewer; (iv) Which is not part of the Publicly Owned Treatment Works (POTW) as defined at 40 CFR § 122.2 (40 CFR § 126.26(b)(8)).



**Most Probable Number (MPN)** – The most probable number (MPN) of coliform or fecal coliform bacteria per unit volume of a sample. It is expressed as the number of organisms which are most likely to have produced the laboratory results noted in a particular test.

**National Pollutant Discharge Elimination System (NPDES) Permit** – A national program under section 402 of the Clean Water Act for regulation of discharges of pollutants from point sources to waters of the United States. Discharges of pollutants are prohibited unless specifically exempted or authorized by an NPDES permit.

**Non-Storm Water** – Non-storm water consists of all discharges to and from a storm water conveyance system that do not originate from precipitation events (i.e., all discharges from a conveyance system other than storm water). Non-storm water includes illicit discharges, prohibited discharges, and NPDES permitted discharges.

**Nuisance** – anything which meets all of the following requirements: 1) Is injurious to health, or is indecent, or offensive to the senses, or an obstruction to the free use of property, so as to interfere with the comfortable enjoyment of life or property. 2) Affects at the same time an entire community or neighborhood, or any considerable number of persons, although the extent of the annoyance or damage inflicted upon individuals may be unequal. 3) Occurs during, or as a result of, the treatment or disposal of wastes (CWC Section 13050(m)).

**Outfall** – A *point source*, as defined by 40 CFR 122.2, at the point where an MS4 discharges to waters of the United States. An outfall does not include open conveyances connecting two municipal separate storm sewers. An outfall does not include pipes, tunnels, or other conveyances which connect segments of the same stream or other waters of the U.S. and are used to convey waters of the U.S. (40 CFR 122.26(b)(9)).

**Party** – Defined as an individual, association, partnership, corporation, municipality, state or federal agency, or an agent or employee thereof (40 CFR § 122.2).

**Permit Registration Documents (PRDs)** – Include the Notice of Intent, the appropriate filing fee and, if applicable, an Engineered Waste Management Plan and Nutrient Management Plan necessary to authorize a discharge under general waste discharge requirements.

**Person** – A person is defined as an individual, association, partnership, corporation, municipality, State or Federal agency, or an agent or employee thereof (40 CFR § 122.2).

**pH** – An indicator of the acidity or alkalinity of water.

**Point Source** – Any discernible, confined, and discrete conveyance, including, but not limited to, any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, runoff from concentrated animal feeding operations, landfill leachate collection systems, vessel, or other floating craft from which pollutants are or may be discharged. This term does not include return flows from irrigated agriculture or agricultural storm water runoff.

**Pollutant** – Any agent that may cause or contribute to the degradation of water quality such that a condition of pollution or contamination is created or aggravated. It includes any type of industrial, municipal, and agricultural waste discharged into water. The term “pollutant” is defined in section 502(6) of the Clean Water Act as follows: “The term ‘pollutant’ means dredged spoil, solid waste, incinerator residue, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials, heat, wrecked or discarded equipment, rock, sand, cellar dirt and industrial, municipal, and agricultural waste discharged into water.” It has also been interpreted to include water characteristics such as toxicity or acidity.

**Pollution** – The alteration of the quality of the Waters of the U.S. by waste, to a degree that unreasonably affects either of the following: 1) The waters for beneficial uses; or 2) Facilities that serve these beneficial uses. Pollution may include contamination (CWC Section 13050(l)).

**Pollution Prevention** – Practices and processes that reduce or eliminate the generation of pollutants, in contrast to source control, treatment, or disposal.

**Priority Toxic Pollutant** – A pollutant identified in the California Toxics Rule.

**Process Wastewater** - Water directly or indirectly used in the operation of the CAFO for any or all of the following: spillage or overflow from animal or poultry watering systems; washing, cleaning, or flushing pens, barns, manure pits, or other CAFO facilities; direct contact swimming, washing, or spray cooling of animals; or dust control. Process wastewater also includes any water which comes into contact with any raw materials, products, or byproducts including manure, litter, feed, milk, eggs, or bedding (40 CFR 412.2(d)).

**Production Area** – That part of an Animal Feeding Operation that includes the animal confinement area, the manure storage area, the raw materials storage area, and the waste containment areas. The animal confinement area includes but is not limited to open lots, housed lots, feedlots, confinement houses, stall barns, free stall barns, milkrooms, milking centers, cowyards, barnyards, medication pens, walkers, animal walkways, and stables. The manure storage area includes but is not limited to lagoons,

runoff ponds, storage sheds, stockpiles, under house or pit storages, liquid impoundments, static piles, and composting piles. The raw materials storage area includes but is not limited to feed silos, silage bunkers, and bedding materials. The waste containment area includes but is not limited to settling basins, and areas within berms and diversions which separate uncontaminated storm water. Also included in the definition of production area is any egg washing or egg processing facility, and any area used in the storage, handling, treatment, or disposal of mortalities (40 CFR 412.2(h)).

**Receiving Waters** – Waters of the United States.

**Receiving Water Limitations** – Waste discharge requirements issued by the Regional Board typically include both: (1) "Effluent Limitations" (or Discharge Limitations) that specify the technology-based or water-quality-based effluent limitations; and (2) "Receiving Water Limitations" that specify the water quality objectives in the Basin Plan as well as any other limitations necessary to attain those objectives. In summary, the "Receiving Water Limitations" provision is the provision used to implement the requirement of CWA SECTION 301(b)(1)(C) that NPDES permits must include any more stringent limitations necessary to meet water quality standards.

**Sediment** – Soil, sand, and minerals washed from land into water. Sediment resulting from anthropogenic sources (i.e. human-induced land disturbance activities) is considered a pollutant. This Order regulates only the discharges of sediment from anthropogenic sources and does not regulate naturally-occurring sources of sediment. Sediment can destroy fish-nesting areas, clog animal habitats, and cloud waters so that sunlight does not reach aquatic plants.

**State Implementation Plan (SIP)** – Formally known as the Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California. The SIP implements the California Toxics Rule.

**State Board** – California State Water Resources Control Board

**Storm Water** – Storm water runoff, snowmelt runoff and surface runoff and drainage (40 CFR § 122.26(b)(13)).

**Storm Water General Permits** – Industrial General Permit (State Board Order No. 2014-00057-DWQ, NPDES No. CAS000001), and Construction General Permit (State Board Order No. 2009-0009-DWQ, NPDES No. CAS000002).

**Twenty-five (25) year, 24-hour rain event** - precipitation events with a probable recurrence interval of once in twenty five years, as defined by the National Weather Service in Technical Paper No. 40, "Rainfall Frequency Atlas of the United States," May, 1961, or equivalent regional or State rainfall probability information developed from this source.

**Total Dissolved Solids (TDS)** – A measure of the total dissolved minerals in the water; the total dissolved (filterable) solids as determined by use of the method specified in 40 CFR § 136 (40 CFR § 122.2)

**Total Maximum Daily Load (TMDL)** – The maximum amount of a pollutant that can be discharged into a water body from all sources (point and non-point) and still maintain water quality standards. Under Clean Water Act § 303(d), TMDLs must be developed for all water bodies that do not meet water quality standards after application of technology-based controls.

**TMDL Implementation Plan** – Component of a TMDL that describes actions, including monitoring, needed to reduce pollutant loadings and a timeline for implementation. TMDL implementation plans can include a monitoring or modeling plan and milestones for measuring progress, plans for revising the TMDL if progress toward cleaning up the waters is not made, and the date by which water quality standards will be met (USEPA Final TMDL Rule: Fulfilling the Goals of the CWA, EPA 841-F-00-008, July 2000).

**Toxicity** – Adverse responses of organisms to chemicals or physical agents ranging from mortality to physiological responses such as impaired reproduction or growth anomalies.

**Turbidity** – The cloudiness of water quantified by the degree to which light traveling through a water column is scattered by the suspended organic and inorganic particles it contains. The turbidity test is reported in Nephelometric Turbidity Units (NTU) or Jackson Turbidity Units (JTU)

**Uncontaminated Groundwater** – Groundwater that is not impaired by waste to a degree which creates a hazard to the public health through poisoning or through the spread of disease

**Urban Runoff** – Urban runoff is defined as all flows in a storm water conveyance system from urban areas which include residential, commercial, industrial, and construction areas. Urban runoff consists of the following components: (1) storm water runoff and (2) authorized non-storm water discharges (See Section III of this Order). Urban runoff does

not include runoff from undeveloped open space, feedlots, dairies, farms, and agricultural fields.

**Waste** – Waste includes sewage and any and all other waste substances, liquid, solid, gaseous, or radioactive, associated with human habitation, or of human or animal origin, or from any producing, manufacturing, or processing operation, including waste placed within containers of whatever nature prior to, and for purposes of, disposal (CWC Section 13050(d)). Article 2 of CCR Title 23, Chapter 15 (Chapter 15) contains a waste classification system which applies to solid and semi-solid waste which cannot be discharged directly or indirectly to water of the state and which therefore must be discharged to land for treatment, storage, or disposal in accordance with Chapter 15. There are four classifications of waste (listed in order of highest to lowest threat to water quality): hazardous waste, designated waste, nonhazardous solid waste, and inert waste.

**Waste Discharge Requirements (WDR)** – As defined in section 13374 of the California Water Code, the term "Waste Discharge Requirements" is the equivalent of the term "permits" as used in the Federal Water Pollution Control Act, as amended. The Regional Board usually uses the terms "permit" and "Order" to refer to Waste Discharge Requirements for discharges to Waters of the U.S.

**Waste Load Allocations (WLA)** – WLA is the distribution or assignment of pollutant loads to entities or sources for existing and future point sources according to a TMDL; the maximum quantity of pollutants a discharger is allowed to release into a particular waterway, as set by a regulatory authority. Discharge limits usually are required for each specific water quality criterion being, or expected to be, violated.

**Water Quality Assessment** – An assessment conducted to evaluate the condition of water bodies which receive process wastewater, storm water and non-storm water discharges.

**Water Quality Objective** – The limits or levels of water quality constituents or characteristics which are established for the reasonable protection of beneficial uses of water or the prevention of nuisance within a specific area [California Water Code Section 13050(h)].

**Water Quality Standards** – Consist of beneficial uses, water quality objectives to protect those uses, an anti-degradation policy, and policies for implementation. Water quality standards are found in Regional Water Quality Control Plans and statewide water quality control plans. The USEPA has also adopted water quality criteria (the same as objectives) for California in the National Toxics Rule and California Toxics Rule.

**Waters of the State** – Any surface water or groundwater, including saline waters, within the boundaries of the State (California Water Code Section 13050(e)). Waters of the State include waters of the United States.

**Waters of the United States** – Waters of the United States can be broadly defined as navigable surface waters and tributaries thereto. Groundwater is not considered to be Waters of the United States. As defined in 40 CFR § 122.2, the Waters of the U.S. are defined as: (a) All waters, which are currently used, were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide; (b) All interstate waters, including interstate “wetlands;” (c) All other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sand flats, “wetlands,” sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds the use, degradation or destruction of which would affect or could affect interstate or foreign commerce including any such waters: (1) Which are or could be used by interstate or foreign travelers for recreational or other purposes; (2) From which fish or shellfish are or could be taken and sold in interstate or foreign commerce; or (3) Which are used or could be used for industrial purposes by industries in interstate commerce; (d) All impoundments of waters otherwise defined as waters of the United States under this definition; (e) Tributaries of waters identified in paragraphs (a) through (d) of this definition; (f) The territorial seas; and (g) “Wetlands” adjacent to waters (other than waters that are themselves wetlands) identified in paragraphs (a) through (f) of this definition. Waters of the United States do not include prior converted cropland. Notwithstanding the determination of an area's status as prior converted cropland by any other federal agency, for the purposes of the Clean Water Act, the final authority regarding Clean Water Act jurisdiction remains with the EPA.

**Watershed** – That geographical area which drains to a specified point on a water course, usually a confluence of streams or rivers; a drainage area, catchment, or river basin.

**Wet Season** – The period of October 1st through May 31st of each year, except where specifically defined otherwise in an approved TMDL Implementation Plan.

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# Staff Report

for the

## Action Plan

for the

### Russian River Watershed

### Pathogen Total Maximum Daily Load



May 2019  
California Regional Water Quality Control Board  
North Coast Region



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Adopted by the  
California Regional Water Quality Control Board  
North Coast Region  
on \_\_\_\_\_, 201x

Approved by the  
State Water Resources Control Board  
on \_\_\_\_\_, 201x  
and the  
Office of Administrative Law  
on \_\_\_\_\_, 201x  
and the  
United States Environmental Protection Agency  
on \_\_\_\_\_. 201x

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Documents are available at:

[http://waterboards.ca.gov/northcoast/water\\_issues/programs/tmdls/russian\\_river](http://waterboards.ca.gov/northcoast/water_issues/programs/tmdls/russian_river)

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## LIST OF ACRONYMS & SHORT HAND NAMES

APMP .....	Advanced Protection Management Plan
Basin Plan.....	Water Quality Control Plan for the North Coast Region
BLRP .....	Bacteria Load Reduction Plan
BMP .....	Best Management Practice
BAV .....	Beach Action Value
CAFO.....	Confined Animal Feeding Operation
Caltrans .....	California Department of Transportation
CDFW .....	California Department of Fish and Wildlife
CDHCD .....	California Department of Housing and Community Development
CDPH .....	California Department of Public Health
CEDEN .....	California Environmental Data Exchange Network
CEQA .....	California Environmental Quality Act
CIWQS.....	California Integrated Water Quality System
cfu.....	colony forming units
CSD .....	Community Service District
CWA .....	Clean Water Act
CWC .....	California Water Code
DNA.....	Deoxyribonucleic acid
EIR.....	Environmental Impact Report
EL.....	Effluent Limitation
I/I.....	inflow and infiltration
Impaired Waters Policy .....	California Water Quality Control Policy for Addressing Impaired Waters: Regulatory Structure and Options
gpd .....	gallons per day
LA .....	Load Allocation
mgd .....	million gallons per day
MPN .....	Most Probably Number
MOS.....	Margin of Safety
MS4 .....	Municipal Separate Storm Sewer Systems
NGI .....	Near Gastrointestinal Illness (includes diarrhea without the requirement of a fever)
NOAA Fisheries .....	National Oceanic and Atmospheric Administration, National Marine Fisheries Service
NPDES.....	National Pollutant Discharge Elimination System
NPS.....	Non-point Source
NRCS.....	Natural Resources Conservation Service
OWTS .....	Onsite Wastewater Treatment Systems
qPCR.....	Quantitative Polymerase Chain Reaction
QA/QC.....	Quality Assurance / Quality Control
REC-1 .....	Water Contact Recreation Beneficial Use
REC-2 .....	Non-Contact Water Recreation Beneficial Use
Regional Water Board .....	North Coast Regional Water Quality Control Board
RCD .....	Resource Conservation District
rRNA.....	Ribosomal Ribonucleic Acid

ROWD .....	Report of Waste Discharge
SSO .....	Sanitary Sewer Overflow
State Water Board.....	State Water Resources Control Board
STV .....	Statistical Threshold Value or 90 <sup>th</sup> percentile
TMDL.....	Total Maximum Daily Load
U.S. EPA .....	United States Environmental Protection Agency
USFS.....	United States Forest Service
USFWS .....	United States Fish and Wildlife Service
Waiver .....	Waiver of Waste Discharge Requirements
WDRs .....	Waste Discharge Requirements
WLA.....	Wasteload Allocation
WWTP.....	Wastewater Treatment Plant

## CHAPTER 1 INTRODUCTION

### 1.1 PROJECT PURPOSE

The purpose of this 2019 Staff Report is to present the information and analyses that support the *Action Plan for the Russian River Watershed Pathogen Total Maximum Daily Load* (Action Plan), which includes both the Russian River Watershed Pathogen Total Maximum Daily Load (Russian River Pathogen TMDL) and a program of implementation, as required under state law. The Action Plan will be proposed to the Regional Water Board for adoption as an amendment to the *Water Quality Control Plan for the North Coast Region* (Basin Plan). The Action Plan with support from this Staff Report includes all of the elements required by U.S. EPA for approval as a TMDL. It also includes the nine key elements of a watershed plan, as required by U.S. EPA to support 319(h) grant solicitations.

The North Coast Regional Water Quality Control Board (Regional Water Board) is undertaking this action under its authority in the state Porter-Cologne Water Quality Control Act: (Porter Cologne). Under state law, the Regional Water Board may establish a program of implementation to address water quality problems; (i.e., pollution, as described in Porter Cologne), including waters identified in the development of the TMDL that are not yet listed on the Clean Water Act Section 303(d) list of impaired waters (303(d) List). Porter Cologne defines the term “pollution” to mean an alteration of the quality of the waters of the state by waste to a degree which unreasonably affects either of the following: (A) The waters for beneficial uses or (B) facilities which serve these beneficial uses. Analysis of the multiple lines of evidence indicate that the water contact recreation (REC-1) beneficial use is not supported in the Russian River Watershed; in all locations. The proposed program of implementation described in the Action Plan includes a prohibition against the discharge of fecal waste to the surface waters of the Russian River Watershed to be implemented through existing and newly proposed waste discharge requirements (WDRs) or waivers of WDRs. Any reference or use of Clean Water Act terms and concepts in the development of this program of implementation ~~program~~ does not limit the Regional Water Board’s authority under state law to address the ~~water quality issues~~ pollution identified.

The Action Plan will be presented to the ~~North Coast Regional Water Quality Control Board (Regional Water Board)~~ in a public hearing as a proposed amendment to the ~~Water Quality Control Plan for the North Coast Region, which is also known as the Basin Plan.~~ Because the basin planning process is certified as an exempt regulatory program, meeting the requirements of Public Resources Code section 21080.5 (Cal. Code Regs., tit.14, § 15251), the Regional Water Board is not required to prepare an initial study, a Negative Declaration, or an Environmental Impact Report. Instead, the basin planning process uses substitute environmental documentation (SED). This Staff Report and its ~~attachment~~ attachments fulfill the requirements of an SED.

Should the Regional Water Board adopt the Action Plan, the State Water Resources Control Board (State Water Board) will hold a hearing to consider approval of the decision. Basin Plan amendments are not effective until they are approved by the State Water Board and the regulatory provisions are approved by the California Office of Administrative Law. The U.S. EPA reviews and approves only the technical elements of the TMDL, not the program of implementation.

## 1.2 PROJECT HISTORY

In January 2015, a *Peer Review Draft Staff Report for the Action Plan for the Russian River Watershed Pathogen Indicator Bacteria Total Maximum Daily Load* (Peer Review Draft Staff Report)<sup>1</sup> was submitted to two external scientific peers to conduct a review of the scientific basis for the Action Plan for the Russian River Pathogen TMDL. The statutory mandate for external scientific review (Health and Safety Code Section 57004) states that it is the reviewer's responsibility to determine whether the scientific work product is "based upon sound scientific knowledge, methods, and practices." The Cal/EPA Scientific Peer Review Program manager identified two external scientific peers who conducted the review:

Patricia A. Holden

Professor, Bren School of Environmental Science & Management  
University of California, Santa Barbara

Nicholas J. Ashbolt

Professor, School of Public Health  
University of Alberta, Edmonton

Staff summarized Professors Holden's and Ashbolt's comments and provided written responses in a Response to Peer Review Comments document<sup>2</sup>. The Staff Report was revised to accommodate the scientific peers' recommendations in August 2015 and the revised report was released for public review as the *Draft Staff Report for the Action Plan for the Russian River Watershed Pathogen Indicator Bacteria Total Maximum Daily Load* (2015 Staff Report), which was accompanied by a draft Action Plan- (2015 draft Action Plan).

The 2015 Staff Report and 2015 draft Action Plan were released for a 45-day public review period, during which three staff-led workshops were also held. The written public comment period closed on October 8, 2015.

### Workshop 1 - September 22, 2015

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1

[http://www.waterboards.ca.gov/northcoast/water\\_issues/programs/tmdls/russian\\_river/pdf/150821/150116\\_StaffReport\\_PeerReviewDraft.pdf](http://www.waterboards.ca.gov/northcoast/water_issues/programs/tmdls/russian_river/pdf/150821/150116_StaffReport_PeerReviewDraft.pdf)

2

[http://www.waterboards.ca.gov/northcoast/water\\_issues/programs/tmdls/russian\\_river/pdf/150821/150827\\_Peer\\_Review\\_Response\\_to\\_Comments\\_MSJ.pdf](http://www.waterboards.ca.gov/northcoast/water_issues/programs/tmdls/russian_river/pdf/150821/150827_Peer_Review_Response_to_Comments_MSJ.pdf)



Monte Rio Middle School  
20700 Foothill Drive, Monte Rio, CA

Workshop 2 - September 23, 2015  
University of California Cooperative Extension - Mendocino County  
890 N. Bush Street Ukiah, CA

Workshop 3 - September 24, 2015  
North Coast Regional Water Quality Control Board  
5550 Skylane Blvd. Suite A, Santa Rosa, CA

A Public Hearing before the Regional Water Board was scheduled for November 19, 2015 to consider adoption of the 2015 draft Action Plan as an amendment to the Basin Plan. But, the number and content of the written public comments indicated the need to revisit the proposed program of implementation described in the 2015 draft Action Plan and consider significant revisions.

Since that time, staff has coordinated with both Sonoma County and Mendocino County on multiple issues, including the local regulation of Onsite Waste Treatment Systems (OWTS), which was a point of specific concern in the 2015 draft Action Plan. A Memorandum of Understanding (MOU) has been signed between the Regional Water Board and Sonoma County, delineating roles and responsibilities. Multiple meetings have been held to familiarize county staff with state funding sources potentially useful for local planning and infrastructure improvements. The 2015 draft Action Plan has been significantly revised in 2017 to address major concerns, particularly with respect to OWTS. For example, the 2017 draft Action Plan now defines included revisions to define the boundaries of the Advanced Protection Management Plan (APMP) area, which is the area within which special requirements for OWTS owners will apply, as described in the State Water Board's 2012 Onsite Waste Treatment System Policy. Accompanying the 2017 draft Action Plan was a revised 2017 draft Staff Report, which modified the presentation of the technical analysis for clarity and transparency, but did not significantly revise it. Significant revisions to the 2015 draft Staff Report included in the 2017 draft Staff Report were primarily associated with the program of implementation and its description in the staff report.

The full Similarly, the 2017 draft Staff Report has also been significantly revised to address public comments. However, the majority of revisions of the Staff Report are to improve clarity and transparency. Little has been revised with respect to the technical analyses that form the basis for 2017 draft Action Plan, as the technical analysis is deemed complete. were noticed Staff Report and Action Plan will be renoticed for a 53-day public comment period, and will include including a public workshop workshop, to be followed by an adoption hearing that was scheduled for December 13, 2017. However, in light of devastating impacts to the Russian River community related to the October 2017 fires, the hearing was postponed.

During the intervening period, the State Water Board has adopted statewide bacteria water quality objectives and implementation options to protect water contact recreational users from the effects of pathogens in California water bodies.

The 2018 adoption of statewide bacteria objectives led Regional Water Board staff to re-analyze *E. coli* bacteria data in the Russian River watershed through the lens of the new Statewide Bacteria Provisions, as well as enterococci data in the lower river based on the salinity threshold associated with the statewide objectives. This re-analysis included the elimination of consideration of fecal coliform data and the use of a six-week rolling geometric mean (GM) and the statistical threshold value (STV) for *E. coli* bacteria data (in freshwater) and enterococci data (in waters meeting the salinity threshold established by the State Water Board). Further, staff have applied the *Water Quality Control Policy For Developing California's Clean Water Act Section 303(d) List* (2015) (303(d) Listing Policy) exceedance frequency recommendations to guide the assessment of pollution and impairment to ensure harmony with the upcoming update to the 303(d) list, which will also be presented to the Regional Water Board in 2019. These changes to staff's approach are consistent with public comment received during 2017 and have led to refinement of both Chapter 3 *Bacteria Standards and Other Indicators of Pathogen Pollution* and Chapter 4 *Evidence of Pollution* of the 2019 Staff Report. Further, alterations to the area of the Russian River Watershed defined as impaired and polluted has affected the geographic scope of the APMP area.

A response to public comments document has been produced, which addresses each of the significant comments submitted during the 2015 and 2017 public review periods. The response to comments document also includes a summary of the changes to the staff report that have been made in each iteration of the project since 2015.

This 2019 Staff Report and associated Action Plan will be the subject of a public hearing to be scheduled before the Regional Water Board. A public notice to this effect will be published for ~~3~~three days in the Press Democrat, distributed to interested stakeholders via a lyris email list<sup>3</sup>, posted in the Monte Rio and Guerneville Post Offices (as per public request), and posted on the Regional Water Board's website.

## **1.3 REGULATORY FRAMEWORK**

Several laws and regulations govern the development and implementation of TMDLs, most notably the federal Clean Water Act (CWA) and the state Porter-Cologne Water Quality Control Act. This section describes the framework and context of these laws and regulations with respect to the Action Plan.

### **1.3.1 SECTION 303(D) LISTING**

Section 303(d) of the CWA requires states to develop a list of waterbodies where required pollution control mechanisms are not sufficient or stringent enough to meet water quality

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<sup>3</sup> [http://www.waterboards.ca.gov/resources/email\\_subscriptions/reg1\\_subscribe.shtml](http://www.waterboards.ca.gov/resources/email_subscriptions/reg1_subscribe.shtml)

standards applicable to such waters (known as the Clean Water Act Section 303(d) list or 303(d) List). Per state policy the Section 303(d) List applicable to a given region of the State is updated once every 6 years.

The 2012 update to the 303(d) List included multiple watershed reaches within the Russian River Watershed, which were identified as impaired due to fecal indicator bacteria. The Action Plan addresses These waterbodies included: an unnamed tributary on Fitch Mountain, the indicator mainstem Laguna de Santa Rosa, tributaries to the Laguna de Santa Rosa, the mainstem Santa Rosa Creek, tributaries to Santa Rosa Creek, the mainstem Russian River at Veterans Memorial beach from the Railroad Bridge to Highway 101, the mainstem Russian River from Fife Creek to Dutch Bill Creek, the mainstem Butch Bill Creek, and the Green Valley Creek Watershed.

The 2012 303(d) List relied on fecal coliform data, as well as evidence generated through the TMDL. The 303(d) List will be updated in 2019 using the new statewide bacteria impairment and refers to the impairment generally as “pathogens”. Exposure to illness-causing pathogens impairs the water contact recreational beneficial use (REC-1) of water objectives. As described in greater above, the data reanalysis conducted in support of the 2019 Action Plan and described in this Staff Report is consistent with the data analysis conducted to support the 2019 303(d) List update to be released later this year. The analysis for both proposed actions relies on *E. coli* and enterococci in a manner consistent with statewide bacteria objectives as well as enterococci in freshwaters, where combined with other lines of evidence of pollution (e.g., beach closures) as described in more detail in Chapter 4 10, the presence of illness-causing pathogens is determined by analyzing water samples for fecal indicator bacteria (FIB). The presence of FIB in the water column suggests the presence of fecal waste, which is a carrier of illness-causing pathogens.

The Basin Plan delineates waterbodies, including the Russian River, utilizing Hydrologic Subareas (HSA's) and designates the beneficial uses associated with those HSA's. The 2012 303(d) List of pathogen-impaired waters is based upon HSAs identified in the Basin Plan. For the purposes of this TMDL, water quality data assessed to determine evidence of pollution have been reevaluated within sub-watershed areas known as Hydrological Unit 12 (HUC-12). This realignment of information results in finer scale delineations and allows more precise impairment/pollution classification. The crosswalk between these two spatial delineation methods is listed in Table 1.1 shows those waterbodies identified on the Section 303(d) List in 2012<sup>4</sup> as impaired due to indicator bacteria/pathogens, as measured by the exceedance of fecal indicator bacteria above thresholds established to protect REC-1. and illustrated in Figure 1. 1. 2 maps the reaches of the watershed listed for indicator bacteria/pathogens on the 303(d) list in 2012.

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<sup>4</sup> The 2012 Section 303(d) has been adopted by the Regional Water Board and State Water Resources Control Board, and on July 30, 2015 it was approved by U.S. EPA (it was partially approved on Jun 26, 2015).

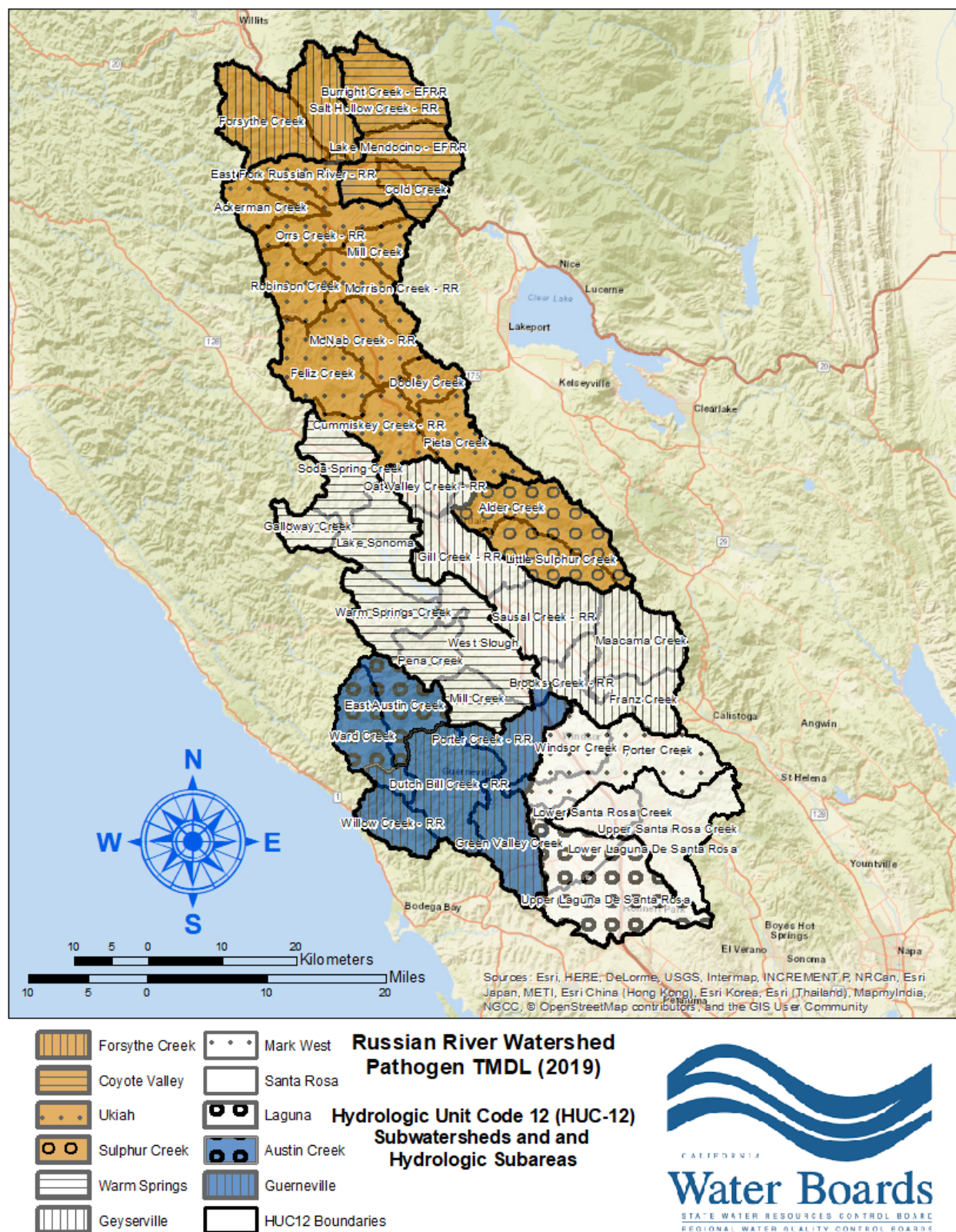


Figure 1.1: Hydrologic Unit 12 (Huc12) Overlain Hydrologic Subarea

<b>Table 1.1 Hydrologic Subarea and Hydrologic Unit 12 (Huc12) Crosswalk</b>		
<b>Hydrologic Area Name</b>	<b>Hydrologic Sub Area</b>	<b>Hydrologic Unit 12</b>
Upper Russian River	Coyote Valley	Lake Mendocino-East Fork Russian River
		Burright Creek
		Cold Creek
	Forsythe Creek	Salt Hollow Creek-Russian River
		Forsythe Creek
	Ukiah	East Fork Russian River
		Ackerman Creek
		Orrs Creek
		Mill Creek
		Robinsons Creek
		Morrisons Creek
		McNab Creek
		Feliz Creek
		Cooley Creek
		Cummiskey Creek
		Pieta Creek
Middle Russian River	Warm Springs	Soda Spring Creek
		Galloway Creek
		Lake Sonoma
		Warm Springs Creek
		West Slough
		Pena Creek
		Mill Creek
	Geyserville	Oat Valley Creek-Russian River
		Gill Creek
		Sausal Creek
		Maacama Creek
		Brooks Creek
		Franz Creek
	Santa Rosa	Upper Santa Rosa Creek
	Laguna	Upper Laguna de Santa Rosa



**Table 1.1 Hydrologic Subarea and Hydrologic Unit 12 (Huc12)  
Crosswalk**

	Mark West	Lower Laguna De Santa Rosa
		Porter Creek-Mark West Creek
		Windsor Creek
Lower Russian River	Austin Creek	East Austin Creek
		Ward Creek
	Guerneville	Porter Creek
		Green Valley Creek
		Dutch Bill Creek
		Willow Creek

Water quality monitoring conducted to support the development of the 2019 Action Plan, Table 1.1 also reports the pollution status of reaches within the Russian River Watershed not yet listed as impaired on the 303(d) list. In summary, Table 1.1 shows that there is confirms evidence of fecal waste throughout the whole of discharge within the Russian River Watershed, with the potential for exposure to illness-causing pathogens through water contact recreation. Details of the water quality monitoring conducted to support the Action Plan can be found in Chapter 9 and in technical memoranda and monitoring reports found on the Regional Water Board's website.<sup>5</sup> 2019 Action Plan can be found in Chapter 4.<sup>6</sup> Chapter 4 reports the pollution status of HUC-12 areas within the Russian River Watershed, including those not yet listed as impaired on the 303(d) List. Due to the reassessment of data using the HUC-12 boundaries rather than HSAs, the areal extent of confirmed fecal waste pollution identified within the Russian River Watershed is greatly reduced from the area described in the 2017 draft Staff Report and 2017 draft Action Plan. This refinement results in commensurate modifications of the boundaries of the APMP area listed in the 2019 Action Plan.

### 1.3.2 TOTAL MAXIMUM DAILY LOAD (TMDL)

A total maximum daily load (TMDL) is a numerical calculation of the amount of a pollutant that a waterbody can assimilate and still meet water quality objectives. The TMDL equation is the sum of waste load allocations (WLAs) for point sources and load allocations (LAs) for nonpoint sources and natural background and must include a margin of safety. An allocation can be expressed as a concentration rather than a load. For pathogens, TMDLs are generally expressed as the concentration of a fecal indicator bacteria, which indicates the potential presence of illness-causing pathogens. This staff report includes all the information necessary to be approved as a TMDL under the Clean Water Act.

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<sup>5</sup> [http://www.waterboards.ca.gov/northcoast/water\\_issues/programs/tmdls/russian\\_river/](http://www.waterboards.ca.gov/northcoast/water_issues/programs/tmdls/russian_river/)

<sup>6</sup> [http://www.waterboards.ca.gov/northcoast/water\\_issues/programs/tmdls/russian\\_river/](http://www.waterboards.ca.gov/northcoast/water_issues/programs/tmdls/russian_river/)

### 1.3.3 ACTION PLAN

An Action Plan is adopted by the Regional Water Board as an amendment to the Basin Plan. An Action Plan summarizes the findings of the TMDL analysis, indicating numeric targets, the TMDL calculation, and TMDL allocations, approves the TMDL, and establishes a program of implementation by which to attain water quality objectives, restore beneficial uses, and protect public health.

An Action Plan amended into the Basin Plan is appropriate for the Russian River Watershed because control of existing direct and indirect discharges of fecal waste, monitoring of progress towards REC-1 protection, and attainment of water quality objectives will require multiple implementation actions. The California Administrative Procedures Act and the State's *Water Quality Control Policy for Addressing Impaired Waters: Regulatory Structure and Options* (Impaired Waters Policy) require the use of a Basin Plan amendment to tie together numerous actions by the Regional Water Board to ensure that persons subject to regulations have the opportunity to provide review and comment.

The purpose of the Action Plan is to:

1. Improve the bacteriological quality of the surface waters in the Russian River Watershed so that public health is protected and water quality objectives are attained. The public health risk of most concern results from water contact recreation (REC-1) and incidental ingestion of water polluted by fecal waste, when and where such conditions exist or threaten to exist.
2. Set limits on the amount of fecal waste discharge to the surface waters of the Russian River Watershed from controllable sources<sup>7</sup> that are necessary to protect water contact recreational beneficial uses (REC-1) by establishing the Russian River Pathogen TMDL.
3. Describe the program of implementation necessary to identify and control controllable discharges of fecal waste, reduce concentrations of fecal indicator bacteria, and reduce the potential for pathogen exposure in the Russian River Watershed to levels that protect public health and meet water quality objectives.
4. Describe the monitoring activities necessary to ensure that the program of implementation results in attainment of water quality objectives and protection of beneficial uses, or to support the revision of the program of implementation, as appropriate.

This staff report includes all the information necessary to support the Regional Water Board's consideration of the Action Plan as an amendment to the Basin Plan.

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<sup>7</sup> As examples, the controllable sources of concern to the Russian River Watershed include but are not limited to leaking septic systems, leaking sewer lines, leaking or undersized manure holding ponds, and direct disposal (or indirect disposal via storm water runoff) of human or domestic animal fecal waste into the Russian River and its tributaries.

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## CHAPTER 2 WATERSHED SETTING

### 2.1 LOCATION

The Russian River Watershed is a large watershed in the southern portion of the North Coast Region. The North Coast Region is a relatively rural region; but, the Russian River Watershed houses one of its largest population centers. It spans two counties, Mendocino County in its northern reaches and Sonoma County to the south. The City of Santa Rosa is the most populous of the watershed's cities with nearly 172,000 people, followed in order of size by Rohnert Park, Windsor, Ukiah, and Healdsburg. The remaining towns and cities have fewer than 10,000 people. Nonetheless, the Russian River Watershed, like the region it sits in, is quite rural with considerable agriculture, timber and open space. As such, it provides a vibrant tourist trade, with wine tasting, restaurants, and outdoor activities, especially during the summer months. Recreational opportunities along the Russian River Watershed include, but are not limited to, swimming, wading, and kayaking/boating. Notable in the Russian River Watershed are several dams that control river flow from several of the river's tributaries and are important to efforts to restore habitat for threatened and endangered aquatic species. A large array of local, state, and federal agencies; private entities; and nonprofit organizations are fully engaged in multiple efforts to study and restore a functioning Russian River Watershed system.

The Russian River Watershed encompasses 1,484 square miles (949,982 acres) in Sonoma and Mendocino counties, California (Figure 2.1). Major municipalities within the watershed include Santa Rosa, Rohnert Park, Windsor, Healdsburg, Sebastopol, Cloverdale, and Ukiah. The watershed also includes numerous unincorporated communities such as, Forestville, Guerneville, Monte Rio, Hopland, and Calpella.

The Russian River Watershed has been divided into eleven (11) Hydrologic Subareas ~~which are shown in Figure 2.2 and listed Table 2.1.~~ (HSA), which are shown in Figure 2.2 and listed in Table 2.1. The HSA delineation is an adequate basis for dividing the watershed for the purpose of general description. See Table 1.1 for a crosswalk between HSAs and HUC-12s. HUC-12 delineation is used for the purpose of assessing water quality data, defining the area of impairment/pollution, and defining the APMP boundary, only.



Figure 2.1: Russian River Watershed Overview Map

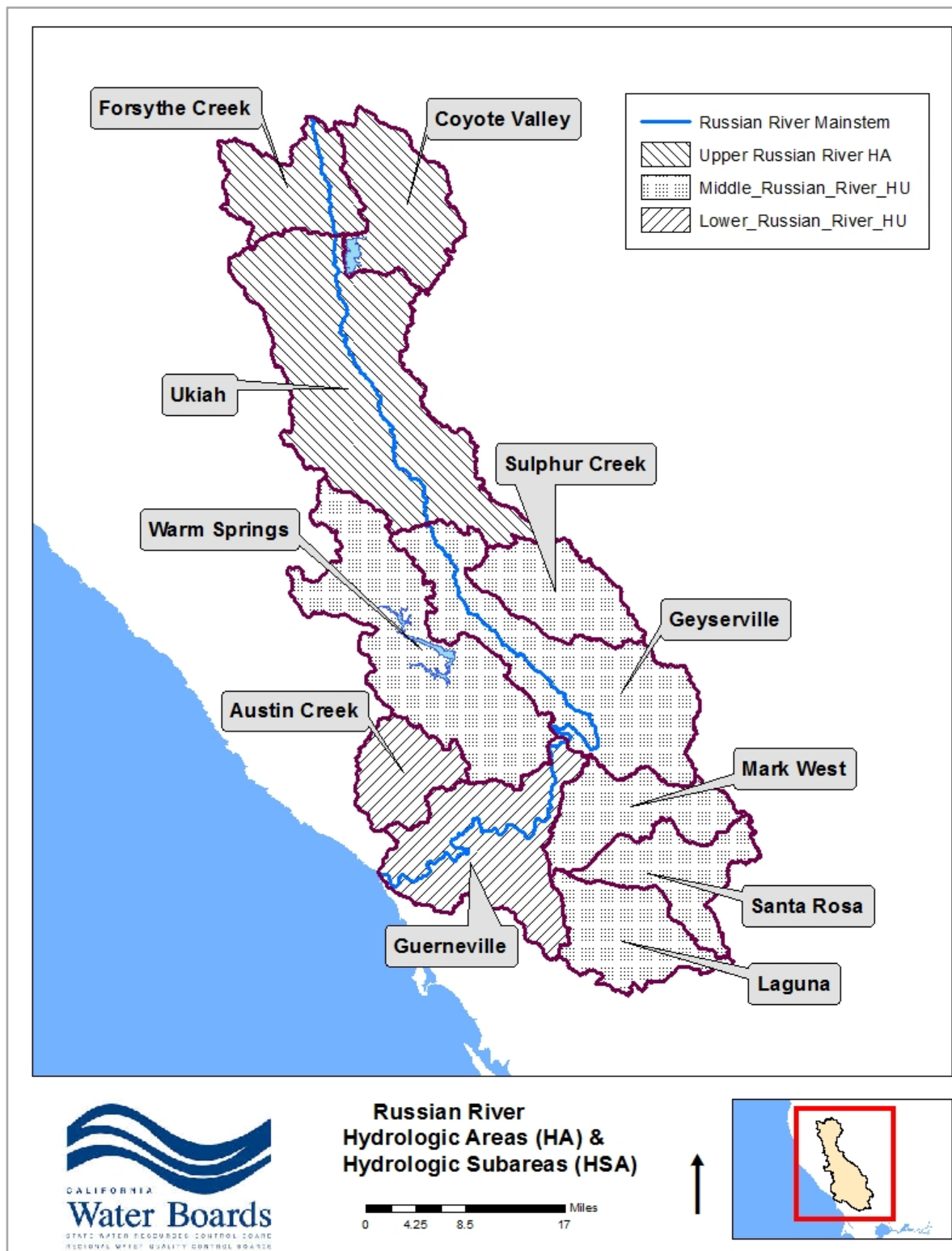


Figure 2.2: Hydrologic Subareas Of The Russian River Watershed

<b>Table 2.1 Hydrologic Areas and Subareas of the Russian River</b>			
<b>Hydrologic Area Name</b>	<b>Hydrologic Subarea Name</b>	<b>Acres</b>	<b>Relative Area (%)</b>
Upper Russian River	Coyote Valley	67,011	7%
	Forsythe Creek	53,965	6%
	Ukiah	200,235	21%
Middle Russian River	Sulphur Creek	52,655	6%
	Warm Springs	139,536	15%
	Geyserville	133,007	14%
	Laguna	56,644	6%
	Santa Rosa	49,511	5%
	Mark West	55,248	6%
Lower Russian River	Guerneville	102,303	11%
	Austin Creek	39,867	4%
<b>Russian River Watershed</b>		<b>949,982</b>	<b>100%</b>

## 2.2 HYDROLOGY

The Russian River Watershed is hydrologically and geomorphologically diverse, containing 238 streams, 23 named springs, 14 natural lakes, 15 named reservoirs, all or portions of 10 groundwater basins, steep ridges, ephemeral streams, rolling hills, and wide alluvial valleys. The Russian River, in conjunction with Lake Mendocino and Lake Sonoma, serves as the primary water source for more than 500,000 residents in Mendocino, Sonoma and Marin counties, and for agricultural production in Mendocino and Sonoma counties. Lake Mendocino, located on the East Fork of the Russian River, has a capacity of 118,900 acre-feet and captures a drainage area of about 105 square miles. Lake Sonoma, located at the confluence of Warm Springs Creek and Dry Creek, about 14 miles northwest of the city of Healdsburg, has a capacity of 381,000 acre-feet and captures a drainage area of about 130 square miles. Neither of these reservoirs were monitored for fecal indicator bacteria as part of this TMDL.

The Russian River Watershed includes all of the tributaries to the river and is affected by the interactions between the hillslopes, the channel, and its floodplain. Sediment produced in the headwaters of the Russian River Watershed is stored in the channel or in reservoirs, extracted as aggregate, or transported toward the Pacific Ocean. The main channel of the Russian River flows through a series of wide alluvial valleys separated by relatively narrow bedrock constrictions. These bedrock constrictions act as geologic controls such that each alluvial valley is relatively independent with respect to adjustments in slope, width and depth (Florsheim and Goodwin 1995).

The 110-mile mainstem channel of the Russian River originates in the Redwood Valley of central Mendocino County about 15 miles north of Ukiah. From its origin, the Russian River flows in a south to southeast direction to the Wohler Bridge area, where it changes to a southwest direction, crosses the Coast Range, and empties into the Pacific Ocean near the town of Jenner 20 miles west of Santa Rosa. Elevations range from zero at the Pacific Ocean to 4,343 feet at Mount St. Helena in the Mayacamas Mountains. Eleven hydrologic subareas containing fifty-seven valleys comprise the watershed.

The Russian River originates upstream of the Ukiah Valley and passes through the alluvial valley until the valley constricts at the Hopland Gage. The river again passes through another alluvial valley that contains the Town of Hopland before again being constricted in the Frog Woman Rock region. Downstream of Ukiah and Hopland, in the Alexander Valley reach, the river enters a mountainous area east of Healdsburg known as the Fitch Mountain Constriction where it is confined by steep bedrock banks. The section of the river in the Healdsburg Valley downstream to Wohler Bridge, where another bedrock constriction occurs, is known as the middle reach. The middle reach contains several permanent in-stream structures including the Healdsburg Dam, two bridges in Healdsburg, Wohler Bridge, and Highway 101. The lower reach is a narrow alluvial valley that terminates at the Pacific Ocean, near the town of Jenner.

~~The Potter Valley Project, an project, delivers water from the basin to the headwaters of the . The main facilities~~

~~There are two dams on the Eel River, a diversion tunnel and . The project derives water from above Scott Dam and approximately 50 square miles between Scott Dam and Cape Horn Dam, where water is diverted to the Russian River.~~

~~Three major reservoir projects that provide water supply for Lake Pillsbury on the Eel Russian River, watershed: Lake Mendocino on the East Fork of the Russian River, and Lake Sonoma on Dry Creek. Under agreements with the US Lake Mendocino and Lake Sonoma are dual-purpose reservoirs in that they provide flood protection (managed by the U.S. Army Corps of Engineers,) and water supply storage (releases managed by the Sonoma County Water Agency manages the stored). The Water Agency, as local sponsor, controls and coordinates water supply in releases from Lake Mendocino and Lake Sonoma to provide water for agriculture, municipal, and industrial uses in accordance with its water-right permit. In addition, the Sonoma County Water Agency also releases water from these reservoirs to contribute the minimum stream flow requirements in the Russian River and Dry Creek established in 1986 by the rights permits and the requirements of the State Water Resources Control Board's Decision 1610. These minimum stream flows provide water for recreation and fish passage for salmon and steelhead in Decision 1610 establishes minimum instream flow requirements for the mainstem Russian River and Dry Creek. The Sonoma County Water Agency also operates an inflatable dam on the Russian River in the Wohler Bridge area to increase water production capacity during peak demand months. The dam is inflated in the early spring to create pool conditions in the river. In the fall, the dam is deflated to provide passage for fish migration. Operation of the inflatable dam~~



increases water production capacity in two important ways. First, surface water immediately behind the dam can be diverted to a series of infiltration ponds that are constructed adjacent to the three Mirabel collector wells. Second, infiltration to the underlying aquifer behind the dam is significantly improved by increasing the recharge area from the river. makes releases to meet downstream demands from agricultural, commercial, and residential individual water uses and other public water systems and to maintain minimum instream flow requirements for beneficial uses, including recreation and fish habitat.

The Potter Valley Project, owned and operated by Pacific Gas and Electric (PG&E), is a hydroelectric project that provides an interbasin water transfer from the Eel River to the East Fork of the Russian River. Its operations are not coordinated with the operation of Coyote Valley Dam at Lake Mendocino. PG&E releases water from Lake Pillsbury to meet minimum instream flow requirements on the Eel River and to divert water through the Potter Valley Project to generate electricity and maintain minimum instream flow requirements in the East Fork Russian River. The water diverted through the Potter Valley Project flows into the East Fork of the Russian River. The Potter Valley Irrigation District diverts a portion of the released water for irrigation, with the remaining eventually flowing to Lake Mendocino.

## 2.3 LAND USES

Based on Landsat satellite imagery (Fry et al. 2006), primary land uses in the Russian River Watershed include urban, rural, agricultural, and undeveloped lands as shown in Table 2.2 and Figure 2.3. Most of the land in the watershed is privately owned (89.78%), with federal (5.41%), state (2.59%), local (2.15%), and tribal lands (0.08%) making up the remaining ownership. Land cover is primarily open space with fifty-one percent of the watershed having less than one housing unit per 160 acres (WCW 2007). Almost 300,000 people live in municipalities incorporated cities and towns of the Russian River Watershed (Table 2.3).

Urban, rural, and agricultural lands each host their own unique problems with respect to pathogens and fecal waste discharge. Chapter 6 elaborates on these sources in detail.

Table 2.2 Land Cover in the Russian River Watershed		
Land Cover Category	Acres	Percent of Watershed Area
Shrub/Scrub	260,269	27.4%
Evergreen Forest	231,347	24.4%
Grassland/Herbaceous	163,358	17.2%
Mixed Forest	104,836	11.0%

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<b>Table 2.2 Land Cover in the Russian River Watershed</b>		
<b>Land Cover Category</b>	<b>Acres</b>	<b>Percent of Watershed Area</b>
Developed, Open Space	57,173	6.0%
Cultivated Crops	55,813	5.9%
Deciduous Forest	23,096	2.4%
Developed, Low Intensity	22,233	2.3%
Developed, Medium Intensity	16,312	1.7%
Open Water	7,130	0.8%
Woody Wetlands	2,564	0.3%
Developed, High Intensity	1,948	0.2%
Pasture/Hay	1,719	0.2%
Barren Land	1,469	0.2%
Herbaceous Wetlands	343	<0.1%
Total	949,611	100%

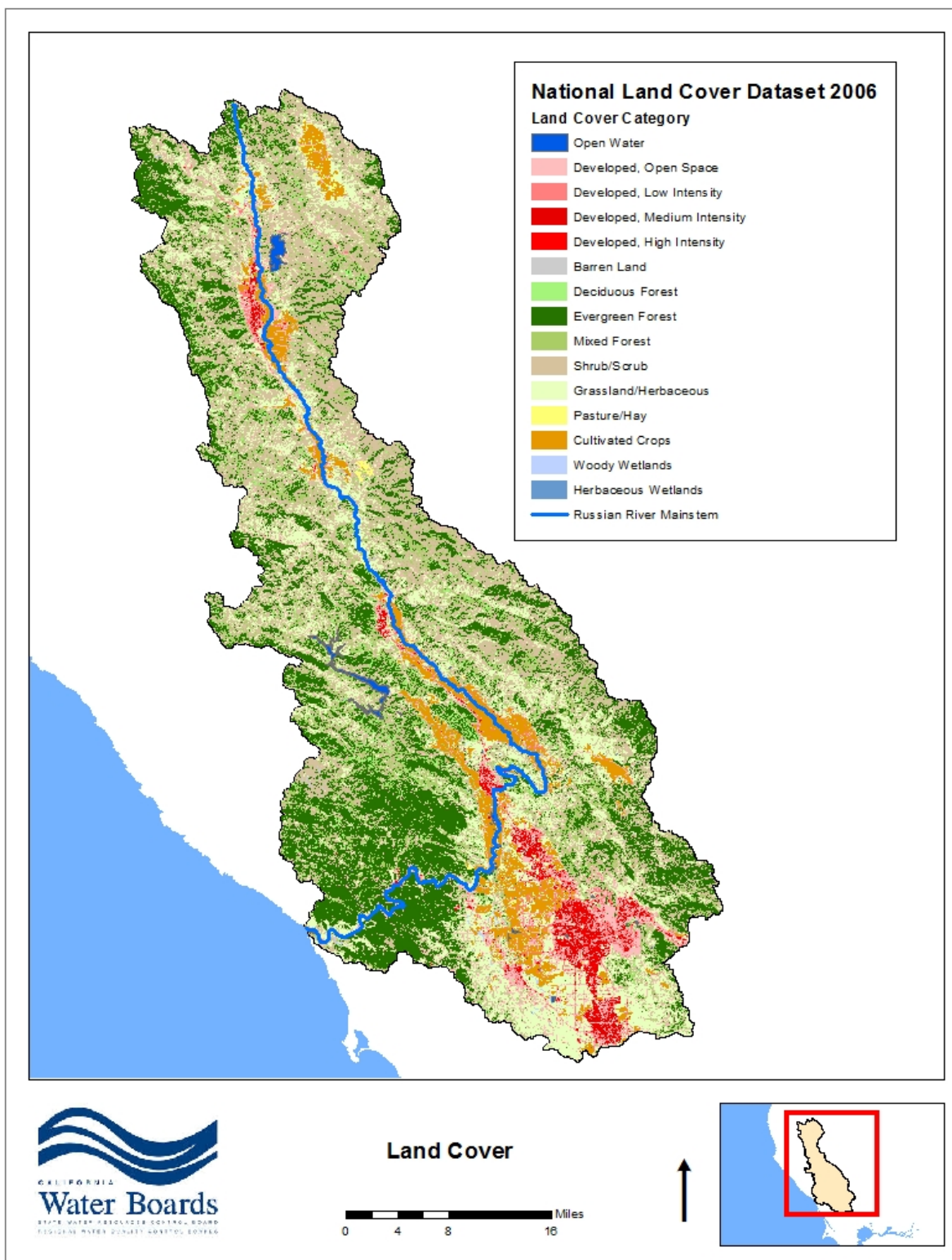


Figure 2.3: Land Cover In The Russian River Watershed



<b>Table 2.3 Population of Cities in the Russian River Watershed</b>		
<b>City or Town</b>	<b>Population<sup>1</sup></b>	<b>Percent of Municipal Population</b>
Cloverdale	8,801	3%
Cotati	7,455	3%
Healdsburg	11,827	4%
Rohnert Park	42,622	14%
Santa Rosa	175,155	59%
Sebastopol	7,678	3%
Ukiah	15,882	5%
Windsor	27,555	9%
Total City Population	296,975	100%

<sup>1</sup> Per U.S. Census Bureau 2016

## 2.4 RECREATIONAL USES

The Russian River and tributary creeks are enjoyed by many swimmers, waders, canoers, kayakers, fishermen, and enthusiasts that partake in water contact and non-contact water recreation. The Russian River is one of the most intensively used rivers for recreation in the North Coast Region. On holiday weekends in the summer, beach visitors along the river number in the thousands. Several of the most popular beaches are listed in Table 2.4 and shown in Figure 2.4. The greatest number of popular swimming beaches are located in the Guerneville HSA, in the lower part of the Russian River Watershed.

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<b>Table 2.4 Popular Swimming Beaches along the Russian River</b>			
<b>Hydrologic Area Name</b>	<b>Hydrologic Subarea Name</b>	<b>Recreational Beach Name</b>	<b>Location</b>
Upper Russian River	Coyote Valley	Mill Creek Park	Potter Valley
	Forsythe Creek	Mariposa Swimming Hole	Redwood Valley
	Ukiah	Vichy Springs Park	Ukiah
		Mill Creek Park	Ukiah
Middle Russian River	Geyserville	Cloverdale River Park	Cloverdale
		Alexander Valley Campground	Healdsburg
Lower Russian River	Guerneville	Veteran Memorial Beach	Healdsburg
		Riverfront Park	Windsor
		Mirabel Park Campground	Forestville
		Steelhead Beach	Forestville
		River Access Beach	Forestville
		Sunset Beach	Forestville
		Johnson's Beach	Guerneville
		Monte Rio Beach	Monte Rio
		Casini Ranch Campground	Duncans Mills



Figure 2.4: Popular Swimming Beaches On The Russian River

## 2.5 CLIMATE

The Russian River Watershed has a Mediterranean climate with hot, dry summers and wet winters. Average precipitation varies across the watershed with generally wetter conditions in the north and west. Summer temperatures can reach over 100° F in inland valleys for weeks at a time, with coastal conditions cool and moist. Drought and severe storms occur periodically but mostly unpredictably; El Niño/ La Niña Southern Oscillation climatic conditions can exacerbate climatic extremes.

Precipitation in the Russian River Watershed is distinctly seasonal; about 80 percent of the total occurs during five months, November through March. The bulk of the precipitation occurs during moderately intense general storms of several days' duration. Snow falls in modest amounts at altitudes above 2,000 feet, but it seldom remains on the ground for more than a few days. Mean annual precipitation varies from about 30 inches in the flat valley lands north of Santa Rosa to more than 80 inches in parts of the mountains. Summers are dry, with total rainfall from June through August averaging less than 0.5 inch (Zhang and Johnson 2010).

Table 2.5 Average Annual Precipitation		
Hydrologic Area Name	Hydrologic Subarea Name	Mean Precipitation (inches/year)
Upper Russian River	Coyote Valley	41.1
	Forsythe Creek	46.0
	Ukiah	43.1
Middle Russian River	Sulphur Creek	51.4
	Warm Springs	48.6
	Geyserville	41.6
	Laguna	31.3
	Santa Rosa	38.5
	Mark West	39.0
Lower Russian River	Guerneville	45.1
	Austin Creek	65.5
Russian River Watershed Mean		44.2

The spatial distribution of mean annual rainfall in the Russian River Watershed is shown in Figure 2.5. These precipitation zones were derived statewide by the California Department of Forestry and Fire Protection for the period 1900-1960. Table 2.5 presents the area weighted precipitation for each Hydrologic Subarea in the Russian River.

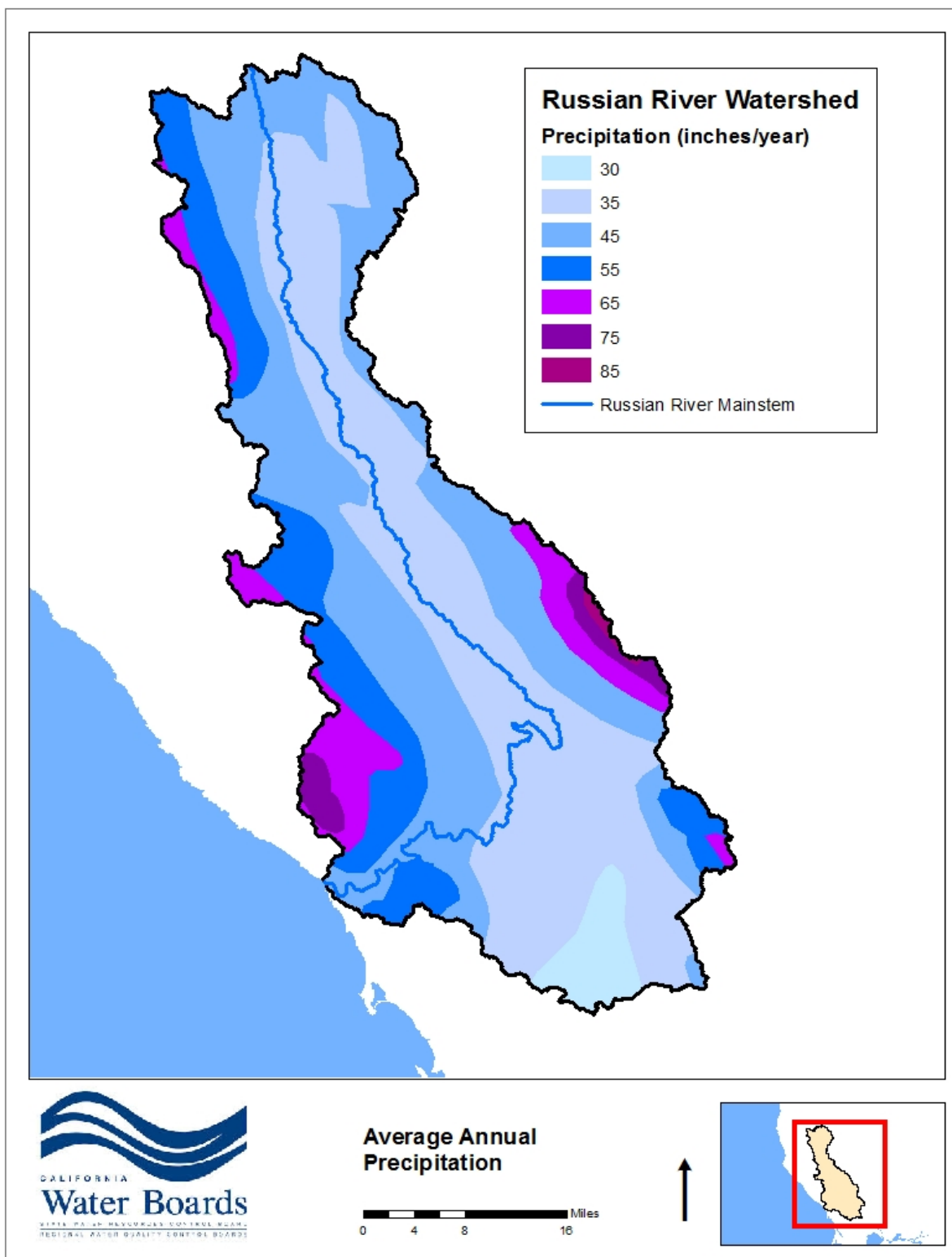


Figure 2.5: Average Annual Precipitation Patterns In The Russian River Watershed

## 2.6 GEOLOGY AND SOILS

The Russian River Watershed is underlain predominantly by the Franciscan Assemblage, which is a highly erodible mélange that formed during the Jurassic-Cretaceous age. The Franciscan Assemblage forms the bulk of the coast range; the sediment consists of muddy sandstones and cherts jumbled together and layered with basalt lava flow. This lithology is very unstable with landslides common throughout the mountainous regions of the basin. Many of the streams within the basin, including the upper mainstem Russian River, follow the northwest to southeast orientation of geologic faults. The Rodgers Creek Fault enters Sonoma County at San Pablo Bay and extends northward through the City of Santa Rosa, where it meets up with the Healdsburg Fault, which continues northward passing east of the Town of Windsor. The Mayacama Fault lies to the east of the Healdsburg Fault and continues northward, passing east of the City of Cloverdale.

The Russian River flows through a series of broad alluvial valleys and narrow bedrock constrictions. For a more in-depth understanding of watershed form and function, a conceptual model of the hydrology, surface and groundwater interactions, and stream ecology of Russian River Watershed has been completed by an Independent Science Review Panel since the first drafting of this report and is available online.<sup>8</sup> Historic photographs show that the historic river channel once meandered across a broad natural floodplain and that the elevation of the active channel was once close to the elevation of the floodplain. Traces of the channel remained on the irregular floodplain as a series of "sloughs" or side channels. Subsequent land use changes in the Russian River Basin have leveled the floodplain, filled the side channels, and constrained the river channel into a narrow and straighter course (Florsheim and Goodwin 1995).

The Russian River Watershed contains a large number of different soils types (NRCS 2013). Identification of hydrologic soil groups is based on comparison of the characteristics of soil profiles, which include hydraulic conductivity, texture, bulk density, structure, strength, clay mineralogy, and organic matter content. Four hydrologic soil groups are categorized in Table 2.6 and shown on Figure 2.6 (NRCS 2007). Hydrologic soil characteristics influence the delivery of bacteria to surface waters. Soils with a greater potential to runoff also have a greater potential to deliver bacteria with the soil particles. Impervious lands, such as urban paved areas, deliver storm water and associated bacteria directly to the river and its tributaries.

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<sup>8</sup> <http://www.russianriverisrp.org/index.html>

<b>Table 2.6 Hydrologic Soil Characteristics of the Russian River Watershed</b>			
<b>Hydrologic Soil Group</b>	<b>Runoff Potential</b>	<b>Acres</b>	<b>Relative Watershed Area (%)</b>
A	Low when thoroughly wet. Water is transmitted freely through the soil.	1,756	0.2%
B	Moderately low when thoroughly wet. Water transmission through the soil is unimpeded.	477,416	50%
C	Moderately high when thoroughly wet. Water transmission through the soil is somewhat restricted.	218,774	23%
D	High when thoroughly wet. Water movement through the soil is restricted or very restricted.	251,664	27%
<b>Total</b>		949,611	100%

The Russian River Watershed is a very important watershed in the North Coast Region. Dependent on the water supplies provided by the Russian River, it contains one of the largest population centers in the region. The river provides broad recreational value, attracting a large tourist population. The Russian River Watershed supports multiple thriving land uses and uses, which produce a variety of anthropogenic influences, stemming both from urban and rural living. The Mediterranean climate causes most of the precipitation in the Russian River Watershed falls during the winter season. This, coupled with the steep slopes of the watershed, results in significant storm water runoff during the wet season. The broad valleys foster significant agricultural production within the river corridor.



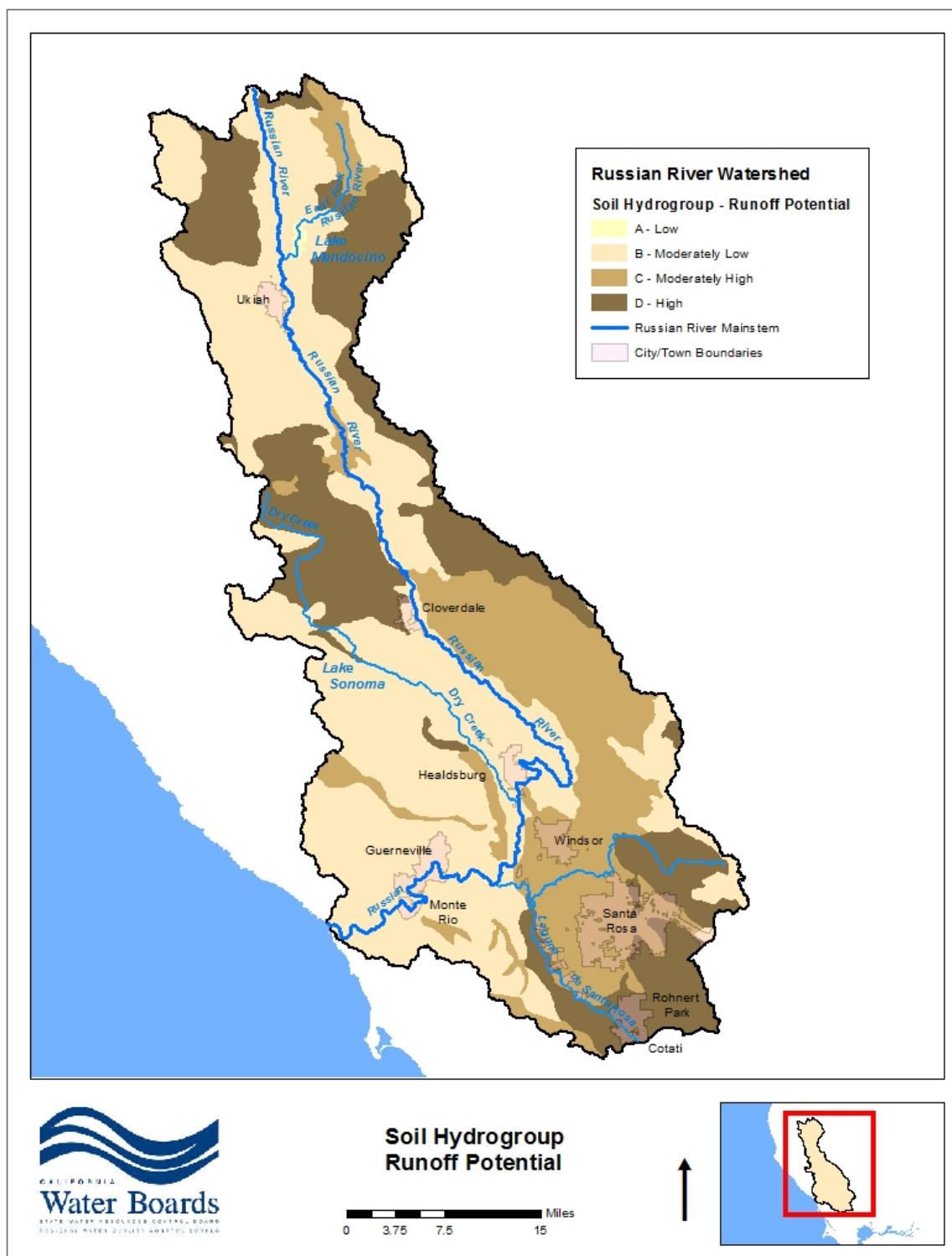


Figure 2.6: Hydrologic Soil Characteristics Of The Russian River Watershed



## 2.7 SUMMARY

The watershed setting is important to understanding the potential sources of pathogens in the Russian River Watershed, the conditions that result in fecal waste discharge, and the effect on water quality, water contact recreation, and public health. In short, the Russian River Watershed has densely populated urban centers, which rely on municipal services such as sewage collection, centralized wastewater treatment, and storm water collection systems. The collection and treatment facilities require adequate maintenance and repair, if they are to consistently transport, treat and dispose of fecal waste properly. The Russian River Watershed also has considerable rural development, where residents generally rely on onsite wastewater treatment systems (OWTS) to treat and dispose of fecal waste. Many reaches of the Russian River and its tributaries are within steep canyons with little soil to support adequate OWTS or were developed long before modern OWTS regulations were in place. As such, there are likely to be numerous old, failing, or inadequately sited OWTS in need of replacement or upgrade. Further, the Russian River Watershed is home to multiple kinds of agriculture, including small and large animal operations such as horse farms, goat farms and dairies, each with the potential for fecal waste discharge. The watershed experiences a long summer drought, with precipitation occurring primarily from October through April, which is important with respect to storm water runoff as a carrier of fecal waste. It is also a very popular tourist destination, particularly in the summer months, which is important with respect to the potential for pathogen exposure.

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## **CHAPTER 3**

### **BACTERIA STANDARDS AND OTHER INDICATORS OF PATHOGEN POLLUTION**

The Russian River Pathogen TMDL uses a number of different analytical approaches to assess water quality conditions in the Russian River Watershed and the potential for human exposure to illness-causing pathogens. The science associated with assessment of pathogens has evolved over time, with the development of new methods, metrics, and criteria. The purpose of the chapter is to describe the standards and indicators used in the Russian River Pathogen TMDL.

#### **3.1 WATER QUALITY STANDARDS FOR BACTERIA**

Water quality standards are established in the Basin Plan. Water quality standards consist of three basic elements: beneficial uses, the water quality objectives minimally required to protect the beneficial uses, and an antidegradation policy. Resolution No. 68-16 was adopted by the State Water Board to protect the state's high quality waters and is incorporated into the Basin Plan as the antidegradation policy.

##### **3.1.1 BENEFICIAL USES**

The beneficial use at issue in this TMDL is water contact recreation. Water contact recreation (REC-1) is defined in the Basin Plan as "the uses of water for recreational activities involving body contact with water, where ingestion of water is reasonably possible. These uses include, but are not limited to, swimming, wading, water-skiing, skin and scuba diving, surfing, white-water activities, fishing, or use of natural hot springs." All of the beneficial uses designated in the Russian River Watershed are identified in Table 3.1. Beneficial uses designated in a downstream waterbody are generally applicable upstream.

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<b>Table 3.1 Beneficial Uses Designated for Protection in Surface Waters of the Russian River Watershed</b>												
<b>HYDROLOGIC AREAS (HA)</b>		<b>Upper Russian River</b>			<b>Middle Russian River</b>						<b>Lower Russian River</b>	
<b>HYDROLOGIC SUB AREAS (HSA)</b>		<b>Coyote Valley</b>	<b>Forsythe Creek</b>	<b>Ukiah</b>	<b>Sulphur Creek</b>	<b>Warm Springs</b>	<b>Geyserville</b>	<b>Laguna</b>	<b>Santa Rosa</b>	<b>Mark West</b>	<b>Guerneville</b>	<b>Austin Creek</b>
MUN	Municipal and Domestic Supply	X	X	X	X	X	X	X	X	X	X	X
AGR	Agricultural Supply	X	X	X	X	X	X	X	X	X	X	X
IND	Industrial Service Supply	X	X	X	X	X	X	X	X	X	X	X
PRO	Industrial Process Supply	X	X	X	X	X	X	X	X	X	X	X
GWR	Groundwater Recharge	X	X	X	X	X	X	X	X	X	X	X
FRSH	Freshwater Replenishment	X		X		X	X	X		X	X	
NAV	Navigation	X	X	X	X	X	X	X	X	X	X	X
POW	Hydropower Generation	X	X	X	X	X	X	X	X	X	X	X
REC-1	Water Contact Recreation	X	X	X	X	X	X	X	X	X	X	X
REC-2	Non-Contact Water Recreation	X	X	X	X	X	X	X	X	X	X	X
COMM	Commercial and Sport Fishing	X	X	X	X	X	X	X	X	X	X	X
WARM	Warm Freshwater Habitat	X	X	X	X	X	X	X	X	X	X	X
COLD	Cold Freshwater Habitat	X	X	X	X	X	X	X	X	X	X	X
WILD	Wildlife Habitat	X	X	X	X	X	X	X	X	X	X	X
RARE	Rare, Threatened, or Endangered Species	X	X	X	X	X	X	X	X	X	X	X
MIGR	Migration of Aquatic Organisms	X	X	X	X	X	X	X	X	X	X	X
SPWN	Spawning, Reproduction, and/or Early Development	X	X	X	X	X	X	X	X	X	X	X
SHELL	Shellfish Harvesting			X			X	X	X	X	X	
EST	Estuarine Habitat										X	
AQUA	Aquaculture	X	X	X	X	X	X	X	X	X	X	X

The Basin Plan delineates waterbodies, including the Russian River, utilizing Hydrologic Subareas (HSA's) and designates the beneficial uses associated with those HSA's. For the purposes of this TMDL, the data have been evaluated within each Hydrological Unit 12 (HUC-12) subwatershed resulting in finer scale delineations and allowing more precise impairment/pollution classification. The crosswalk between these two spatial delineation methods is listed in Table 1.1 and illustrated in Figure 1.1.

### **3.1.2 WATER QUALITY OBJECTIVES**

The water quality objective for bacteria ~~currently~~ contained in the Basin Plan reads as follows. ~~It will be superseded by the statewide bacteria objective for REC-1 protection to be adopted by the State Water Resources Control Board, as described below.~~

#### **Regional Bacteria Water Quality Objective**

The bacteriological quality of waters of the North Coast Region shall not be degraded beyond natural background levels. In no case shall coliform concentrations in waters of the North Coast Region exceed the following:

In waters designated for contact recreation (REC-1), the median fecal coliform concentration based on a minimum of not less than five samples for any 30-day period shall not exceed 50/100 mL, nor shall more than ten percent of total samples during any 30-day period exceed 400/100 mL (State Department of Health Services).

At all areas where shellfish may be harvested for human consumption (SHELL), the fecal coliform concentration throughout the water column shall not exceed 43/100 ml for a 5-tube decimal dilution test or 49/100 ml when a three-tube decimal dilution test is used (National Shellfish Sanitation Program, Manual of Operation).

As noted, the objective has three parts requiring:

- ~~1. Consistency with natural background conditions;~~
- ~~2. Protection of water contact recreation; and~~
- ~~3. Protection of human consumption of shellfish.~~

The Regional Water Board is conducting a study of reference streams to determine the expected fecal indicator bacteria concentrations from relatively undisturbed waterbodies. The reference study will provide additional information with which to reasonably assess compliance in the Russian River Watershed with the first element of the bacteria objective, the natural background requirement.

Similarly, additional information is necessary to reasonably assess compliance with the third element of the bacteria objective, the SHELL requirements. This is because updated science no longer recognizes fecal coliform as an appropriate metric for measuring

potential risk to shellfish and no alternative criteria are readily available. Regional Water Board staff assessed the extent of the SHELL use in the watershed. A limited staff survey of resource agency professionals, non-governmental organizations, and recreation sport fishing suppliers found no evidence of existing or historical harvesting of freshwater shellfish from the Russian River Watershed. Conversely, a U.C. Davis survey of Native American tribal use found anecdotal evidence of historic traditional use of mussels from the river (Butkus 2015). Regional Water Board staff assessed the extent of SHELL in the watershed and documented evidence of shellfish in several areas (Butkus 2015). Freshwater mussels (*Anodonta* spp., *Margaritifera falcate*, and other unidentified species) were observed in the mainstem Russian River, East Fork, Mark West Creek, and Green Valley Creek. Although staff was unable to document current use of freshwater shellfish, there remains the potential for any individual to use shellfish from the Russian River and its tributaries for human consumption.

The Russian River Pathogen TMDL does not establish wasteload and load allocations to implement the narrative portion of the existing bacteria objective nor the fecal coliform objective for protection of SHELL. Staff envision that the Action Plan will result in the control of fecal waste discharge in a manner that protects all relevant beneficial uses. Ongoing monitoring and implementation of an adaptive management strategy will allow for future revision and update as necessary to accommodate any new information.

Only the second part of the bacteria objective is relevant to the protection subject of REC-1 and the Russian River Pathogen TMDL. It is important to note that the objective was adopted by the Regional Water Board in 1975 when fecal coliform was a common measure of bacterial contamination. In 1984, the U.S. EPA promulgated national criteria for the protection of recreation, which are based on *E. coli* and enterococci bacteria. In 2012, U.S. EPA released revised national criteria for the protection of recreation, also based on *E. coli* and enterococci bacteria. The State Water Board is currently in the process of developing adopted statewide bacteria objectives in August of 2018, which are based on U.S. EPA's 2012 national criteria, which will be proposed for statewide applicability. The statewide bacteria objective, once adopted by the State Water Board will supersede REC-1 standards contained in Basin Plans. Draft documents have been released. The statewide bacteria objective adopted by the State Water Board for public review and can be found on the State Water Board website.<sup>9</sup> The draft documents propose that the statewide bacteria objective for the adopted language includes protection of REC-1 in freshwaters be based on the national criteria for *E. coli* using 32 gastrointestinal illnesses per 1,000 recreators as the threshold and in saline waters based on the national criteria for enterococci also using 32 gastrointestinal illnesses per 1,000 recreators as the threshold. (See further discussion below).

As such, the Russian River Pathogen TMDL is based on the draft statewide *E. coli* objective now out for public review. freshwater and enterococci objective for saline water adopted in August 2018. Wasteload allocations and load allocations are also based on the draft

<sup>9</sup> <http://www.waterboards.ca.gov/bacterialobjectives/>

statewide *E. coli* and enterococci objectives. (See further discussion in Chapter 7). The draft statewide *E. coli* objectives for the protection of REC-1 is as follows: reproduced in Table 3.2

<b>Table 3.2 Statewide Bacteria Objectives for the Protection of REC-1</b>			
Applicable Waters	Objective Elements	Estimated Illness Rate (NGI): 32 per 1,000 water contact recreators	
		Magnitude	
		GM (cfu/100 mL)	STV (cfu/100/mL)
All the waters where salinity is equal to or less than 1 ppt 95 percent of more of the time	<i>E. coli</i>	100	320
All the waters where salinity is greater than 1 ppt more than 5 percent of the time	Enterococci	30	110
<p>The waterbody GM shall not be greater than the applicable GM magnitude in any six-week interval, calculated weekly. The applicable STV shall not be exceeded by more than 10 percent of the samples collected in a CALENDAR MONTH, calculated in a static manner.</p> <p>NGI = National Epidemiological and Environmental Assessment of Recreational Water gastrointestinal illness rate GM = geometric mean STV = statistical threshold value cfu = colony forming units mL = milliliters ppt = parts per thousand</p>			

~~A six-week rolling GEOMETRIC MEAN of *Escherichia coli* (*E. coli*) not to exceed 100 colony forming units per 100 milliliters (cfu/100 mL), calculated weekly, and a STATISTICAL THRESHOLD VALUE (STV) of 320 cfu/100 mL not to be exceeded more than 10 percent of the time, calculated monthly.~~

~~A decision of the State Water Board is currently scheduled for December 2017, a week prior to the Regional Water Board's scheduled hearing on the Russian River Pathogen TMDL Action Plan.~~

### **3.1.3 ANTIDegradation POLICY**

The federal antidegradation policy described in 40 C.F.R. section 131.12 and state Antidegradation Policy contained in State Water Board Resolution No. 68-16 obligate the Regional Water Board to protect the quality of waters, and to make appropriate findings when any lowering of water quality is authorized. Under the state Antidegradation Policy, which incorporates the requirements of the federal policy, waters that exceed minimum water quality objectives are described as high-quality waters. In those locations and during those times of year when the quality of water in the Russian River Watershed can be described with respect to pathogens as high quality, the Regional Water Board must

maintain that high quality unless certain findings are made. Chapter 13 of the staff report more fully describes the Regional Water Board's antidegradation analysis for the Russian River Pathogen TMDL.

### 3.2 OTHER INDICATORS OF PATHOGEN POLLUTION

Though the Russian River Pathogen TMDL is based on *E. coli* as the bacteria objective for protection of REC-1 in freshwater and enterococci for saline waters, there are numerous other analytical methods useful to the assessment of fecal waste discharge and pathogen exposure. This section describes some of the other metrics staff have used to assess pollution in the Russian River Watershed.

Pathogens most commonly identified and associated with waterborne diseases can be grouped into three general categories: bacteria, protozoans, and viruses (Table 3.23). Bacteria are microscopic unicellular organisms that are ubiquitous in nature, including the intestinal tract of animals. Many types of harmless bacteria colonize the human intestinal tract and are routinely shed in feces. However, pathogenic (disease-causing) bacteria are present in the feces of infected humans and animals and can contaminate surface water and groundwater as a result of inadequate waste treatment or disposal methods. Protozoans are unicellular organisms that are present primarily in the aquatic environment. Of the 35,000 known species of protozoans, almost 30 percent are pathogenic. Pathogenic protozoans can occur in humans and animals where they multiply in the intestinal tract of the infected individual or animal and are later excreted in feces as cysts. Viruses are obligate intracellular parasites, incapable of replication outside of a specific host organism. Viruses that are of a public health concern are viruses that replicate in the intestinal tract of humans, and are referred to as human enteric viruses (U.S. EPA 2001).

Table 3.3 Pathogenic Bacteria, Protozoan, and Virus of Concern to Water Quality		
Pathogen Type	Disease	Effects
<b>Bacteria</b>		
<i>Escherichia coli</i>	Gastroenteritis	Vomiting, diarrhea
<i>Salmonella typhi</i>	Typhoid fever	High fever, diarrhea, ulceration of the small intestine
<i>Salmonella</i>	Salmonellosis	Diarrhea, dehydration
<i>Shigella</i>	Shigellosis	Bacillary dysentery
<i>Vibrio cholera</i>	Cholera	Extremely heavy diarrhea, dehydration
<i>Yersinia enterocolitica</i>	Yersiniosis	Diarrhea
<b>Protozoan</b>		
<i>Balantidium coli</i>	Balantidiasis	Diarrhea, dysentery
<i>Cryptosporidium</i>	Cryptosporidiosis	Diarrhea, death in susceptible populations
<i>Entamoeba histolytica</i>	Amebiasis (amebic dysentery)	Prolonged diarrhea with bleeding, abscesses of the liver and small intestine
<i>Giardia lamblia</i>	Giardiasis	Mild to severe diarrhea, nausea, indigestion
<b>Virus</b>		



<b>Table 3.3 Pathogenic Bacteria, Protozoan, and Virus of Concern to Water Quality</b>		
<b>Pathogen Type</b>	<b>Disease</b>	<b>Effects</b>
<b>Bacteria</b>		
Adenovirus	Respiratory disease, gastroenteritis	Various effects
Enterovirus	Gastroenteritis, heart anomalies, meningitis	Various effects
Hepatitis A	Infectious hepatitis	Jaundice, fever
Reovirus	Gastroenteritis	Vomiting, diarrhea
Rotavirus	Gastroenteritis	Vomiting, diarrhea
Calicivirus	Gastroenteritis	Vomiting, diarrhea
Astrovirus	Gastroenteritis	Vomiting, diarrhea

Adapted from Metcalf & Eddy 1991 and Fout 2000; as cited in U.S. EPA 2001

### 3.2.1 FECAL INDICATOR BACTERIA (FIB)

Several groups of intestinal bacteria are used as indicators that a waterbody has been contaminated with fecal waste and that pathogens are present. Most strains of fecal indicator bacteria (FIB) do not directly pose a health risk to swimmers and those recreating in the water; but, indicator bacteria often co-occur with human pathogens and are easier to measure than the actual pathogens that may pose the risk of illness. Not only is it impractical to directly measure the wide range of fecal-borne pathogens (bacteria, viruses, and protozoans), but the methods to detect human pathogens are characteristically expensive and inefficient, or may be not be available. The following are descriptions of various methods of using indicators to determine fecal waste contamination in a waterbody.

#### 3.2.1.1 FECAL COLIFORM

Fecal coliform bacteria are a subgroup of total coliform bacteria found mainly in the intestinal tracts of warm-blooded animals, and thus, are considered a more specific indicator of fecal waste pollution than the total coliform group. Fecal coliform bacteria concentration criteria were initially recommended by U.S. EPA (1976) for assessing support of recreational use. However, since 1976, several key epidemiological studies were conducted to evaluate the criteria for effectiveness at protecting public health related to water contact recreation (Cabelli et al. 1982; Cabelli et al. 1983; Dufour 1983; Favero 1985; Seyfried et al. 1985a, Seyfreid et al. 1985b). These studies concluded that the 1976 U.S. EPA recommended fecal coliform bacteria criteria were not protective of public health from incidental ingestion associated with swimming recreation. As a result, the U.S. EPA changed the criteria recommendation in 1986 to use the fecal indicator bacteria *E. coli* and enterococci bacteria. ~~At least one of the potential issues with the use of fecal coliform bacteria as an indicator of fecal waste is that this bacteria group contains a genus, *Klebsiella*, with species that are not necessarily fecal in origin. *Klebsiella* bacteria are commonly associated with soils and the surfaces of plants, so that areas with organic debris may show high levels of fecal coliform bacteria that do not have a fecal-specific bacteria~~

source.— The State Water Board has since adopted objectives based on the U.S. EPA's recommendations that now supersede any fecal coliform objectives. This TMDL no longer relies upon fecal coliform bacteria data for assessment of impairment or pollution.

### 3.2.1.2 E. COLI BACTERIA AND ENTEROCOCCI BACTERIA

*E. coli* is a species of fecal coliform bacteria that is found in the fecal material of humans and other animals. U.S. EPA (2012) compiled numerous epidemiological studies and concluded that *E. coli* bacteria are a good indicator of human health risk from water contact in recreational freshwaters. National criteria are established for both the geometric mean and the statistical threshold value (STV) (Table 3.3). To assess impairment of REC-1, the geometric mean criterion is compared to the logarithmic average of the bacteria concentration distribution. In addition, the STV criterion is compared to the 90<sup>th</sup> percentile of the bacteria concentration distribution. The State Water Board's ~~draft~~ bacteria objective for freshwater is based on *E. coli* and is consistent with the national criteria. This TMDL identifies impaired HUC-12 units based on exceedances of the statewide objective for *E. coli* in freshwaters.

Enterococci is a genera of fecal indicator bacteria that is also found in the fecal material of humans and other animals. U.S. EPA (2012) compiled numerous epidemiological studies and concluded that enterococci bacteria are a good indicator of human health risk from water contact in recreational marine and freshwaters. National criteria are established for both the geometric mean and the statistical threshold value (STV) (Table 3.4). The geometric mean criterion is compared to the logarithmic average of the bacteria concentration distribution. In addition, the STV criterion is compared to the 90<sup>th</sup> percentile of the bacteria concentration distribution. The State Water Board ~~has not proposed for its draft bacteria objective, the development of adopted objectives for enterococci bacteria in freshwater. Instead, the draft bacteria objectives include enterococci objectives for the protection of REC-1 in marine, which are consistent with the national criteria, but applicable to saline waters, only.~~ The statewide objective for enterococci apply to waters with a salinity threshold of 1 part per thousand more than 5 percent during the calendar year. However, the scientific peer reviewers for the Russian River Pathogen TMDL recommended the use of enterococci bacteria in freshwater ~~as an indicator of potential exposure to fecal-borne pathogens in the Russian River Watershed, too as an indicator of potential exposure to fecal-borne pathogens in the Russian River Watershed.~~ This TMDL identifies impaired HUC-12 units based on exceedances of the statewide objective for enterococci in waters with a salinity threshold that exceeds 1 ppt more than 5 percent of time in a calendar year. This TMDL also identifies impaired HUC-12 units based on exceedances of the national criteria for enterococci in freshwaters, when coupled with another line of evidence of pollution (e.g., beach closure). This approach is consistent the statewide bacteria objectives, the national bacteria criteria, and the results of the scientific peer review process.

U.S. EPA published *E. coli* and enterococci bacteria criteria for two different levels of illness risk. The first level of risk (36 estimated illnesses per 1,000 recreators) is the same risk

level applied with the previous recreational criteria (i.e., U.S. EPA 1986). The 1986 U.S. EPA criteria correspond to the level of risk associated with an estimated illness rate of the number of highly credible gastrointestinal illnesses (HCGI) per 1,000 primary contact recreators. The information developed for the 2012 U.S. EPA criteria uses a more comprehensive definition of GI illness, referred to as NEEAR-GI (NGI), which includes diarrhea without the requirement of a fever. Because NGI is broader than HCGI, more illness cases were reported and associated with recreation using the NGI definition of illness, at the same level of water quality observed using the previous illness definition (i.e., HCGI). The U.S. EPA (2012) also recommends criteria that correspond to an illness rate of 32 NGI per 1,000 primary contact recreators to “encourage an incremental improvement in water quality.” The statewide bacteria objectives are based on 32 NGI per 1,000 primary contact recreators, as is this TMDL.

The 2012 U.S. EPA criteria are expressed as colony-forming units per sample volume (cfu/100mL) based on membrane filtration methods (U.S. EPA 2002a; U.S. EPA 2002b). Many laboratories, including the Regional Water Board Microbiology Laboratory, use a different analysis method to measure *E. coli* (and enterococci) bacteria concentrations (IDEXX 2001). These methods, (Colilert® and Enterolert® Quanti-Tray/2000) have been shown to produce equivalent results as the membrane filtration methods (Budnick et al. 1996; Yakub et al. 2002) and have been approved by the U.S. EPA in the Code of Federal Regulations (40 C.F.R. 136.3). Both methods are based on culturing the bacteria in the sample on nutrient media.

In addition to the 2012 U.S. EPA criteria, U.S. EPA suggests the use of the Beach Action Value (BAV) as a conservative, precautionary tool for making beach notification decisions. The BAV is not a component of U.S. EPA’s recommended criteria, but a tool that states may choose to use, without adopting it into their water quality standards as a “do not exceed value” for beach notification purposes. The BAV is applied to single sample measurements: any single sample above the BAV could trigger a beach notification until another sample below the BAV is collected. States also may choose a quantitative polymerase chain reaction-based (qPCR) BAV for beach notification purposes.

~~This~~ Pathogen TMDL includes numeric targets based on the U.S. EPA (2012) fecal indicator bacteria criteria for both *E. coli* and enterococci bacteria. Inclusion of both U.S. EPA recommended criteria is consistent with the scientific peer review comments on the Peer Review Draft Staff Report, which strongly recommended inclusion of enterococci bacteria criteria for the Russian River Pathogen TMDL. The scientific peer reviewer explained that the dose-response relationship between enterococci bacteria concentration and gastrointestinal illness establishes it as a good indicator of human health protection. The scientific peer reviewer explained that while *E. coli* is also a reasonable fecal indicator bacteria, U.S. EPA retained *E. coli* in the 2012 REC-1 criteria document so as to provide consistency with the previous approach.

### 3.2.1.3 BACTEROIDES BACTERIA

*Bacteroides* bacteria are another group of fecal indicator bacteria that are used to measure fecal waste in water. *Bacteroides* is the genus name of the bacteria from the phylum

Bacteroidetes and order Bacteroidales. *Bacteroides* bacteria are anaerobic (i.e., they do not live or grow in the presence of oxygen) and make up a substantial portion of the gastrointestinal flora of mammals (Wexler 2007). However, some species of *Bacteroides* bacteria can come from non-enteric sources (Niemi et al. 2012).

Due to their anaerobic-nature, *Bacteroides* bacteria have a low potential for survival and regrowth in the environment. In addition, water temperature has been shown to affect the persistence of *Bacteroides* in surface water. For water temperatures typically observed in the Russian River during the summer period (20-25°C or 68-77°F), *Bacteroides* bacteria survive one to two days. In cooler temperatures, *Bacteroides* bacteria likely survive for a week or more. Because of this short life span, *Bacteroides* bacteria concentrations are often used to indicate recent introduction of fecal waste to surface waters.

*Bacteroides* bacteria are especially useful as a tool to identify fecal waste from specific animal sources. The percentage of the *Bacteroides* bacteria population that originates from specific animal hosts can be determined using real-time quantitative polymerase chain reaction (qPCR) methods, which amplify specific DNA sequences of the 16S rRNA gene marker (Molina 2007). *Bacteroides* bacteria assay primers have been developed for most domestic animal hosts including cattle, swine, chicken, dog, and horse (Griffith et al. 2013). Commercial laboratories are available that conduct these animal host analyses. Some animal host assays are non-quantitative and produce only presence/absence results. Water samples analyzed for the Russian River Pathogen TMDL project were analyzed for both human-specific and bovine-specific *Bacteroides* bacteria.

According to the few epidemiological studies currently available for human *Bacteroides*, there is link between the bacteria and illness rates. Wade et al. (2010) estimated the probability of gastrointestinal illness due to increasing concentrations of *Bacteroides* bacteria, and found that a geometric mean of 60 gene copies/100mL 100 mL corresponded to about 30 gastrointestinal illnesses per 1,000 swimmers. Ashbolt et al. (2010) compared human-specific *Bacteroides* bacteria concentration to *Norovirus* concentrations. From these estimates, a concentration of 860 gene copies/100mL 100 mL corresponded to about 30 gastrointestinal illnesses per 1,000 swimmers. Soller et al. (2010a) identified *Norovirus* as the pathogen most responsible for a majority of gastrointestinal illness. Bohem et al. (2015) found a linear relationship between the risk of GI illness associated with swimming and concentrations of human *Bacteroides* bacteria concentration.

For the purposes of this TMDL, *Bacteroides* data were used as a triad of information with *E. coli* and enterococci from which to assess the potential presence of illness causing pathogens. The detection of human or bovine-sourced *Bacteroides* was taken as an indication of the potential of recent discharge of fecal waste. Elevated *Bacteroides* concentrations was taken as an indication of the potential for significant recent discharge of fecal waste. In no case was a pollution or impairment determination made based on *Bacteroides* findings, alone.

### 3.2.1.4 DNA MARKER SENSITIVITY AND SPECIFICITY

Bernhard and Field (2000a) first identified species composition differences in *Bacteroides* bacteria populations by screening 16S rDNA from human and cow feces. Conventional host-specific PCR assays were then developed to detect these genetic markers in environmental samples (Bernhard and Field 2000b). Further technical advancements have allowed for the relative quantification of animal host-specific genetic markers. There have been more than a dozen human-specific genetic markers developed over the last decade (Griffith et al. 2013). Studies have evaluated these genetic markers for sensitivity (does the marker detect human material when it is present in the sample) and specificity (does the marker cross-react with other animal sources).

Shilling et al. (2009) recommended use of the HuBac genetic marker of human-specific *Bacteroides* bacteria and the BoBac marker for bovine-specific *Bacteroides* bacteria for concentration measurements to support the Russian River Pathogen TMDL. Layton et al. (2006) found the HuBac genetic marker assay had 100% sensitivity, but it also had a 32% false-positive rate with potential for cross-sensitivity with swine feces. Shanks et al. (2010a) found the HuBac marker showed cross-sensitivity with feces from other animal hosts, most prominently with cats, dogs, and chickens. This leads staff to conclude that the HuBac marker was highly likely to correctly detect human waste material in samples from the watershed, but could have also counted other animal fecal waste in the total concentration value.

In regards to bovine host markers, Layton et al. (2006) found the BoBac genetic marker assay was specific for bovine fecal samples with 100% sensitivity and 0% cross-sensitivity with the other animal hosts evaluated. Shanks et al. (2010b) found that the BoBac genetic marker showed cross-sensitivity with feces from many other animal hosts, most prominently with sheep and pig feces. The bovine-specific genetic markers, CowM2 and CowM3, both showed 100% specificity with no detection of other animal host fecal wastes.

The use of the HF183 and HumM2 markers is recommended for future human-specific *Bacteroides* analyses and CowM2 and Rum2Bac markers for bovine-specific analyses, until such time that better technology becomes available. These recommendations are based on the research and review by Griffith et al. (2013) of studies on human-specific and bovine-specific genetic markers. Griffith et al. concluded that the HF183 and HumM2 markers should be used for measuring human fecal waste in environmental samples because they provide the best combination of sensitivity and specificity. Griffith et al. also suggests that bovine-specific assays use both the CowM2 and the Rum2Bac genetic markers if non-cow ruminants are present in the watershed. ~~Additionally, the U.S. EPA is in the process of approving the CowM2 method.~~

### 3.2.2 DIRECT MEASUREMENT OF PATHOGENS

Pathogenic bacteria, protozoans, and viruses are occasionally measured directly without relying on indicator bacteria species, and the ability to do so is increasing with continuing advances in DNA technology. No direct measurements of viruses were made in support of

this TMDL project. But, direct measurements of specific bacteria and protozoans were available, as described below.

### 3.2.2.1 BACTERIA COMMUNITY

Analytical measurement technology has advanced to a point where entire bacterial communities are quantified instead of just specific fecal indicator bacteria groups or species. High-throughput DNA sequence analysis can potentially identify all sources of microbial contaminants in a single test by measuring the total diversity of microbial communities. The PhyloChip™ (Second Genome, San Bruno CA) is a phylogenetic DNA microarray that has 16S rRNA gene probes that can quantify 59,316 different bacterial taxa in a single water sample. Analyzing the comprehensive suite of bacteria in a sample can help identify specific disease-causing bacteria species, as well as the major sources of fecal waste pollution from which such disease-causing bacteria may be emanating (Hazen et al. 2010).

Analysis of the bacteria with the PhyloChip™ reveals strong differences in community composition among fecal wastes from human, birds, pinnipeds, and livestock. Differences in the diversity among fecal wastes reveal hundreds of unique taxa that are specific to human, bird, and livestock feces (Dubinsky et al. 2012). Actinobacteria, Bacilli, and many Gammaproteobacteria taxa discriminate birds from mammalian sources. Families within the Clostridia and Bacteroidetes taxa discriminate between humans, livestock, and pinniped animal sources. Comprehensive interrogation of microbial communities for these diverse identifier taxa can assist in fecal waste source identification. Phylogenetic microarrays are an effective tool for rapidly measuring the full assortment of microbial taxa that discriminate sources of fecal contamination in surface waters. Similarly, phylogenetic microarrays are an effective tool for identifying the presence of specific potential human pathogens.

For the purpose of this TMDL, PhyloChip™ data was used in a manner like that of *Bacteroides* data. That is, PhyloChip™ data indicating the significant<sup>10</sup> presence of human or bovine fecal waste was used as a line of evidence with which to interpret *E. coli* and enterococci findings. No pollution or impairment determinations were made on the basis of PhyloChip™ data, alone.

### 3.2.2.2 CRYPTOSPORIDIUM AND GIARDIA PROTOZOA

Protozoans are unicellular organisms that are present primarily in the aquatic environment. Of the 35,000 known species of protozoans, almost 30 percent are pathogenic. Pathogenic protozoans can occur in humans and animals where they multiply in the intestinal tract of the infected individual or animal and are later excreted in feces as cysts. Protozoan cysts do not reproduce in the environment, but are capable of surviving

<sup>10</sup> A 20% gene match or higher was used as the threshold to determine whether human or grazer-sourced pathogens were potentially significant at a given site (Dubinsky and Anderson, 2014).

dormant in the soil and surface water for extended periods of time, which makes them a prominent public health concern.

Two waterborne protozoans of major public health concern are *Giardia lamblia* and *Cryptosporidium parvum*. The *Giardia* organism inhabits the digestive tract of a wide variety of domestic and wild animal species, as well as humans. Once shed in feces, *Giardia* cysts are frequently found in rivers and lakes. Infection by *Giardia* can result in giardiasis in humans, which is characterized by gastroenteritis, particularly among the young and elderly. *Giardia* is considered nonpathogenic in cattle because it is usually found in animals that have normal feces and no sign of disease. However, among the human population, giardiasis affects approximately 200 million people worldwide and is one of the most prevalent waterborne diseases in the United States. *Cryptosporidium* species are a group of parasitic protozoa that are recognized as pathogens of domesticated livestock, poultry, and wildlife and are readily transmitted to humans. *Cryptosporidium* oocysts are about 4-6 µm in diameter, slightly larger than bacteria, and relatively unaffected by conventional methods of wastewater disinfection, such as chlorination. Infection by *Cryptosporidium* can cause cryptosporidiosis, whose symptoms include loss of appetite, nausea, and abdominal pain followed by acute or persistent diarrhea. Although *Cryptosporidium* infections are usually of short duration and self-limiting in individuals with an intact immune system, there is no specific treatment available and the infection can be life threatening in patients with profound impairment of immune function.

For the purpose of this TMDL, the direct measurement of protozoa was included in the Staff Report for general interest. No pollution or impairment determinations were made using direct measurement of protozoa, alone.

### 3.3 SUMMARY

The Basin Plan contains a fecal coliform bacteria objective for the protection of REC-1, which currently REC-1 protection currently described in the Basin Plan is replaced by the statewide bacteria objective for *E. coli* in freshwater and enterococci in saline water. This TMDL is based on fecal coliform, a metric that is no longer recognized as appropriate the statewide bacteria objectives. The 2019 Staff Report and Action Plan have been updated from previous versions to measure eliminate consideration of fecal coliform data.

There are numerous other metrics with which to assess the potential for human exposure to illness-causing pathogens. Since its adoption in 1975, there have been enormous advancements in the development of methods, metrics, and criteria with which to assess fecal waste pollution and potential for pathogen exposure. Many of these methods and metrics have been used in development of the Russian River Pathogen TMDL and are described in this chapter, including other fecal indicator bacteria, as well as direct measures of specific pathogens.

U.S. EPA (2012) has established national criteria based on *E. coli* and enterococci bacteria for the protection of REC-1. The Regional Water Board's scientific peer reviewers strongly recommended the use of enterococci bacteria as a good indicator of human health

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protection. This Pathogen TMDL includes numeric targets for both *E. coli* and enterococci bacteria. exposure to pathogens in freshwaters. To conform to the results of the legally mandated scientific peer review process, national criteria for enterococci in freshwaters were also used to assess impairment, but only in combination with other evidence that considered by itself would constitute evidence of impairment and the potential for human exposure to illness-causing pathogens. It should be noted that evidence of beach closures alone is sufficient to identify a give reach as impaired or polluted. Use of enterococci data, too, strengthens the finding.



## CHAPTER 4 EVIDENCE OF POLLUTION

### 4.1 OVERVIEW

The development of a TMDL includes monitoring studies, analyses and assessments to help determine the geographic extent of the noted pollution and the sources of the pollution that need additional management and control. The Action Plan is designed to address both exceedances of water quality objectives for bacteria (e.g., as required of a TMDL under federal law) and evidence of pollution as demonstrated using other relevant and reliable metrics (e.g., under the authority of state law). As described in Chapter 3, using multiple lines of evidence to assess fecal waste pollution, beneficial use impairment, and the potential for exposure to illness-causing pathogens is reasonable and appropriate given the nature of pathogens and the evolving field of pathogen measurement and assessment. Individual metrics for the measurement of pathogens respond to environmental factors in different ways, indicating the efficacy of using multiple lines of evidence to ensure full public health protection. To ensure clarity with respect to requirements specific to TMDLs, under federal law, evidence of exceedance of bacteria objectives for protection of REC-1 (i.e., impairment) are particularly noted. However, all the lines of evidence of fecal waste pollution is taken as a whole, when describing an appropriate Program of Implementation to be implemented under state law.

The 2012 Section 303(d) List of Impaired Waters was approved by U.S. EPA on July 30, 2015.<sup>11</sup> ~~The List identifies~~ There are six (6) waterbody-pollutant pairs in the Russian River Watershed identified in the 2012 Section 303(d) List as impaired for fecal indicator bacteria due to the failure to fully attain the ~~existing~~ Basin Plan bacteria water quality objective. The data analysis necessary to produce the 2019 Section 303(d) List of Impaired Waters is currently underway and therefore, not supporting the REC-1 beneficial use. ~~These waterbodies are~~ is following an approach for assessment of pathogen data in the Russian River at Veterans Memorial Beach, Russian River between the confluences of Fife Creek in Guerneville and Dutch Bill Creek in Monte Rio, an unnamed stream near Healdsburg at Fitch Mountain, Laguna de Santa Rosa, Santa Rosa Creek, Green Valley Creek, and Dutch Bill Creek (Table 1.1 and Figure 1.1), that is consistent with that which is reported here. The assessment of data that resulted in the 2012 Section 303(d) List ~~provides a line of evidence of fecal waste pollution in the Russian River Watershed and the potential for exposure to illness-causing pathogens. described in this chapter updates the findings of the 2012 Section 303(d) List of Impaired Waters.~~ For the purposes of this TMDL, that assessment was completed, additional data have been collected, criteria have been updated, and assessment methods have improved. Regional Water Board staff have conducted the following additional multiple monitoring studies to assess the geographic extent of fecal waste discharge in the Russian River Watershed and the potential for human exposure to pathogens.

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<sup>11</sup> The list was partially approved by U.S. EPA on June 26, 2015.

- ~~Pilot Studies and Monitoring Design Project (September 2009)~~
- ~~Lower Russian River Bacteria Monitoring (May 2012)~~
- ~~Upper Russian River Bacteria Monitoring (Nov 2013)~~
- ~~Onsite Wastewater Treatment System Impact Study (July 2013)~~
- ~~Recreation Impact Study (Nov 2013)~~
- ~~Phylochip Microbial Community Analysis (May 2014)~~

This chapter summarizes the evidence of fecal waste pollution and beneficial use impairment in the Russian River and its tributaries ~~resulting from these studies~~. ~~Technical memoranda describing each of the studies in more detail can be found on the Regional Water Board's website.<sup>12</sup>~~ The multiple lines of evidence of fecal waste pollution provided by these studies and beneficial use impairment allows for robust, conservative conclusions regarding the geographic extent and sources of fecal waste pollution, as is appropriate for public health protection. Following the State Water Board's adoption in August 2018 of statewide REC-1 bacteria objectives, staff reanalyzed all the data collected as part of this TMDL to compare against the new standards. The data were aggregated by HUC-12 geographic unit<sup>13</sup>. Data in each HUC-12 was separated by data type (e.g., *E. coli*, enterococci, *Bacteroides*, etc.). The rolling 6-week geomean and statistical threshold value (STV) were calculated for *E. coli* in freshwater and enterococci in saline water and the Water Quality Control Policy for Developing California's Clean Water Act Section 303(d) List (Listing Policy) guidelines<sup>14</sup> were applied to assess impairment. Enterococci data for freshwater was aggregated by HUC-12; but, the static geomeans reported in the 2015 Staff Report and 2017 Staff Report were retained. Determination of impairment was based on the following conditions:

- Any HUC-12 in which there was sufficient *E. coli* data in freshwater or enterococci data in saline water to determine impairment under the Listing Policy was assessed for impairment and the results described.
- Any HUC-12 in which there was sufficient enterococci data in freshwater to determine impairment under the Listing Policy was only identified as impaired if enterococci exceeded the national criteria for enterococci and there were public health advisories for recreational beaches within the HUC-12.

This chapter describes the data, analyses, and results. In summary, the multiple lines of evidence indicate that surface waters throughout much of the Russian River Watershed experience fecal waste pollution, as demonstrated by water samples with measured pathogen indicator bacteria concentrations that exceed the ~~draft~~ statewide bacteria objectives to ~~protection~~ protect REC-1, the U.S. EPA (2012) bacteria criteria for protection of recreation, and as corroborated by *Bacteroides* bacteria data, DNA analyses, and other

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<sup>12</sup> [http://www.waterboards.ca.gov/northcoast/water\\_issues/programs/tmdls/russian\\_river/](http://www.waterboards.ca.gov/northcoast/water_issues/programs/tmdls/russian_river/)

<sup>13</sup> The U.S. Geological Survey (USGS) has defined hydrologic unit codes (HUC) for nested subwatershed units. The HUC-12 is a subwatershed unit within a larger watershed (e.g., Russian River Watershed) that represents individual tributaries, subwatersheds and subunits of the mainstem.

<sup>14</sup> [https://www.waterboards.ca.gov/water\\_issues/programs/tmdl/docs/ffed\\_303d\\_listingpolicy093004.pdf](https://www.waterboards.ca.gov/water_issues/programs/tmdl/docs/ffed_303d_listingpolicy093004.pdf)

analytical methods. Though, it is recognized that the greatest public use of the Russian River occurs during the summer months, water contact recreation is a beneficial use of the Russian River Watershed throughout the year. The beneficial use impairment is based on data collected in both the wet and dry season, with the following general findings:

1. Concentrations of fecal coliform bacteria measured in several recreational beaches and streams in the watershed ~~indicate were used to assess impairment prior to the adoption of statewide bacteria objectives for *E. coli* and enterococci. Those data indicated a potential risk of illness during water contact recreation. These data also demonstrate, including periodic exceedances of the fecal coliform bacteria objective for the protection of REC-1 currently contained in the Basin Plan. These data are no longer included in this TMDL and are not used to define the extent of pollution/impairment.~~
2. Concentrations of *E. coli* bacteria measured in numerous recreational beaches and streams in the watershed indicate a potential risk of illness during water contact recreation. These data also demonstrate periodic exceedances of the ~~draft~~statewide bacteria objective for the protection of REC-1 ~~proposed as a statewide objective, which will superseded the existing fecal coliform bacteria objective contained in the Basin Plan, if adopted by the State Water Resources Control Board.~~
3. Concentrations of enterococci bacteria measured in numerous recreational beaches and streams in the watershed indicate a potential risk of illness during water contact recreation. These data also demonstrate periodic exceedances of the statewide REC-1 objective for saline waters and national REC-1 criteria recommended by the U.S. EPA (2012)- for freshwaters. One of the scientific reviewers of this project specifically supported use of the U.S. EPA 2012 enterococci bacteria criteria as an important line of evidence relative to public health protection: in freshwaters.
4. Human-specific and bovine-specific *Bacteroides* bacteria are found in almost all sampling locations in the watershed. Detections of human and bovine *Bacteroides* bacteria in association with *E. coli* and/or enterococci bacteria confirm the likelihood that any exceedances of the ~~draft~~-statewide *E. coli* and enterococci bacteria objectives or the U.S. EPA 2012 enterococci criteria are related to fecal waste pollution and not other environmental causes.
5. Microbiological source identification using ~~PhyloChip™~~PhyloChip™ phylogenetic DNA microarray associate specific animal sources with elevated concentrations of fecal indicator bacteria. These data confirm the presence of fecal waste in the water column.
6. Bacteria species that are potential human pathogens are found at numerous locations in the watershed. These data confirm the potential for exposure to illness-causing pathogens via water contact.

7. The 2012 Section 303(d) List of Impaired Waters identifies several reaches of the mainstem Russian River and several tributaries as impaired for indicator bacteria. The listings are based on data collected prior to August 2010.
8. Public health advisories warning of potential risk of illness from recreational water contact have been posted at mainstem Russian River beaches and along Santa Rosa Creek.

Sampling locations were established at multiple places throughout the watershed, as described in Table 4.1 and depicted in Figure 4.1.

**Table 4.1 Sample Locations**

Hydrologic Area Name	Hydrologic Sub Area	Hydrologic Unit 12 (HUC-12)	Sample Location
Upper Russian River	Coyote Valley	Lake Mendocino-East Fork Russian River	Russian River, East Fork at East Road
		Burright Creek	--
		Cold Creek	--
	Forsythe Creek	Salt Hollow Creek-Russian River	Russian River at East School Way
		Forsythe Creek	--
	Ukiah	East Fork Russian River	Russian River at Mendocino Drive
		Ackerman Creek	--
		Orrs Creek	Russian River at Talmage Road
			Russian River at Vichy Springs Road
		Mill Creek	Palmer Creek at Palmer Creek Road
		Robinsons Creek	--
		Morrisons Creek	--
		McNab Creek	--
		Feliz Creek	--
		Cooley Creek	--
		Cummiskey Creek	--
		Pieta Creek	--
Middle Russian River	Warm Springs	Soda Spring Creek	--
		Galloway Creek	--
		Lake Sonoma	--
		Warm Springs Creek	--
		West Slough	Unnamed Tributary at West Dry Creek Road
			Foss Creek at Matheson Street
			Unnamed Tributary at Lambert Bridge Road
		Pena Creek	--
		Mill Creek	--
	Geyserville	Oat Valley Creek-Russian River	Russian River at Cloverdale River Park
		Gill Creek	Russian River at Crocker Road
		Sausal Creek	Unnamed Tributary at Fredson Road
			Unnamed Tributary at Alexander Valley Road

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**Table 4.1 Sample Locations**

Hydrologic Area Name	Hydrologic Sub Area	Hydrologic Unit 12 (HUC-12)	Sample Location
			Russian River at Alexander Valley
			Russian River at Highway 128
		Maacama Creek	--
		Brooks Creek	Unnamed Tributary at Redwood Drive
			Unnamed Tributary at Fitch Mountain Road
			Russian River at Healdsburg Veterans Memorial Beach
			Russian River at Camp Rose
			Russian River at Diggers Bend
		Franz Creek	--
	Santa Rosa	Upper Santa Rosa Creek	Santa Rosa Creek at Los Alamos Road
			Piner Creek at Fulton Road
			Santa Rosa Creek at Railroad Street
			Unnamed Tributary at River Road
			Abramson Creek at Willowside Road Levy
	Laguna	Upper Laguna de Santa Rosa	Blucher Creek at Lone Pine Road
			Copeland Creek at Commerce Drive
			Crane Creek at Snyder Lane
			Gossage Creek at Gilmore Avenue
			Unnamed Tributary at Turner and Daywalt Road
		Lower Laguna De Santa Rosa	Laguna de Santa Rosa at Guerneville Road
			Laguna de Santa Rosa at Sebastopol Community Center
			Unnamed Tributary at Sanford Road
			Mark West Creek at Trenton-Healdsburg Road
			Van Buren Creek at St. Helena Road
	Mark West	Porter Creek-Mark West Creek	
		Windsor Creek	--
Lower Russian River	Austin Creek	East Austin Creek	--
		Ward Creek	--
	Guerneville	Porter Creek	Unnamed Tributary at Trenton Road
			Russian River at Steelhead Beach
			Russian River at Riverfront Park
			Unnamed tributary at Old Redwood Highway
		Green Valley Creek	Atascadero Creek at Green Valley Road
			Green Valley Creek at Martinelli Road
		Dutch Bill Creek	Unnamed Tributary at River Road near Duncan Road
			Unnamed tributary at Diver Drive
			Unnamed Tributary at Old Monte Rio Road
			Unnamed Tributary at Main Street
			Unnamed Tributary at River Road near Rio Nido
			Unnamed Tributary at Foot Hill Drive
			Unnamed Tributary at Market Street

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**Table 4.1 Sample Locations**

Hydrologic Area Name	Hydrologic Sub Area	Hydrologic Unit 12 (HUC-12)	Sample Location
			Dutch Bill Creek at Fir Road
			Unnamed Tributary at Del Rio Court
			Russian River at Monte Rio Beach
			Russian River at Johnsons Beach
			Russian River at Forestville Access Beach
			Mays Creek at Neeley Road
			Russian River at Hacienda Bridge
		Willow Creek	Unnamed Tributary at Moscow Road
			Russian River at Jenner Boat Ramp
			Russian River at Bridgehaven
			Russian River at Casini Ranch
			Russian River at Duncans Mills

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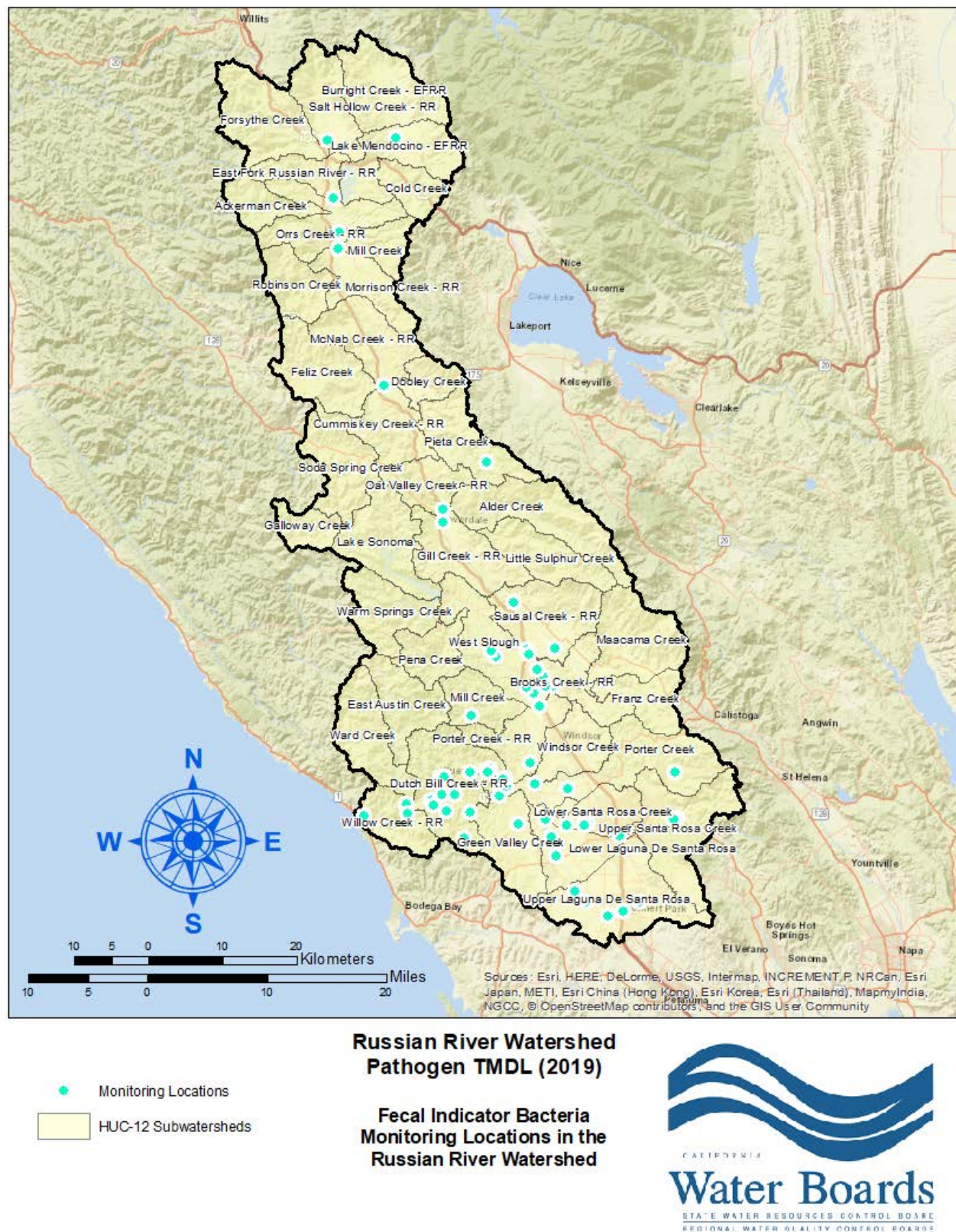


Figure 4.1 Fecal Indicator Bacteria Monitoring Locations



What follows is a summary of the findings from each of the assessment methods. The technical memoranda and monitoring reports detailing the methods and results of these studies can be found on the Regional Water Board website.

## **4.2 — ASSESSMENT OF FECAL COLIFORM BACTERIA CONCENTRATIONS**

As described in Chapter 3, the existing bacteria objective for the protection of REC-1 contained in the Basin Plan is based on fecal coliform and was established in 1975. Measured fecal coliform bacteria concentrations were used to assess whether the waterbody is supporting recreational (i.e., REC-1) beneficial use, based on the existing REC-1 bacteria objective. Regional Water Board staff has collected water samples to measure fecal coliform bacteria concentrations at several beaches and streams in the Russian River Watershed since 1980. Measured fecal coliform bacteria concentrations were compiled from four (4) recreation beaches on the Russian River (i.e., Camp Rose Beach, Healdsburg Veteran's Memorial Beach, Johnsons Beach, and Monte Rio Beach) and one tributary stream along a public park (i.e., Santa Rosa Creek at Railroad Street along the Prince Memorial Greenway).

Regional Water Board staff compared the compiled fecal coliform concentrations to the numeric Basin Plan water quality objectives (WQOs) (Butkus 2013c). Only 15 percent of the 30-day periods within the data record have an adequate number of fecal coliform concentration measurements for application of the two-part Basin Plan water quality objective (i.e., median and 90<sup>th</sup> percentile from a 30-day period), since the objective requires 5 samples collected within a 30-day period. Water samples were simply not collected frequently enough to provide a complete assessment of impairment to REC-1 using the Basin Plan WQO. For example, adequate water samples were not collected in Santa Rosa Creek to assess exceedance of the Basin Plan WQO. Nonetheless, based on those available data as shown in Table 4.1, all four beaches assessed showed at least one 30-day period that exceeded the water quality objective<sup>15</sup>, with 37% of the measurements overall exceeding the water quality objective (Butkus 2013c).

Fecal coliform bacteria storm water samples are collected as a requirement of the Municipal Separate Storm Sewer Systems (MS4) permit for the City of Santa Rosa, County of Sonoma, and Sonoma County Water Agency. Single storm water samples were collected from Santa Rosa Creek upstream and downstream of the urban area. These single samples cannot be directly assessed with the Basin Plan Water Quality Objective for fecal coliform bacteria, which requires 5 samples collected in a 30-day period. However, the fecal coliform concentrations measured in Santa Rosa Creek during storm events range from 170–5,000,000 MPN/100mL. These very high concentrations supplement other evidence

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<sup>15</sup> From the Basin Plan, the bacteria objectives reads “In waters designated for contact recreation (REC-1), the median fecal coliform concentration based on a minimum of not less than five samples for any 30-day period shall not exceed 50/100 ml, nor shall more than ten percent of total samples during any 30-day period exceed 400/100 ml (State Department of Health Services).”



that Santa Rosa Creek is impaired due to high bacterial loads, especially during wet weather.

## 4.2 ASSESSMENT OF *E. COLI* BACTERIA CONCENTRATIONS

*E. coli* bacteria data from the Russian River Watershed were compiled from three agencies: the Regional Water Board, the Sonoma County Water Agency, and the University of California (UC) Davis Aquatic Ecosystems Analysis Laboratory. Sample locations are representative of the range of streams and rivers in the watershed. Water samples were collected at ~~2964~~ locations from 2001 to ~~2013~~2017 for analysis of *E. coli* bacteria concentrations (NCRWQCB 2012, 2013a, 2013b).

Water samples were analyzed by IDEXX Colilert and were either undiluted or serially diluted 1:10, resulting in a minimum reporting limit of 1 or 10 MPN/~~100 mL~~100 mL and a maximum reporting limit of 2,419 or 24,196 MPN/100 mL. Sample measurements below and above analytical reporting limits are called censored data. When bacteria concentration results were beyond any of these limits, the reporting limit was substituted for censored data. ~~100 mL. Originally,~~ data were assessed using discrete 30-day periods ~~were~~ defined based on the Julian calendar date of each year (i.e., 30-day period 1 for Julian days 1-30; 30-day period 2 for Julian days 31-60, etc.).

~~Fecal waste pollution was determined using *E. coli* bacteria concentrations measured at each specific sampling location as compared to the draft ), only. The statewide *E. coli* bacteria objective for protection of REC-1. The draft statewide bacteria objective is, however, specifies a rolling 6-week period to calculate the geometric mean of 100 cfu/100 mL and a statistical threshold value of 320 cfu/100 mL, based on a public health outcome of now more than 32 illnesses per 1000 recreators and is more fully discussed in Chapter 3. The results of the assessment for *E. coli* bacteria concentrations for discrete 30-day averaging periods are presented in Figure 4.1 and Table 4.2. *E. coli* data was reanalyzed applying the calculation method specified in the statewide objective. Findings were made based on geographic areas defined by HUC-12 boundaries and the exceedance frequency recommendations of the 303(d) Listing Policy.~~

The results of the assessment for *E. coli* bacteria concentrations are presented per HUC-12 in Table 4.2 and Figure 4.2. Table 4.2 shows the number of exceedances over the total number of data (or calculations) for both the geomean and the STV.

**Table 4.2 *E. coli* Bacteria Data—Comparison of Results to Water Quality Objectives**

Hydrologic Area	Hydrologic Sub Area	Hydrologic Unit 12	6-week Rolling Geometric Mean <sup>1</sup>	30-day Statistical Threshold Value <sup>1</sup>
Upper Russian River	Coyote Valley	Burright Creek-East Fork Russian River	-	-
		Cold Creek	-	-

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**Table 4.2 *E. coli* Bacteria Data—Comparison of Results to Water Quality Objectives**

Hydrologic Area	Hydrologic Sub Area	Hydrologic Unit 12	6-week Rolling Geometric Mean <sup>1</sup>	30-day Statistical Threshold Value <sup>1</sup>
	Forsythe Creek Ukiah	Lake Mendocino-East Fork Russian River	0/0	1/1
		Forsythe Creek	-	-
		Salt Hollow Creek-Russian River	0/0	0/1
		East Fork Russian River-Russian River	0/0	1/1
	Sulphur Creek	Little Sulphur Creek	-	-
		Alder Creek-Big Sulphur Creek	-	-
	Ukiah	Ackerman Creek	-	-
		Mill Creek	-	-
		Orrs Creek-Russian River	0/0	0/2
		Robinson Creek	-	-
		Morrison Creek-Russian River	-	-
		Dooley Creek	-	-
		McNab Creek-Russian River	-	-
		Feliz Creek	-	-
		Pieta Creek	-	-
		Cummisky Creek-Russian River	0/70	1/24
Middle Russian River	Geyserville	Oat Valley Creek-Russian River	0/40	0/15
		Gill Creek-Russian River	0/13	0/3
		Sausal Creek-Russian River	0/91	5/38
		Franz Creek	-	-
		Maacama Creek	-	-
		Brooks Creek-Russian River	0/284	6/110
	Warm Springs	Galloway Creek	-	-
		Soda Spring Creek-Dry Creek	-	-
		Warm Springs Creek	-	-
		Lake Sonoma-Dry Creek	-	-
		Pena Creek	-	-
		Mill Creek	0/0	1/4
		<b>West Slough-Dry Creek</b>	0/0	<b>5/8</b>
	Laguna	<b>Upper Laguna de Santa Rosa</b>	0/0	<b>14/21</b>
		<b>Lower Laguna de Santa Rosa</b>	<b>7/17</b>	<b>7/10</b>
	Santa Rosa	<b>Upper Santa Rosa Creek</b>	0/0	<b>8/49</b>
		<b>Lower Santa Rosa Creek</b>	<b>55/57</b>	<b>50/93</b>
	Mark West	Windsor Creek	-	-
		<b>Porter Creek-Mark West Creek</b>	<b>4/6 - Summer</b>	1/7
Lower Russian River	Guerneville	East Austin Creek	-	-
		Ward Creek-Austin Creek	-	-
		<b>Green Valley Creek</b>	<b>8/19</b>	<b>10/17</b>
		<b>Porter Creek-Russian River</b>	<b>6/6 - Winter</b>	<b>7/59</b>
		<b>Dutch Bill Creek-Russian River</b>	1/369	<b>8/18 - Winter</b>
		Willow Creek-Russian River <sup>2</sup>	0/0	1/1

\* Locations that exceed the draft statewide bacteria water quality objectives are shown in **Bold** font.

<sup>1</sup> The ratio shown represents the number of calculations that exceed either the geometric mean (100 cfu/100 mL) or the statistical threshold value (320 cfu/100 mL) over the total number of geomeans or STVs that were

calculated. A minimum of 5 samples are required to calculate year round or winter impairment and a minimum of 3 samples to calculate summer impairment.

<sup>2</sup> As per the statewide bacteria objective, saline waters are those in which salinity exceeds 1 part per thousand more than 5% of the time during the calendar year. The Jenner Boat Launch meets this salinity threshold; the statewide enterococci objective is applied in the Willow Creek-Russian River HUC-12.

The data show that of the 43 HUC-12s within the Russian River Watershed, *E. coli* concentrations were measured in 20 of them. Only 14 of the HUC-12s had a sufficient number of data, as per the 303(d) Listing Policy, to calculate exceedances. Nine of these exceeded the water quality objective at a frequency consistent with the 303(d) Listing Policy so as to be identified as impaired. These 9 impaired HUC-12s include: West Slough-Dry Creek, Upper Laguna de Santa Rosa, Lower Laguna de Santa Rosa, Upper Santa Rosa Creek, Lower Santa Rosa Creek, Porter Creek-Mark West Creek, Green Valley Creek, Porter Creek-Russian River, and Dutch Bill Creek-Russian River.

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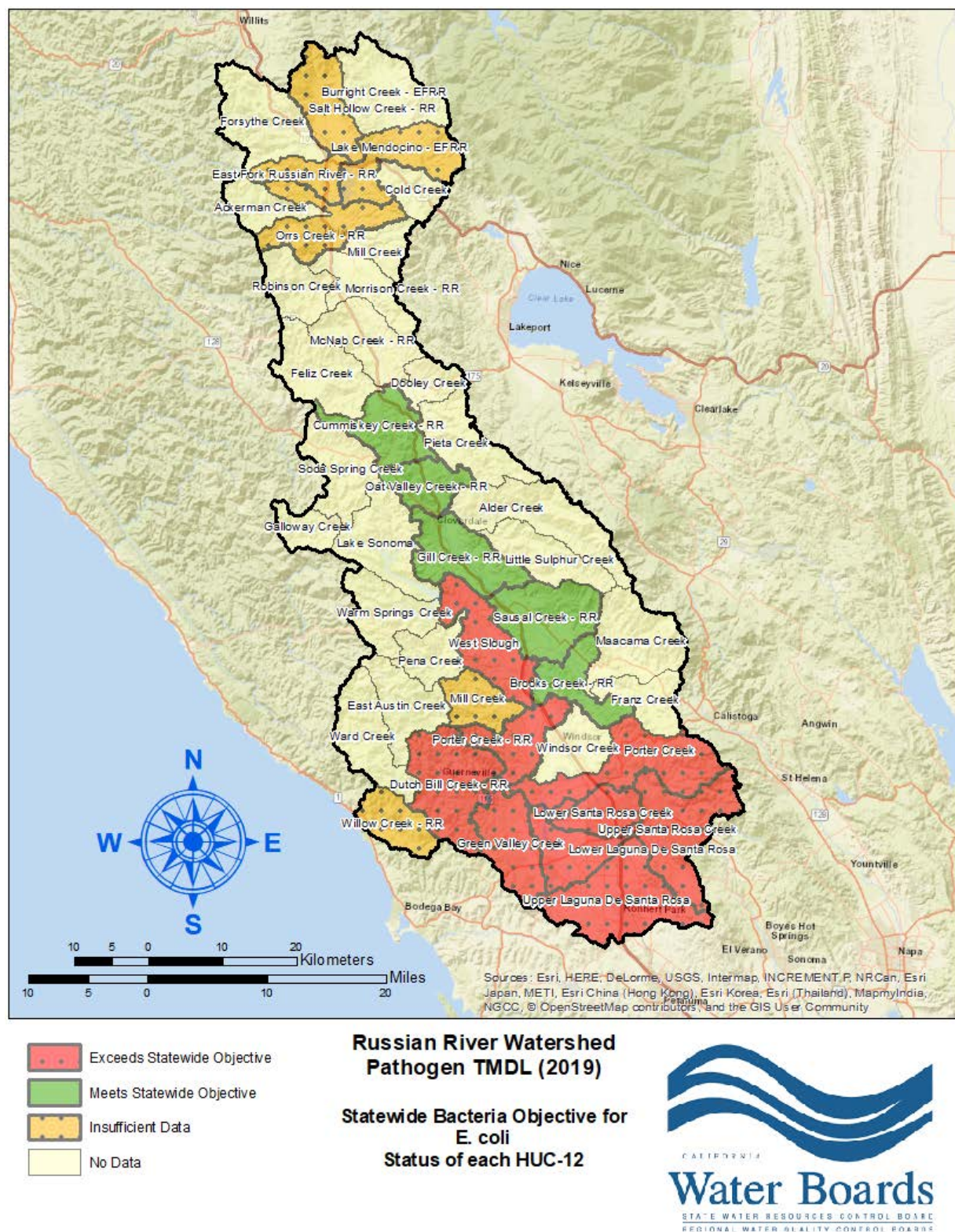


Figure 4.2: Exceedances Of Bacteria Objectives For E. Coli

#### 4.43 ASSESSMENT OF ENTEROCOCCI BACTERIA CONCENTRATIONS

Enterococci bacteria data from the Russian River Watershed were compiled from three agencies: the Regional Water Board, the Sonoma County Water Agency, and the University of California (UC) Davis Aquatic Ecosystems Analysis Laboratory. Sample locations are representative of the range of streams and rivers in the watershed. Water samples were collected at 29 locations from 2001 to 2013 for analysis of enterococci bacteria concentrations (NCRWQCB 2012, 2013a, 2013b).

Water samples were analyzed by IDEXX Enterolert and were either undiluted or serially diluted 1:10, resulting in a minimum reporting limit of 1 or 10 MPN/100 mL and a maximum reporting limit of 2,419 or 24,196 MPN/100 mL. Sample measurements below and above analytical reporting limits are called censored data. When bacteria concentration results were beyond any of these limits, the reporting limit was substituted for censored data. For the most part, data were assessed using a static/discrete 30-day averaging approach (Butkus 2013b). Discrete 30-day periods were defined based on the Julian calendar date of each year (i.e., 30-day period 1 for Julian days 1-30; 30-day period 2 for Julian days 31-60, etc.). For enterococci data collected from locations meeting the salinity threshold of the statewide bacteria objective for saline waters, the geometric mean was calculated as a rolling 6-week average, as specified by the State Water Board. Data in the Willow Creek HUC-12 (i.e., the estuary) were treated this way. The national criteria for enterococci are set as a geometric mean (30 cfu/100 mL) or the statistical threshold value (110 cfu/100 mL) to ensure no more than 32 illnesses per 1000 recreators, as defined by U.S. EPA (2012).

Enterococci bacteria concentrations measured at each specific sampling location were assessed using the enterococci criteria of the geometric mean (30 cfu/100mL) or the statistical threshold value (110 cfu/100mL) for 32 illnesses per 1000 recreators. These criteria are taken from U.S. EPA (2012), which establishes fecal indicator bacteria criteria based on *E. coli* and enterococci bacteria for the protection of public health in freshwater streams. While the draft statewide bacteria objective is based on the *E. coli* criteria established in U.S. EPA (2012), only While the statewide bacteria objective for freshwater is based on *E. coli*, one of the scientific peer reviewers of this project strongly recommended use of U.S. EPA (2012) enterococci bacteria criteria in freshwater because of the strength of the epidemiological relationships. For this TMDL, any findings of pollution/impairment derived from assessment of enterococci data in freshwaters required a second line of evidence of potential pathogen exposure, namely public health advisories for recreational beaches. Use of enterococci bacteria in freshwater as a line of evidence in this project affirms the importance of scientific peer review, strengthens the conclusions regarding fecal waste pollution, and is allowed under state law. Though, record of a public health advisory for a recreational beach alone would be sufficient evidence of beneficial use impairment. The results of the assessment for enterococci bacteria concentrations are presented in Figure 4.23 and Table 4.3 for discrete 30-day averaging periods.



Of the 43 HUC-12s in the Russian River Watershed, enterococci concentrations were measured in 20 of them. Of these, 14 HUC-12s had sufficient data, as per the 303(d) Listing Policy, to calculate exceedances. All 14 showed rates of exceedance above the exceedance frequencies recommended in the 303(d) Listing Policy. These include: Cummisky Creek-Russian River, Oat Valley Creek-Russian River, Sausal Creek-Russian River, Brooks Creek-Russian River, West Slough-Dry Creek, Upper Laguna de Santa Rosa, Lower Laguna de Santa Rosa, Upper Santa Rosa Creek, Lower Santa Rosa Creek, Porter Creek-Mark West Creek, Green Valley Creek, Porter Creek-Russian River, Dutch Bill Creek-Russian River, and Willow Creek-Russian River. The Willow Creek HUC-12 data was compared to the statewide objective for enterococci due to its applicability based on salinity data, thereby apply the 6 week rolling average geomean.

**Table 4.3 Enterococci Bacteria Data in the Russian River**

Enterococcus results for freshwaters are compared to U.S. EPA Criteria

Hydrologic Area	Hydrologic Sub Area	Hydrologic Unit 12	4 week Static Geometric Mean <sup>1</sup>	30-day Statistical Threshold Value <sup>1</sup>
Upper Russian River	Coyote Valley	Burright Creek-East Fork Russian River	-	-
		Cold Creek	-	-
		Lake Mendocino-East Fork Russian River	0/0	1/1
	Forsythe Creek Ukiah	Forsythe Creek	-	-
		Salt Hollow Creek-Russian River	1/1	0/1
		East Fork Russian River-Russian River	0/0	1/1
	Sulphur Creek	Little Sulphur Creek	-	-
		Alder Creek-Big Sulphur Creek	-	-
	Ukiah	Ackerman Creek	-	-
		Mill Creek	-	-
		Orrs Creek-Russian River	0/2	0/2
		Robinson Creek	-	-
		Morrison Creek-Russian River	-	-
		Dooley Creek	-	-
		McNab Creek-Russian River	-	-
		Feliz Creek	-	-
		Pieta Creek	-	-
		<b>Cummisky Creek-Russian River</b>	<b>14/27</b>	<b>6/27</b>
Middle Russian River	Geyserville	<b>Oat Valley Creek-Russian River</b>	<b>7/17</b>	<b>2/17</b>
		Gill Creek-Russian River	1/3	2/3
		<b>Sausal Creek-Russian River</b>	<b>18/42</b>	<b>14/42</b>
		Franz Creek	-	-
		Maacama Creek	-	-
		<b>Brooks Creek-Russian River</b>	<b>19/87</b>	<b>10/87</b>
		Galloway Creek	-	-
	Warm Springs	Soda Spring Creek-Dry Creek	-	-
		Warm Springs Creek	-	-
		Lake Sonoma-Dry Creek	-	-
		Pena Creek	-	-
		Mill Creek	4/4	2/4

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**Table 4.3 Enterococci Bacteria Data in the Russian River**

Enterococcus results for freshwaters are compared to U.S. EPA Criteria

	Laguna	<b>West Slough-Dry Creek</b>	<b>17/18</b>	<b>15/18</b>
		<b>Upper Laguna de Santa Rosa</b>	<b>19/20</b>	<b>16/20</b>
		<b>Lower Laguna de Santa Rosa</b>	<b>14/17</b>	<b>13/17</b>
	Santa Rosa	<b>Upper Santa Rosa Creek</b>	<b>10/11</b>	<b>9/11</b>
		<b>Lower Santa Rosa Creek</b>	<b>37/42</b>	<b>29/42</b>
	Mark West	Windsor Creek	-	-
		<b>Porter Creek-Mark West Creek</b>	<b>5/7</b>	<b>3/7</b>
Lower Russian River	Guerneville	East Austin Creek	-	-
		Ward Creek-Austin Creek	-	-
		<b>Green Valley Creek</b>	<b>13/18</b>	<b>14/18</b>
		<b>Porter Creek-Russian River</b>	<b>14/50</b>	<b>9/50</b>
		<b>Dutch Bill Creek-Russian River</b>	<b>42/137</b>	<b>36/137</b>
		<b>Willow Creek-Russian River</b>	5/66	<b>7/32</b>

\* Locations that exceed the water quality standards are shown in **Bold** font

<sup>1</sup> The ratio shown represents the number of calculations that exceed either the geometric mean (100 cfu/100 mL) or the statistical threshold value (320 cfu/100 mL) over the total number of geomeans or STVs that were calculated. A minimum of 5 samples are required to calculate year round or winter impairment and a minimum of 3 samples to calculate summer impairment.

<sup>2</sup> The statewide bacteria objective includes a geomean and STV for enterococci, which applies to saline waters. Saline waters are those in which salinity exceeds 1 part per thousand more than 5% of the time during the calendar year. The Jenner Boat Launch meets this salinity threshold; the enterococci objective (e.g., geomean calculated on a 6 week rolling basis) is applied in the Willow Creek-Russian River HUC-12.

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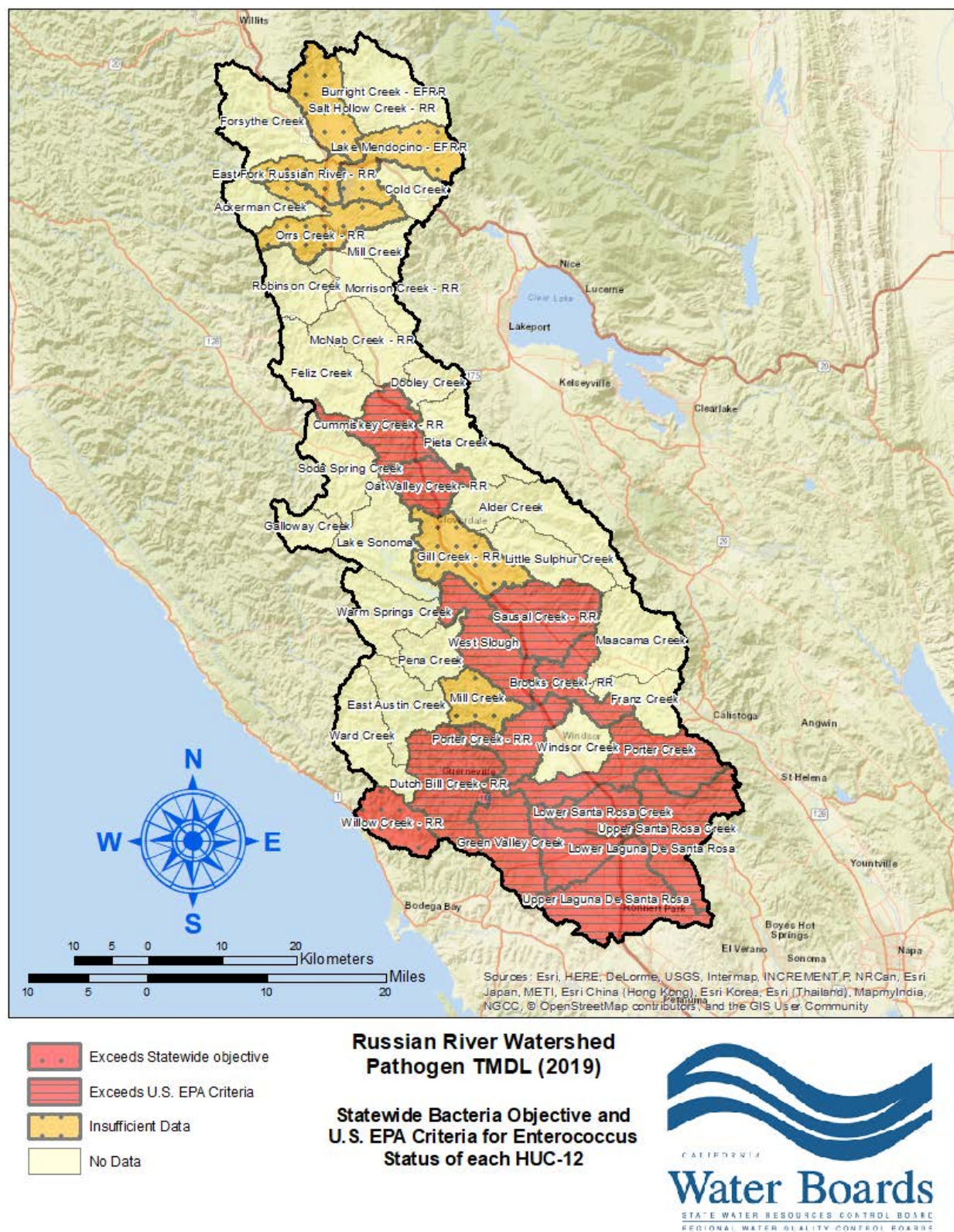


Figure 4.3: Exceedances Of Bacteria Objectives For Enterococcus



#### 4.4 ASSESSMENT OF BACTEROIDES BACTERIA CONCENTRATIONS

Regional Water Board staff collected water samples for measurement of human-specific and bovine-specific *Bacteroides* bacteria at numerous locations in the Russian River Watershed from 2011 to 2013 (NCRWQCB 2012; NCRWQCB 2013a; NCRWQCB 2013b). Sample locations represent the range of streams and rivers in the watershed. Staff collected samples from waterbodies during both wet and dry periods and from a range of flows. Sample sites were located in waterbodies that drain the wide range of land uses (from urban to undeveloped) and geomorphic features (from bedrock to alluvial landscapes) in the watershed.

*Bacteroides* bacteria are a suitable indicator of a waterbody's bacteriological quality since the bacteria come from the gastrointestinal systems of mammals, they degrade rapidly outside of the body, and technology is available to trace the bacteria back to specific types of animals, including humans and domestic animals.

Human-specific and bovine-specific *Bacteroides* bacteria data were compared to the current laboratory reporting limit of 60 gene copies/100 mL for human-specific *Bacteroides* and 30 gene copies/100 mL for bovine-specific *Bacteroides*. Any measurements above the reporting limit indicate a high likelihood that fecal waste material is present and the bacteriological quality of the water has been degraded. Human-specific *Bacteroides* were analyzed with the HuBac genetic marker and the Bovine-specific *Bacteroides* were analyzed with the BoBac genetic marker following U.S. EPA (2010) Method B. The median concentrations of human-specific *Bacteroides* measured at each location in the Russian River Watershed are shown in Figure 4.3 and listed in Table 4.4 for the Russian River mainstem and Table 4.5 for Russian River tributaries. The median concentrations of bovine-specific *Bacteroides* measured at each location in the Russian River Watershed are shown in Figure 4.4 and listed in Table 4.6 for the Russian River mainstem and Table 4.7 for Russian River tributaries. Staff were unable to identify a well-accepted threshold for *Bacteroides* that relates to public health protection. For reporting purposes the median concentrations of human-specific and bovine-specific *Bacteroides* measured at each location in the mainstem Russian River Watershed and tributaries are shown in Figures 4.4 and 4.5 and listed in Tables 4.4 and 4.5, respectively. The HUC-12s generally can be stratified based on the order of magnitude of median *Bacteroides* concentration with the lowest concentrations (e.g., 10-100 gene copies/100 mL) indicating weak evidence and the highest concentrations (>10,000 gene copies/100 mL) indicating very strong evidence of water quality degradation. As a general recommendation, those HUC-12s with the highest median *Bacteroides* concentrations should be considered for additional monitoring, as necessary. High concentrations of human-specific *Bacteroides* bacteria indicate the presence in the respective HUC-12 of human fecal sources requiring control. High concentrations of bovine-specific *Bacteroides* bacteria indicate the presence in the respective HUC-12 of bovine fecal sources requiring control.

Assessment of the human-specific *Bacteroides* bacteria data shows that bacteria from human waste are widespread throughout the Russian River Watershed. Human-specific *Bacteroides* bacteria are present at levels that exceed the current laboratory reporting limit (60 gene copies/100mL for human-specific *Bacteroides*) in all 17 mainstem locations, and in all but one of the 35 tributary locations sampled by Regional Water Board staff. Of the 179 samples collected in these 52 sites, 95% of the samples exceed the analytical reporting limit, meaning that 95% of the samples contain detectable levels of human-waste--source *Bacteroides* bacteria. Of the 43 HUC-12 subwatersheds in the Russian River watershed, human-specific *Bacteroides* bacteria data were collected in 17 of them. All HUC-12 median values (e.g., 17 of 17) exceeded 500 gene copies/100 mL. 15 of 17 HUC-12 median values exceeded 1,000 gene copies/100 mL. 4 of 17 HUC-12 median values exceeded 10,000 gene copies/100 mL. Table 4.4 and Figure 4.4 summarize these results.

**Table 4.4 Human-specific *Bacteroides* in the Russian River**

Human-specific *Bacteroides* were analyzed with the HuBac genetic marker following U.S. EPA (2010) Method B

Hydrologic Area	Hydrologic Sub Area	Hydrologic Unit 12	Median Human-specific <i>Bacteroides</i> (gene copies/100 mL) <sup>1</sup>	Number of <i>Bacteroides</i> measurements
Upper Russian River	Coyote Valley	Burright Creek-East Fork Russian River	-	-
		Cold Creek	-	-
		Lake Mendocino-East Fork Russian River	5,949	3
	Forsythe Creek Ukiah	Forsythe Creek	-	-
		Salt Hollow Creek-Russian River	979	3
		East Fork Russian River-Russian River	3,275	3
	Sulphur Creek	Little Sulphur Creek	-	-
		Alder Creek-Big Sulphur Creek	-	-
	Ukiah	Ackerman Creek	-	-
		Mill Creek	-	-
		<b>Orrs Creek-Russian River</b>	<b>10,548</b>	<b>6</b>
		Robinson Creek	-	-
		Morrison Creek-Russian River	-	-
		Dooley Creek	-	-
		McNab Creek-Russian River	-	-
		Feliz Creek	-	-
		Pieta Creek	-	-
		Cummisky Creek-Russian River	1,898	5
Middle Russian River	Geyserville	Oat Valley Creek-Russian River	1087	2
		Gill Creek-Russian River	573	3
		Sausal Creek-Russian River	5,560	17
		Franz Creek	-	-
		Maacama Creek	-	-
		Brooks Creek-Russian River	8,053	25
	Warm Springs	Galloway Creek	-	-
		Soda Spring Creek-Dry Creek	-	-
		Warm Springs Creek	-	-
		Lake Sonoma-Dry Creek	-	-

**Table 4.4 Human-specific *Bacteroides* in the Russian River**

Human-specific *Bacteroides* were analyzed with the HuBac genetic marker following U.S. EPA (2010) Method B

Hydrologic Area	Hydrologic Sub Area	Hydrologic Unit 12	Median Human-specific <i>Bacteroides</i> (gene copies/100 mL) <sup>1</sup>	Number of <i>Bacteroides</i> measurements
		Pena Creek	-	-
		Mill Creek	-	-
		West Slough-Dry Creek	4,040	5
	Laguna	Upper Laguna de Santa Rosa	-	-
		Lower Laguna de Santa Rosa	7,469	2
	Santa Rosa	Upper Santa Rosa Creek	2,727	2
		<b>Lower Santa Rosa Creek</b>	<b>32,909</b>	<b>2</b>
	Mark West	Windsor Creek	-	-
		Porter Creek-Mark West Creek	-	-
Lower Russian River	Guerneville	East Austin Creek	-	-
		Ward Creek-Austin Creek	-	-
		<b>Green Valley Creek</b>	<b>17,016</b>	<b>2</b>
		<b>Porter Creek-Russian River</b>	<b>48,200</b>	<b>7</b>
		Dutch Bill Creek-Russian River	4,750	59
		Willow Creek-Russian River	3,781	3

<sup>1</sup> HUC-12 subwatersheds, where the median number of gene copies of human-specific *Bacteroides* per 100 mL exceed a threshold of 10,000 are highlighted in **bold** font. These are HUC-12 subwatersheds with strong evidence of the presence of human fecal waste in surface waters.

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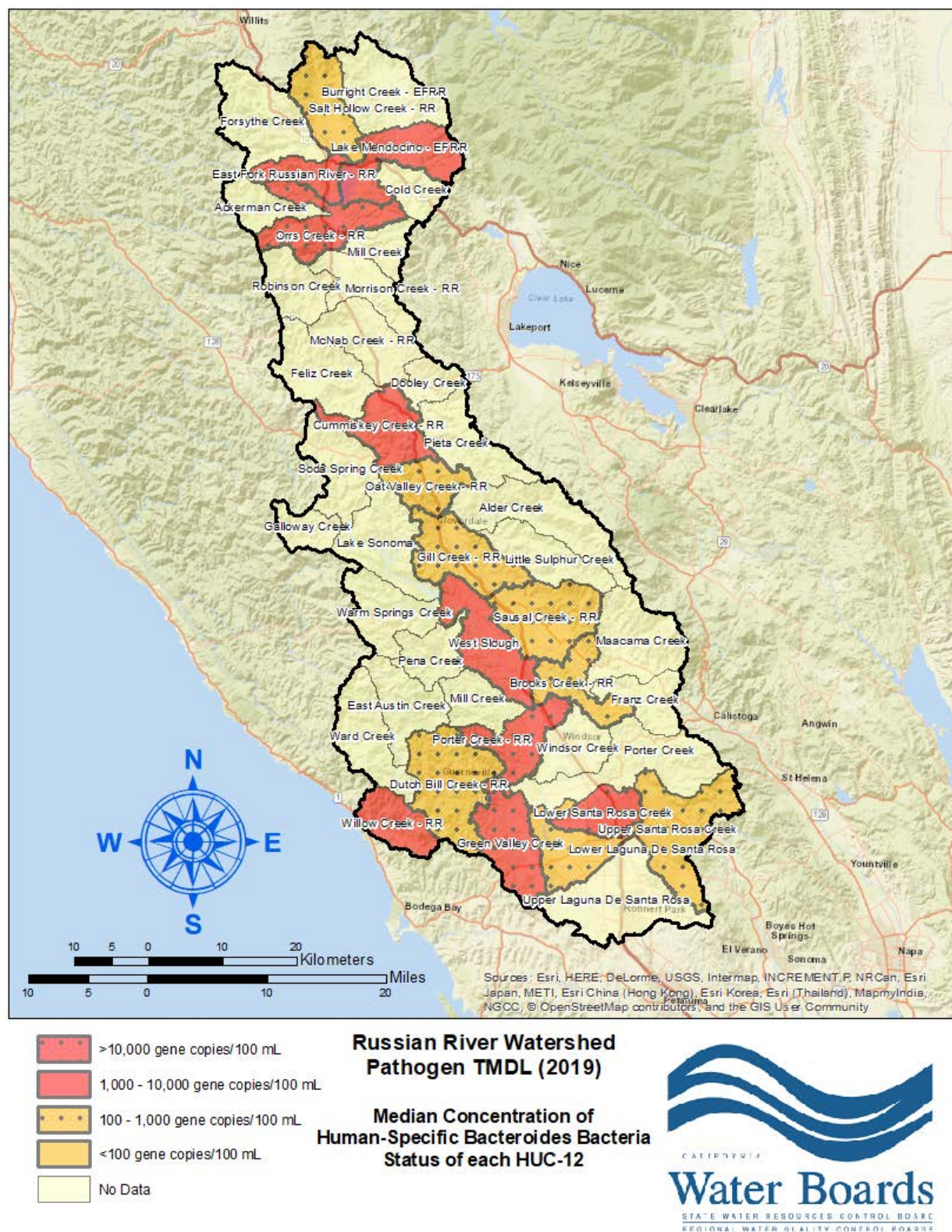


Figure 4.4: Median Concentration Of Human-Specific Bacteroides



For bovine-specific *Bacteroides* bacteria, quantifiable levels were found in all 11 mainstem locations, and in all but one of the 19 tributary locations sampled. Of the 83 samples collected, 95% of the samples also exceed the analytical reporting limit (30 gene copies/100mL for bovine-specific *Bacteroides*), meaning that 95% of the samples contain detectable levels of bovine ~~wastesource~~ *Bacteroides* bacteria.

Of the 43 HUC-12 subwatersheds, 11 HUC-12s were sampled for bovine-specific *Bacteroides* bacteria. All but Green Valley Creek HUC-12 showed median concentrations exceeding 100 gene copies/100 mL. 4 of the 11 HUC-12 subwatersheds sampled showed median concentrations exceeding 1,000 gene copies/100 mL, and Porter Creek-Russian River HUC-12 showed median concentrations of 23,684 gene copies/100 mL. The higher the median concentration of bovine-specific *Bacteroides* bacteria, the greater the certainty that discharges of bovine fecal waste occur within the identified HUC-12 subwatershed. Table 4.5 and Figure 4.5 summarize these data.

**Table 4.5 Bovine-specific *Bacteroides* in the Russian River**

Bovine-specific *Bacteroides* were analyzed with the BoBac genetic marker following U.S. EPA (2010) Method B

Hydrologic Area	Hydrologic Sub Area	Hydrologic Unit 12	Median Bovine-specific <i>Bacteroides</i> (gene copies/100 mL) <sup>1</sup>	Number of <i>Bacteroides</i> measurements
Upper Russian River	Coyote Valley	Burright Creek-East Fork Russian River	-	-
		Cold Creek	-	-
		Lake Mendocino-East Fork Russian River	-	-
	Forsythe Creek Ukiah	Forsythe Creek	-	-
		Salt Hollow Creek-Russian River	-	-
		East Fork Russian River-Russian River	-	-
	Sulphur Creek	Little Sulphur Creek	-	-
		Alder Creek-Big Sulphur Creek	-	-
	Ukiah	Ackerman Creek	-	-
		Mill Creek	-	-
		Orrs Creek-Russian River	-	-
		Robinson Creek	-	-
		Morrison Creek-Russian River	-	-
		Dooley Creek	-	-
		McNab Creek-Russian River	-	-
		Feliz Creek	-	-
		Pieta Creek	-	-
Middle Russian River	Geyserville	Cummisky Creek-Russian River	5,413	2
		Oat Valley Creek-Russian River	710	2
		Gill Creek-Russian River	-	-
		Sausal Creek-Russian River	175	4
		Franz Creek	-	-
		Maacama Creek	-	-
		Brooks Creek-Russian River	286	4
	Warm Springs	Galloway Creek	-	-

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**Table 4.5 Bovine-specific *Bacteroides* in the Russian River**

Bovine-specific *Bacteroides* were analyzed with the BoBac genetic marker following U.S. EPA (2010) Method B

Hydrologic Area	Hydrologic Sub Area	Hydrologic Unit 12	Median Bovine-specific <i>Bacteroides</i> (gene copies/100 mL) <sup>1</sup>	Number of <i>Bacteroides</i> measurements
		Soda Spring Creek-Dry Creek	-	-
		Warm Springs Creek	-	-
		Lake Sonoma-Dry Creek	-	-
		Pena Creek	-	-
		Mill Creek	-	-
		West Slough-Dry Creek	-	-
	Laguna	Upper Laguna de Santa Rosa	-	-
		Lower Laguna de Santa Rosa	272	2
	Santa Rosa	Upper Santa Rosa Creek	181	2
		Lower Santa Rosa Creek	7,765	2
	Mark West	Windsor Creek	-	-
		Porter Creek-Mark West Creek	-	-
Lower Russian River	Guerneville	East Austin Creek	-	-
		Ward Creek-Austin Creek	-	-
		Green Valley Creek	72	2
		<b>Porter Creek-Russian River</b>	<b>23,684</b>	<b>2</b>
		Dutch Bill Creek-Russian River	133	24
		Willow Creek-Russian River	2,682	2

<sup>1</sup> HUC-12 subwatersheds, where the median number of gene copies of bovine-specific *Bacteroides* per 100 mL exceed a threshold of 10,000 are highlighted in **bold** font. These are HUC-12 subwatersheds with good evidence that bovine fecal waste has been discharged.

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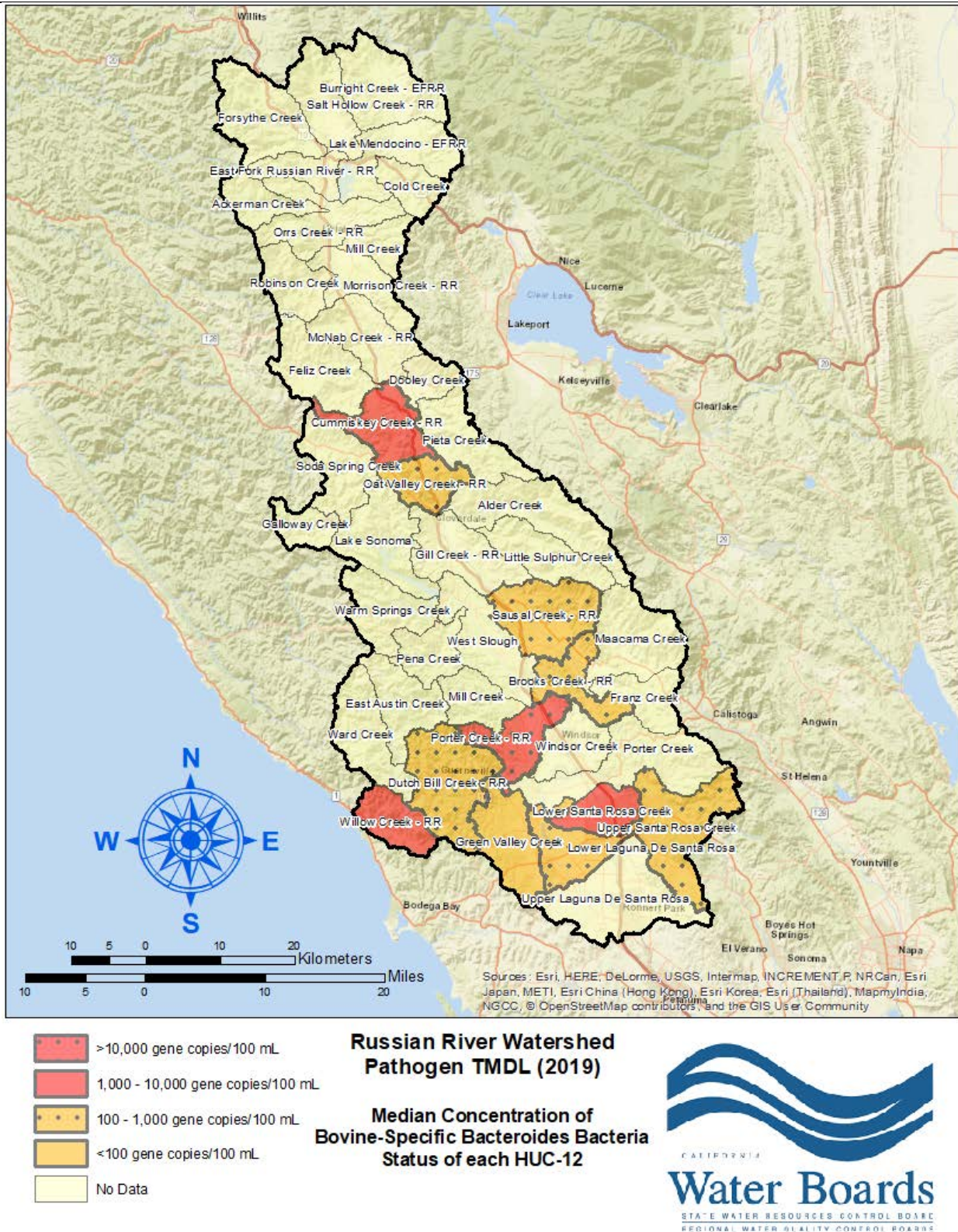


Figure 4.5: Median Concentration Of Bovine-Specific Bacteroides

## 4.5 MICROBIOLOGICAL SOURCE IDENTIFICATION

Regional Water Board staff conducted a monitoring study to attribute the animal sources of fecal waste to elevated fecal indicator bacteria concentrations in surface waters of the Russian River Watershed from 2011 to 2013 (NCRWQCB 2012, 2013a, 2013b, 2013c). The monitoring study included microbiological source identification in the watershed. Over one hundred samples were analyzed during this study by the Lawrence Berkeley National Laboratory using the PhyloChip™ phylogenetic DNA microarray in order to estimate the percentages of bacteria in water samples that matched DNA profiles for reference fecal waste sources. The analysis methods and results (Dubinsky and Anderson 2014) are summarized in this section and ~~in a memo to the file record (Butkus 2014a), which can be found on the Regional Water Board website.~~ Dubinsky and Anderson (2014) recommend a threshold of 20% DNA match as significant. The results of the study help to determine whether human or grazer fecal waste is the likely source of exceedances of the ~~draft~~ statewide *E. coli* objective or U.S. EPA (2012) enterococci criteria, at those locations where exceedances were measured. Also, the results provide another line of evidence of fecal waste pollution, distinguishing between anthropogenic and natural sources of fecal waste.

### 4.5.1 METHODS

The Lawrence Berkeley National Laboratory collected, composited, and cataloged specific DNA profiles of fecal waste from humans, grazing mammals, and birds. This library of DNA profiles included human waste samples from raw sewage, septic waste, and feces. The DNA profile for grazing mammals included samples of droppings from cows, horses, deer, and elk. The profile for birds included samples of droppings from gulls and pelicans. Water samples from the Russian River Watershed were then compared to the library of DNA profiles from known human, grazer, and bird wastes to determine the percentage of bacteria DNA gene sequences that matched the known profiles.

Regional Water Board staff collected multiple water samples from monitoring locations in the Russian River Watershed during both wet and dry seasons in order to analyze for *E. coli*, enterococci, and *Bacteroides* bacteria, as well as DNA profiles. Sets of all samples were analyzed for *E. coli*, enterococci, and *Bacteroides* bacteria. However, due to cost, not all water samples were immediately analyzed to assess for fecal DNA profile. Instead, a set of each water sample collected was frozen to be analyzed later using the phylogenetic DNA microarray. Frozen water samples were later thawed and analyzed using the phylogenetic DNA microarray when any of the other fecal bacteria measurements were shown to be elevated.

### 4.5.2 RESULTS

~~There is a wide range~~ Presented in Tables 4.6, 4.7, and 4.8 below are summaries of human fecal waste DNA matches found in the Russian River and its tributaries. PhyloChip™ results for human, grazer, and bird fecal waste sources, respectively. These summary tables present the maximum and median gene sequence percent match per HUC-12



subwatershed. Sample locations where the gene sequence percent match exceeds 20% represent locations where a source of fecal waste are mapped in Figure 4.5, based on percent requires control. HUC-12 subwatersheds where the median gene sequence percent match exceeds 20% represents a subwatershed where relevant activities require control. Please note that only 15 of the 43 HUC-12 subwatersheds were measured using the PhyloChip™ DNA microarray technique.

Of the 15 HUC-12 subwatersheds monitored using the PhyloChip™ DNA match. The ten locations with the highest microarray technique, 4 contained locations where the median human gene sequence percent match exceeds 20%, indicating sources of human fecal waste measured are shown in Table 4.7. The highest percent matches are found in the that require control. These include Upper Laguna de Santa Rosa and the Guerneville Hydrologic Subareas in the lower, Lower Santa Rosa Creek, Porter Creek-Russian River, and Dutch Bill Creek-Russian River. For example, in water samples collected in an unnamed stream in Monte Rio at Foothill Drive, 89% of the measured. Similarly, these same HUC-12 subwatersheds contained locations with evidence that grazer fecal waste requires control. Of these, Lower Santa Rosa Creek and Porter Creek-Russian River HUC-12 subwatersheds also contain bovine-specific *Bacteroides* bacteria DNA gene concentrations at levels that indicate that bovine species are the source of the grazer fecal waste requiring control. Further, the PhyloChip™ data indicates that the Upper Laguna de Santa Rosa HUC-12 as a whole requires efforts to control grazer fecal waste discharge.

Exceedances of *E. coli* bacteria objectives can sometimes be caused by high concentrations of bird fecal waste. To assess this possible source as a cause of *E. coli* exceedances, the PhyloChip™ assessment included measurement of bird gene sequences match known human waste. None of the HUC-12 subwatersheds measured showed bird gene sequences exceeding the 20% threshold, though the Lower Santa Rosa Creek HUC-12 contained a sample location measuring 19% bird fecal waste match.

**Table 4.6 Bacteria DNA sequences – Human Fecal Waste**

Human fecal waste were analyzed using PhyloChip

Hydrologic Area	Hydrologic Sub Area	Hydrologic Unit 12	Max of Gene Sequence Percent Match <sup>1</sup>	Median of Gene Sequence Percent Match	Number of Gene Sequence Measurements
Upper Russian River	Coyote Valley	Burright Creek-East Fork Russian River	-	-	-
		Cold Creek	-	-	-
		Lake Mendocino-East Fork Russian River	-	-	-
	Forsythe Creek Ukiah	Forsythe Creek	-	-	-
		Salt Hollow Creek-Russian River	-	-	-
		East Fork Russian River-Russian River	-	-	-
	Sulphur Creek	Little Sulphur Creek	-	-	-
		Alder Creek-Big Sulphur Creek	-	-	-
	Ukiah	Ackerman Creek	-	-	-
		Mill Creek	-	-	-

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**Table 4.6 Bacteria DNA sequences – Human Fecal Waste**

Human fecal waste were analyzed using PhyloChip

Hydrologic Area	Hydrologic Sub Area	Hydrologic Unit 12	Max of Gene Sequence Percent Match <sup>1</sup>	Median of Gene Sequence Percent Match	Number of Gene Sequence Measurements
		Orrs Creek-Russian River	-	-	-
		Robinson Creek	-	-	-
		Morrison Creek-Russian River	-	-	-
		Dooley Creek	-	-	-
		McNab Creek-Russian River	-	-	-
		Feliz Creek	-	-	-
		Pieta Creek	-	-	-
		Cummisky Creek-Russian River	1	0.5	2
Middle Russian River	Geyserville	Oat Valley Creek-Russian River	1	1	2
		Gill Creek-Russian River	-	-	-
		Sausal Creek-Russian River	5	2	8
		Franz Creek	-	-	-
		Maacama Creek	-	-	-
		Brooks Creek-Russian River	10	2	8
	Warm Springs	Galloway Creek	-	-	-
		Soda Spring Creek-Dry Creek	-	-	-
		Warm Springs Creek	-	-	-
		Lake Sonoma-Dry Creek	-	-	-
		Pena Creek	-	-	-
		Mill Creek	6	4	2
		West Slough-Dry Creek	16	5	5
	Laguna	<b>Upper Laguna de Santa Rosa</b>	<b>24</b>	10	10
		Lower Laguna de Santa Rosa	9	1	4
	Santa Rosa	Upper Santa Rosa Creek	5	3	2
		<b>Lower Santa Rosa Creek</b>	<b>32</b>	6	8
	Mark West	Windsor Creek	-	-	-
		Porter Creek-Mark West Creek	5	3	2
Lower Russian River	Guerneville	East Austin Creek	-	-	-
		Ward Creek-Austin Creek	-	-	-
		Green Valley Creek	1	1	2
		<b>Porter Creek-Russian River</b>	<b>54</b>	7	7
		<b>Dutch Bill Creek-Russian River</b>	<b>89</b>	2	36
		Willow Creek-Russian River	16	2	3

<sup>1</sup> HUC-12 subwatersheds, where the percent gene sequence match of a sample to a known source of fecal waste exceeds 20% are highlighted in **bold font**. These are HUC-12 subwatersheds with good evidence that human fecal waste has been discharged in amounts requiring further monitoring and/or control.

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**Table 4.7 Bacteria DNA sequences – Grazer Fecal Waste**

Grazer fecal waste were analyzed using PhyloChip

Hydrologic Area	Hydrologic Sub Area	Hydrologic Unit 12	Max of Gene Sequence Percent Match <sup>1</sup>	Median of Gene Sequence Percent Match	Number of Gene Sequence Measurements
Upper Russian River	Coyote Valley	Burright Creek-East Fork Russian River	-	-	-
		Cold Creek	-	-	-
		Lake Mendocino-East Fork Russian River	-	-	-
	Forsythe Creek Ukiah	Forsythe Creek	-	-	-
		Salt Hollow Creek-Russian River	-	-	-
		East Fork Russian River-Russian River	-	-	-
	Sulphur Creek	Little Sulphur Creek	-	-	-
		Alder Creek-Big Sulphur Creek	-	-	-
	Ukiah	Ackerman Creek	-	-	-
		Mill Creek	-	-	-
		Orrs Creek-Russian River	-	-	-
		Robinson Creek	-	-	-
		Morrison Creek-Russian River	-	-	-
		Dooley Creek	-	-	-
		McNab Creek-Russian River	-	-	-
		Feliz Creek	-	-	-
		Pieta Creek	-	-	-
		Cummisky Creek-Russian River	3	2	2
Middle Russian River	Geyserville	Oat Valley Creek-Russian River	2	1	2
		Gill Creek-Russian River	-	-	-
		Sausal Creek-Russian River	14	2	8
		Franz Creek	-	-	-
		Maacama Creek	-	-	-
		Brooks Creek-Russian River	7	2	8
	Warm Springs	Galloway Creek	-	-	-
		Soda Spring Creek-Dry Creek	-	-	-
		Warm Springs Creek	-	-	-
		Lake Sonoma-Dry Creek	-	-	-
		Pena Creek	-	-	-
		Mill Creek	8	8	2
		West Slough-Dry Creek	6	3	5
	Laguna	<b>Upper Laguna de Santa Rosa</b>	<b>34</b>	<b>22</b>	10
		Lower Laguna de Santa Rosa	17	2	4
	Santa Rosa	Upper Santa Rosa Creek	6	3	2
		<b>Lower Santa Rosa Creek</b>	<b>36</b>	6	8
	Mark West	Windsor Creek	-	-	-
		Porter Creek-Mark West Creek	4	3	2
Lower Russian River	Guerneville	East Austin Creek	-	-	-
		Ward Creek-Austin Creek	-	-	-
		Green Valley Creek	5	3	2
		<b>Porter Creek-Russian River</b>	<b>20</b>	2	7
		<b>Dutch Bill Creek-Russian River</b>	<b>23</b>	2	36
		Willow Creek-Russian River	4	3	3

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<sup>1</sup> HUC-12 subwatersheds, where the percent gene sequence match of a sample to a known source of fecal waste exceeds 20% are highlighted in **bold font**. These are HUC-12 subwatersheds with good evidence that grazer fecal waste has been discharged in amounts requiring further monitoring and/or control.

**Table 4.8 Bacteria DNA sequences – Bird Fecal Waste**

Bird fecal waste were analyzed using PhyloChip

Hydrologic Area	Hydrologic Sub Area	Hydrologic Unit 12	Max of Gene Sequence Percent Match	Median of Gene Sequence Percent Match	Number of Gene Sequence Measurements
Upper Russian River	Coyote Valley	Burright Creek-East Fork Russian River	-	-	-
		Cold Creek	-	-	-
		Lake Mendocino-East Fork Russian River	-	-	-
	Forsythe Creek Ukiah	Forsythe Creek	-	-	-
		Salt Hollow Creek-Russian River	-	-	-
		East Fork Russian River-Russian River	-	-	-
	Sulphur Creek	Little Sulphur Creek	-	-	-
		Alder Creek-Big Sulphur Creek	-	-	-
	Ukiah	Ackerman Creek	-	-	-
		Mill Creek	-	-	-
		Orrs Creek-Russian River	-	-	-
		Robinson Creek	-	-	-
		Morrison Creek-Russian River	-	-	-
		Dooley Creek	-	-	-
		McNab Creek-Russian River	-	-	-
		Feliz Creek	-	-	-
		Pieta Creek	-	-	-
		Cummisky Creek-Russian River	3	3	1
Middle Russian River	Geyserville	Oat Valley Creek-Russian River	3	3	1
		Gill Creek-Russian River	-	-	-
		Sausal Creek-Russian River	-	-	-
		Franz Creek	-	-	-
		Maacama Creek	-	-	-
		Brooks Creek-Russian River	8	4	4
	Warm Springs	Galloway Creek	-	-	-
		Soda Spring Creek-Dry Creek	-	-	-
		Warm Springs Creek	-	-	-
		Lake Sonoma-Dry Creek	-	-	-
		Pena Creek	-	-	-
		Mill Creek	12	12	1
		West Slough-Dry Creek	11	6	3
	Laguna	Upper Laguna de Santa Rosa	10	8	5
		Lower Laguna de Santa Rosa	7	6	2
	Santa Rosa	Upper Santa Rosa Creek	7	7	1
		Lower Santa Rosa Creek	19	12	4
	Mark West	Windsor Creek	-	-	-
		Porter Creek-Mark West Creek	6	6	1
	Guerneville	East Austin Creek	-	-	-

**Table 4.8 Bacteria DNA sequences – Bird Fecal Waste**

Bird fecal waste were analyzed using PhyloChip

Hydrologic Area	Hydrologic Sub Area	Hydrologic Unit 12	Max of Gene Sequence Percent Match	Median of Gene Sequence Percent Match	Number of Gene Sequence Measurements
Lower Russian River		Ward Creek-Austin Creek	-	-	-
		Green Valley Creek	-	-	-
		Porter Creek-Russian River	11	9	3
		Dutch Bill Creek-Russian River	10	6	13
		Willow Creek-Russian River	4	3	2

<sup>1</sup> HUC-12 subwatersheds, where the percent gene sequence match of a sample to a known source of fecal waste exceeds 20% are highlighted in **bold** font. These are HUC-12 subwatersheds with good evidence that bird fecal waste has been discharged in amounts requiring further monitoring and/or control.

## 4.6 ASSESSMENT OF PATHOGENIC SPECIES

Pathogenic bacteria and protozoans are occasionally measured directly without relying on indicator bacteria species, and the ability to do so is increasing with continuing advances in DNA technology. This section describes detections of pathogenic organisms and provides additional evidence of fecal waste pollution.

### 4.6.1 PATHOGENIC BACTERIA DETECTIONS

Regional Water Board staff collected water samples from 2011 to 2013 (NCRWQCB 2012, 2013a, 2013b). This monitoring focused on microbiological source identification in the middle and lower Russian River Watershed. As described above, over one hundred samples were analyzed by the Lawrence Berkeley National Laboratory using the PhyloChip™ phylogenetic DNA microarray, which evaluates 16S rRNA gene sequences to identify different bacteria taxa. Taxa were identified, but not quantified. The analysis results (Dubinsky and Anderson 2014) are summarized in this section and in a memo to the file record (Butkus 2014a).

Over 10,000 different bacteria taxa were identified in the samples from the Russian River Watershed. Most of the taxa detected are in the Actinobacteria phylum, Flavobacteria order, and Proteobacteria phylum of bacteria, which are naturally abundant in freshwater and soil, and do not likely originate from human or animal fecal waste sources. However, a substantial number of taxa in the Bacteroidia class, Clostridia class, Bacilli class, and Verrucomicrobia phylum of bacteria were also found in the samples. These taxa likely originate from fecal waste sources and individual pathogenic species are found within these taxa groups.

The human health risk associated with the presence of pathogenic bacteria is unknown since detection of a pathogenic species does not necessarily indicate that illness will occur. Some pathogenic bacteria are only pathogenic under certain circumstances, such as contact

with an open wound. Additionally, there can be more than one strain of a particular bacterium species, and not all strains are pathogenic. The results of the PhyloChip™ analysis, as presented in Table 4.89, show a list of bacteria species found in the Russian River Watershed that have the potential to be human pathogens and cause illness.

<b>Table 4.9 Potential Human Pathogens Detected in the Russian River Watershed</b>				
Pathogenic Bacteria Species	Health Impact	Number of Locations with Detected Species		Percent of Samples with Detected Bacteria
		Mainstem	Tributaries	
<i>Proteus mirabili</i>	Urinary Tract Infections	1	10	11%
<i>Salmonella enterica</i>	Gastroenteritis	1	9	10%
<i>Serratia marcescens</i>	Infections, Pneumonia, Meningitis	3	27	41%
<i>Shigella flexneri</i>	Gastroenteritis	0	15	16%
<i>Staphylococcus epidermidis</i>	Infections	3	13	22%
<i>Staphylococcus haemolyticus</i>	Infections	2	0	2%
<i>Yersinia sp.</i>	Plague	4	7	15%

#### 4.6.2 CRYPTOSPORIDIUM AND GIARDIA DETECTIONS

The Sonoma County Water Agency (SCWA) conducted monitoring for *Cryptosporidium* and *Giardia* oocysts in the Russian River near Wohler Bridge from 2004 through 2006 as part of their Sanitary Survey as shown in Table 4.910 (Palencia & Archibald 2013). The SCWA found three *Giardia* cysts and five *Cryptosporidium* oocysts out of 660 L of water from 48 samples. *Giardia lamblia* and *Cryptosporidium parvum* are pathogens that can cause gastrointestinal illness. The low number of *Cryptosporidium* oocysts detected meant no additional treatment is needed for the drinking water collected from the Russian River near Wohler Road (71 FR 775).

<b>Table 4.10 Cryptosporidium and Giardia Detections in the Russian river near Wohler Bridge</b> (data from Palencia and Archibald, 2013)		
Collection Date	<i>Cryptosporidium</i> (oocysts/L)	<i>Giardia</i> (cysts/L)
3/9/2004	0.1	-
5/18/2004	-	0.1

**Table 4.10 Cryptosporidium and Giardia Detections in the Russian river near Wohler Bridge**

(data from Palencia and Archibald, 2013)

Collection Date	<i>Cryptosporidium</i> (oocysts/L)	<i>Giardia</i> (cysts/L)
12/26/2004	0.2	-
3/2/2005	0.1	0.1
3/23/2005	0.1	-
8/8/2005	0.1	0.1
1/10/2006	-	0.1

#### **4.7 SECTION 303(D) IMPAIRED WATER LISTINGS**

The 2012 Section 303(d) List of Impaired Waters was approved by the Regional Water Board on August 14, 2014 and State Water Board on April 8, 2015. The list was approved by U.S. EPA on July 30, 2015.<sup>16</sup> The List identifies six waterbody-pollutant pairs in the Russian River Watershed as not attaining the Bacteria Water Quality Objective and therefore, not supporting the REC 1 beneficial use. In order to determine whether a waterbody should be listed as impaired on the 2012 Section 303(d) List, instream measurements of *E. coli* and fecal coliform bacteria concentrations collected and submitted prior to August 2010 were assessed. The data used in the listing decisions is available online at . The data assessment supporting the listings provides a line of evidence of fecal waste pollution and pathogen impairment in the Russian River Watershed. The listed waterbodies include the Russian River at Veterans Memorial Beach, Russian River reach between the confluences of Fife Creek in Guerneville and Dutch Bill Creek in Monte Rio, an unnamed stream near Healdsburg at Fitch Mountain, Laguna de Santa Rosa and tributaries, Santa Rosa Creek and tributaries, Green Valley Creek and tributaries, and mainstem Dutch Bill Creek (Table 1.1 and Figure 1.1).

For the Section 303(d) List assessment, *E. coli* data were compared against the draft California Department of Health Services (CDHS 2006) guidance for posting advisories at fresh water beaches. The draft guidance identifies a single sample concentration level of 235 MPN/100 mL as a threshold for posting a beach advisory to inform swimmers of potential risk. The draft guidance also recommends a 30-day average value of 126 MPN/100 mL applied on a rolling basis.

State Water Board staff determined that the 2012 U.S. EPA Recreational Water Quality Criteria (U.S. EPA 2012) would not be applied to data submitted for the 2012 Integrated

<sup>16</sup> The list was partially approved by U.S. EPA on June 26, 2015.

Report cycle, as the data had already been assessed and lines of evidence developed by the time the criteria were finalized. In the interest of expedience, State Water Board staff directed the Regional Water Boards to move forward with the existing lines of evidence and to utilize the 2012 U.S. EPA criteria for the next Integrated Report cycle. Thus, the evaluation guideline for *E. coli* utilized to interpret the Basin Plan objective is cited from the “California Department of Health Services Draft Guidance for Fresh Water Beaches” (CADHS 2011), which is the same as that recommended in the U.S. EPA document “Ambient Water Quality Criteria for Bacteria-1986” (U.S. EPA 1986).

*E. coli* data used in the listing process were also used to inform the TMDL Action Plan. Since that assessment was completed, additional data have been collected, criteria have been updated, and assessment methods have improved. Data were reassessed in accordance with improved criteria and methods, and the results are described in this chapter. Data collected both before and after 2010 were assessed and utilized in the development of the TMDL Action Plan.

Detailed information on listing decisions and respective lines of evidence can be found at:-

## 4.7 PUBLIC HEALTH ADVISORIES

Local agencies use information on fecal indicator bacteria concentrations to post streams with public health advisories that warn against swimming and water recreation. The City of Santa Rosa posts a permanent advisory for swimming in Santa Rosa Creek at Prince Memorial Greenway. This advisory is based on FIB fecal indicator bacteria concentrations measured in the stream near the Railroad Street Bridge. The Sonoma County Department of Health Services uses FIB fecal indicator bacteria data to temporarily post Russian River beaches when concentrations exceed the California Department of Health thresholds during the summer recreation season. Table 4.4011 lists the number of days with posted advisories each year since 2001 (Tyler 2013; SCDHS 2014). Between 2001 and 20142018, Russian River beaches were posted with advisories on 157175 days.

*E. coli* bacteria concentration data used by the City of Santa Rosa and the County of Sonoma for posting advisories were assessed and utilized in the development of the Action Plan, and the results are described in this chapter.



**Table 4.11 Russian River Beach Advisories Issued by the Sonoma Co. Department of Health Services**

Year	Number of Beaches Sampled	Number of Posted Advisories (Days)
2001	6	0
2002	6	1
2003	6	1
2004	6	0
2005	6	0
2006	6	1
2007	6	3
2008	6	11
2009	10	80
2010	6	5
2011	7	7
Total Days Posted 2001-2011		109
2012	9	36
2013	8	9
2014	9	3
2015	12	6
2016	10	2
2017	10	8
2018	10	2
Total Days Posted Since 2012		66

## 4.8 SUMMARY

This chapter presents ~~eight multiple~~ lines of evidence that human and domestic animal fecal waste discharge is widespread throughout the Russian River Watershed, with the potential to impact the REC-1 beneficial use through human exposure to illness-causing pathogens. Fecal coliform data are compared to the bacteria objective for REC 1 protection in the Basin Plan to assess exceedance of standards. Similarly (Table 4.12). *E. coli* data are compared to the ~~draft statewide bacteria objective~~ objectives for freshwater to determine exceedance of superseding standards. Enterococci data ~~are compared to statewide bacteria objectives for saline waters and U.S. EPA (2012) criteria~~, for freshwater. Direct measurement of pathogenic species, and the history of public health advisories are used to assess the evidence of a risk to public health. Finally, *Bacteroides* bacteria data and PhyloChip™ phylogenetic DNA microarray results are used to confirm a relationship between indicator bacteria exceedances and human and domestic animal fecal waste discharge, ~~so as to confirm the veracity of standards and public health criteria exceedances.~~ Finally, direct measurement of pathogenic species provides evidence that exposure to pathogens is a real risk to human health.

Table 4.12 and Figure 4.6 present a summary of the relevant data.

**Table 4.12 Weight of Evidence Summary Table**

Hydrologic Area	Hydrologic Sub Area	Hydrologic Unit 12	<i>E. coli</i> <sup>1</sup>	Public Health Advisory <sup>2</sup>	Enterococcus <sup>3</sup>	Human <i>Bacteroides</i> <sup>4</sup>	Bovine <i>Bacteroides</i> <sup>4</sup>	Human DNA <sup>5</sup>	Grazer DNA <sup>5</sup>
Upper Russian River	Coyote Valley	Burright Creek-East Fork Russian River	-	-	-	-	-	-	-
		Cold Creek	-	-	-	-	-	-	-
		Lake Mendocino-East Fork Russian River	×	-	×	×	-	-	-
	Forsythe Creek Ukiah	Forsythe Creek	-	-	-	-	-	-	-
		Salt Hollow Creek-Russian River	×	-	×	×	-	-	-
		East Fork Russian River-Russian River	×	-	×	×	-	-	-
	Sulphur Creek	Little Sulphur Creek	-	-	-	-	-	-	-
		Alder Creek-Big Sulphur Creek	-	-	-	-	-	-	-
	Ukiah	Ackerman Creek	-	-	-	-	-	-	-
		Mill Creek	-	-	-	-	-	-	-
		Orrs Creek-Russian River	×	-	×	×	-	-	-
		Robinson Creek	-	-	-	-	-	-	-
		Morrison Creek-Russian River	-	-	-	-	-	-	-
		Dooley Creek	-	-	-	-	-	-	-
		McNab Creek-Russian River	-	-	-	-	-	-	-
		Feliz Creek	-	-	-	-	-	-	-
		Pieta Creek	-	-	-	-	-	-	-
		Cummisky Creek-Russian River	×	-	☒	×	×	×	×
Middle Russian River	Geyserville	<b>Oat Valley Creek-Russian River</b>	×	☒	☒	×	×	×	×
		Gill Creek-Russian River	×	☒	×	×	×	-	-
		<b>Sausal Creek-Russian River</b>	×	☒	☒	×	×	×	×
		Franz Creek	-	-	-	-	-	-	-
		Maacama Creek	-	-	-	-	-	-	-
		<b>Brooks Creek-Russian River</b>	×	☒	☒	×	×	×	×
	Warm Springs	Galloway Creek	-	-	-	-	-	-	-
		Soda Spring Creek-Dry Creek	-	-	-	-	-	-	-
		Warm Springs Creek	-	-	-	-	-	-	-
		Lake Sonoma-Dry Creek	-	-	-	-	-	-	-
		Pena Creek	-	-	-	-	-	-	-
		Mill Creek	×	-	×	-	-	×	×
		<b>West Slough-Dry Creek</b>	☒	-	☒	×	×	×	×
	Laguna	<b>Upper Laguna de Santa Rosa</b>	☒	-	☒	-	-	×	×
		<b>Lower Laguna de Santa Rosa</b>	☒	-	☒	×	×	×	×
	Santa Rosa	<b>Upper Santa Rosa Creek</b>	☒	☒	☒	×	×	×	×
		<b>Lower Santa Rosa Creek</b>	☒	☒	☒	×	×	×	×
	Mark West	Windsor Creek	-	-	-	-	-	-	-
		<b>Porter Creek-Mark West Creek</b>	☒	-	☒	-	-	×	-
Lower Russian River	Guerneville	East Austin Creek	-	-	-	-	-	-	-
		Ward Creek-Austin Creek	-	-	-	-	-	-	-
		<b>Green Valley Creek</b>	☒	-	☒	×	×	×	×
		<b>Porter Creek-Russian River</b>	☒	☒	☒	×	×	×	×
		<b>Dutch Bill Creek-Russian River</b>	☒	☒	☒	×	×	×	×

**Table 4.12 Weight of Evidence Summary Table**

Hydrologic Area	Hydrologic Sub Area	Hydrologic Unit 12	<i>E. coli</i> <sup>1</sup>	Public Health Advisory <sup>2</sup>	Enterococcus <sup>3</sup>	Human <i>Bacteroides</i> <sup>4</sup>	Bovine <i>Bacteroides</i> <sup>4</sup>	Human DNA <sup>5</sup>	Grazer DNA <sup>5</sup>
		<b>Willow Creek-Russian River<sup>6</sup></b>	×	-	⊗	×	×	×	×

\* The parameters collected in each HUC-12 subwatershed are indicated with an “x” in the relevant parameter column. HUC-12 subwatersheds with parameters represented as “⊗” are locations where data exceeds either the statewide bacteria objective *E. coli* in freshwater or enterococci in saline waters or the REC-1 beneficial use is impacted due to public health advisories associated with recreational beaches. HUC-12 subwatersheds with exceedances of the national criteria for enterococci in freshwater are represented by the symbol “⊗”. *Bacteroides* and PhyloChip™ data that exceed the respective assessment thresholds are represented by a capital X. HUC-12 subwatersheds that are identified as impaired/polluted are shown in **bold** font.

<sup>1</sup> The statewide objective for *E. coli* bacteria in freshwater was used to assess impairment/pollution, applying the exceedance thresholds identified in the 303(d) Listing Policy.

<sup>2</sup> Any public health advisory posted since 2012 for a recreational beach in the Russian River watershed represents an impact to the recreational beneficial use. Only if these data were accompanied by exceedances of the national criteria for enterococci in freshwater were they used as the basis of an impairment/pollution finding.

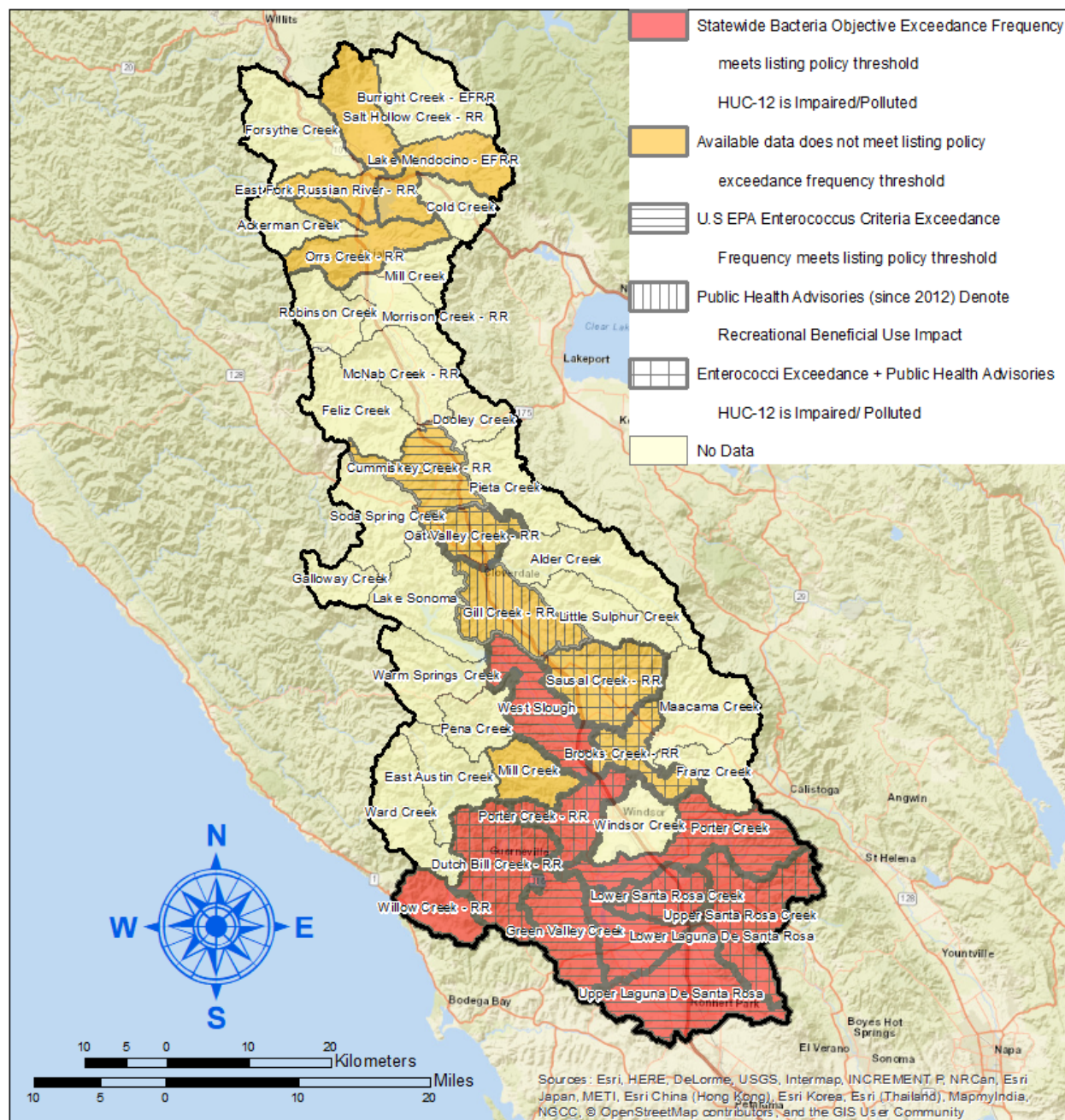
<sup>3</sup> The statewide objective for enterococci bacteria in saline water was used to assess impairment/pollution, applying the exceedance thresholds contained in the 303(d) Listing Policy. The national criteria for enterococci bacteria in freshwater was used to assess impairment/pollution, applying the exceedance thresholds contained in the 303(d) Listing Policy and requiring the additional evidence of public health advisories.

<sup>4</sup> *Bacteroides* bacteria data indicate the presence of relatively fresh fecal waste from the gut of its host (e.g., human, bovine). A threshold of at least 10,000 gene copies/100 mL was used as strong evidence of the presence of host fecal waste. These data were used for informational purposes, only.

<sup>5</sup> PhyloChip™ data indicate the percent of a sample that matches known gene sequences of specific source animals. A threshold of 20% gene sequence match with a known fecal waste source (e.g., human, grazer) was used as evidence of the presence of host fecal waste. These data were used for informational purposes, only.

<sup>6</sup> Salinity at the Jenner Boat Ramp in the Willow Creek HUC-12 meets the statewide bacteria objective’s threshold for saline waters. The statewide objectives for enterococci apply in this HUC-12.

Draft Staff Report  
for the Action Plan for the Russian River Pathogen TMDL



**Russian River Watershed  
Pathogen TMDL (2019)**

**Weight of Evidence Summary  
Impairment/Pollution  
Status of Each HUC-12**



Figure 4.6: Weight Of Evidence Summary

From these data, two specific findings can be made: 1) The E. coli, enterococci, and public health advisory data provide a rational basis for identifying the HUC-12 subwatersheds that are impaired/polluted and require specific attention with respect to source control and public health protection; 2) The body of data provides a rational basis for identifying areas deserving additional monitoring. Table 4.12 provides a summary of all the ambient water quality data collected. From these data, the following HUC-12 subwatersheds are identified as impaired/polluted:

- Oat Valley Creek-Russian River
- Sausal Creek-Russian River
- Brooks Creek-Russian River
- West Slough-Dry Creek
- Upper Laguna de Santa Rosa
- Lower Laguna de Santa Rosa
- Upper Santa Rosa Creek
- Lower Santa Rosa Creek
- Porter Creek-Mark West Creek
- Green Valley Creek
- Porter Creek-Russian River
- Dutch Bill Creek-Russian River
- Willow Creek-Russian River

From these data, the following HUC-12 subwatersheds are highlighted because though the data is too limited to draw impairment/pollution conclusions, there is nonetheless evidence of potential concern, which requires additional monitoring:

- Lake Mendocino-East Fork Russian River
- East Fork Russian River-Russian River
- Orrs Creek-Russian River
- Cummisky Creek-Russian River
- Gill Creek-Russian River

From this data summary, the following HUC-12 subwatersheds are highlighted because there is no recent data from which to draw clear conclusions:

- Burright Creek-East Fork Russian River
- Cold Creek
- Forsythe Creek
- Little Sulphur Creek
- Alder Creek-Big Sulphur Creek
- Ackerman Creek
- Mill Creek (Ukiah Hydrologic Subarea)

- Robinson Creek
- Morrison Creek-Russian River
- Dooley Creek
- McNab Creek-Russian River
- Feliz Creek
- Pieta Creek
- Franz Creek
- Maacama Creek
- Galloway Creek
- Soda Spring Creek-Dry Creek
- Warm Springs Creek
- Lake Sonoma-Dry Creek
- Pena Creek
- Windsor Creek
- East Austin Creek
- Ward Creek-Austin Creek

Chapter 6 describes the results of the source assessment conducted for this TMDL project, including an assessment of land cover types and their respective association with *E. coli*, enterococci, and *Bacteroides* bacteria. The *Bacteroides* bacteria concentration data and PhyloChip™ DNA microarray data point to both human and bovine sources of fecal waste as significant in much of the Russian River watershed.

## CHAPTER 5 NUMERIC TARGETS

### 5.1 OVERVIEW

It is sometimes necessary as part of a TMDL to establish indicators and numeric targets by which to measure progress towards attainment of the water quality objectives at issue ~~inapplicable to~~ the TMDL. The water quality objectives at issue in this pathogen TMDL are the ~~draft~~ statewide fecal indicator bacteria objectives based on *E. coli* in freshwater and enterococci in saline waters. For each of these fecal indicator bacteria, the statewide objectives establish a rolling 6-week geometric mean limitation and a monthly statistical threshold value, as described in Chapter 3 and summarized here. ~~The water quality objective has significance within the context of a TMDL because it~~ Direct measurement of the statewide bacteria objectives themselves is the regulatory endpoint upon which the TMDL is calculated. But with pathogens, the water quality objective also has significance within the context of public health protection. This chapter describes the use an adequate means of two separate instream indicators and numeric targets as appropriate when assessing tracking progress towards attainment of the draft limitations. There are no numeric targets other than the statewide bacteria objective objectives proposed for *E. coli* and protection of public health this pathogen TMDL.

### 5.2 E. COLI BACTERIA

As described in Chapter 3, the Regional Water Board adopted in 1975 a Basin Plan objective to protect REC-1, which was based on fecal coliform bacteria. At that time, fecal coliform was the standard indicator of fecal waste discharge and risk of pathogen exposure. Since that time, other, more reliable indicators have been developed. As such, fecal coliform is no longer recommended as the most effective indicator for REC-1 protection. The Basin Plan fecal coliform objective for the protection of REC-1 soon will be superseded by a statewide objective for bacteria based on more contemporary science. A draft statewide bacteria objective based on *E. coli* is now out for public review. For the purpose of this TMDL, the draft statewide *E. coli* objectives is used as the water quality objective endpoint. The draft statewide *E. coli* objectives are given as a geometric mean and a statistical threshold value, based on the number of colony forming units (cfu) per 100 mL of sample. These concentration-based objectives 1) are derived from epidemiological studies that relate known concentrations of *E. coli* to rates of gastrointestinal illness and 2) are set based on a rate of illness deemed acceptable for the protection of public health. *E. coli* concentrations are easily measured and require no surrogate to ensure their attainment. As such, the draft statewide *E. coli* objectives are proposed as numeric targets, as well, as shown in Table 5.1.



### 5.3—ENTEROCOCCI BACTERIA

The draft statewide *E. coli* objectives are derived from the most recent U.S. EPA REC-1 criteria document (USEPA 2012). U.S. EPA (2012) reviews the epidemiological evidence associated with both *E. coli* bacteria and enterococci bacteria in freshwater. One of the scientific peer reviewers of this TMDL project finds the epidemiological evidence relating health outcomes and enterococci concentrations particularly compelling. He strongly recommends use of U.S. EPA (2012) enterococci criteria for the protection of REC-1 uses in this TMDL. While measurement of enterococci bacteria cannot be used to assess compliance with the draft statewide *E. coli* objective, it can be said to 1) provide further evidence of public health protection and 2) provide a margin of safety against any uncertainty associated with *E. coli* measurements, alone. It is important to note that measured concentrations of both *E. coli* bacteria and enterococci bacteria are influenced by environmental conditions, sometimes resulting in false positives (that is erroneous quantification of concentrations exceeding the threshold value) or false negatives (that is erroneous quantification of concentrations below the threshold value). As such, monitoring, which indicates *E. coli* geometric means or statistical threshold values lower than the objective cannot be said with certainty to represent acceptable public health protection, depending on other environmental factors. As with this TMDL project generally, multiple lines of evidence are necessary to reduce uncertainties and ensure the best protection of public health. To this end, enterococci bacteria concentrations based on U.S. EPA (2012) and 32 gastrointestinal illnesses per 1000 recreators are included as a second numeric target.

### 5.2—PROPOSED NUMERIC TARGETS

Table 5.1 outlines the proposed numeric targets for *E. coli* and enterococci bacteria. The geometric mean is to be based on a rolling 6-week period, calculated weekly. A statistically relevant number of samples must be included, generally a minimum of 5 samples in a 6-week period. The Statistical Threshold Value (STV) is not to be exceeded any more than 10% of the time, calculated monthly. The *E. coli* targets are, identical to the draft statewide bacteria objectives. The enterococci targets are identical to the REC-1 criteria identified by U.S. EPA (2012), using illness rates identical to that used to establish the *E. coli* targets.



<b>Table 5.1 Fecal Indicator Bacteria and Target Conditions</b>			
<b>Applicable Waters</b>	<b>Objective Elements</b>	<b>Estimated Illness Rate (NGI):</b> 32 per 1,000 water contact recreators	
		<b>Magnitude</b>	
		<b>GM</b> (cfu/100 mL)	<b>STV</b> (cfu/100/mL)
All the waters where salinity is equal to or less than 1 ppth 95 percent of more of the time	<i>E. coli</i>	100	320
All the waters where salinity is greater than 1 ppth more than 5 percent of the time	Enterococci	30	110
<p>The waterbody GM shall not be greater than the applicable GM magnitude in any six-week interval, calculated weekly. The applicable STV shall not be exceeded by more than 10 percent of the samples collected in a CALENDAR MONTH, calculated in a static manner.</p> <p>NGI = National Epidemiological and Environmental Assessment of Recreational Water gastrointestinal illness rate  GM = geometric mean  STV = statistical threshold value  cfu = colony forming units  mL = milliliters  ppth = parts per thousand</p>			

Cfu = colony forming units; mL = milliliters

### 5.3 SUMMARY

Out of an abundance of caution and as a margin of safety, targets for two fecal indicator bacteria are proposed. The indicators and targets are selected because of the epidemiological evidence that links their measurement to health outcomes, as described in U.S. EPA (2012). These two indicators measure different bacteria, but under different scenarios are linked to similar health outcomes and are identically scaled to result in no more than 32 gastrointestinal illnesses per 1000 recreators. Should environmental factors cause measurement of either of the indicators to result in a false positive, then the results of the other will allow for better assessment and response. Such a margin of safety ensures greater certainty when assessing attainment of the water quality objective and protection of public health.

Attainment of the statewide bacteria objectives for the protection of REC-1 is best determined by measurement of the fecal indicator bacteria for which statewide objectives have been established. In the Russian River Watershed, the REC-1 beneficial use is designated as a year-round use and applies to all waters.

## CHAPTER 6 SOURCE ANALYSIS

### 6.1 OVERVIEW

A TMDL source analysis typically identifies the amount, timing, and point of origin of pollutants of concern, measured or estimated as loads or loading rates (e.g., pounds/acre or tons/mi<sup>2</sup>/year). The pollutant loading is then translated into load and waste load allocations, which together with a margin of safety represent the total maximum daily loading that will meet objectives.

This typical approach is somewhat modified when the pollutant of concern is bacteria. A modification is necessary for many reasons. 1) The water quality issue of concern with respect to fecal indicator bacteria is a public health concern related to the risk of exposure to pathogens. 2) The risk of exposure to pathogens is estimated by the presence of fecal indicator bacteria. 3) A given concentration of specific fecal indicator bacteria is associated with a number of illnesses per ~~1000~~1,000 recreators that is acceptable as defined by policy. 4) The presence of fecal indicator bacteria is an indication of fecal waste discharge. 5) Any discharge of human and/or domestic animal fecal waste increases the risk of pathogen exposure to recreators. 6) As a matter of general public health protection, there is no allowable load of fecal waste discharge that can ~~be considered to be~~ without any risk. 7) An obvious public health principle is to eliminate the discharge of fecal waste to waterbodies that support recreation and other human contact.

Given that any load of fecal waste discharge can pose a risk to human health, pathogen TMDLs generally take another approach. Pathogen TMDLs generally apply fecal indicator bacteria *concentrations* as the load and waste load allocations. Through the use of concentrations, policy makers assert the allowable number of illnesses per ~~1000~~1,000 recreators that constitute an acceptable public health risk. With respect to the development of a program of implementation, this approach serves to narrow the needs of a source analysis. Unlike mass-based load and wasteload allocations, where the mass of pollutant from each source adds up to the total allocation, concentration-based allocations do not add up to equal the TMDL. Rather, in order to achieve the concentration-based TMDL, each source must meet the concentration-based allocation. Under this approach, a source analysis simply needs to identify the categories of sources of fecal waste discharge, the places on the landscape where they exist, and the places where there is a high risk of fecal waste discharge such that its control is a high priority.

This chapter evaluates all potential sources of fecal waste discharge and identifies the major sources of fecal waste contributing to elevated concentrations of fecal indicator bacteria found in the surface waters of Russian River Watershed. Where there are geographic delineations made in this chapter, they are based on Hydrologic Subarea (HSA). Please see Chapter 1 for a cross-walk between HSAs and HUC-12, as necessary.

The source analysis is composed of two parts:

1. An assessment of elevated fecal indicator bacteria concentrations associated with different land cover categories.
2. An inventory of the types of point source and nonpoint source facilities and activities that discharge or have the potential to discharge fecal waste to surface waters.

The land cover assessment serves two purposes. 1) It helps to extend the evidence of pollution findings in Chapter 4 by associating FIB sampling results with land cover categories. 2) By establishing the land cover categories that are associated with evidence of pollution, it helps to confirm whether or not the inventory of potential sources is reasonably complete. The inventory of point and nonpoint source facilities and activities with the potential to discharge fecal waste represent all the known potential sources of fecal waste in the watershed. Section 6.6 Source Analysis Conclusions provides a summary of the sources requiring further control, which are associated with land cover types showing evidence of pollution. The program of implementation is designed to ensure additional assessment of individual facilities and activities, where the development of a new source control program may be necessary or existing programs may need updating.

## 6.2 SOURCES BY LAND COVER TYPE

Fecal indicator bacteria results described in Chapter 4 showed exceedance of U.S. EPA (2012) recommended criteria for statewide bacteria objectives for both *E. coli* in freshwater and enterococci in saline water during both wet and dry weather periods in multiple HUC-12s in the mainstem Russian River and most tributaries sampled in the watershed.<sup>17</sup> Similarly, exceedance of national criteria for enterococci in freshwater, coupled with other evidence of pollution, established several additional HUC-12s as impaired. Regional Water Board staff conducted studies to investigate the relationship between land cover types and fecal indicator bacteria in the surface waters of the Russian River Watershed. Regional Water Board staff assessed the relative contributions, magnitude, and variability of fecal indicator bacteria in the Russian River Watershed based on different land cover types during both dry and wet weather periods. Methods and sample concentration results are documented in a monitoring report by Regional Water Board staff (NCRWQCB 2012). An assessment of the data, including a statistical analysis, is documented in a memorandum (Butkus 2013a) on our website.<sup>18</sup> This section of the staff report summarizes the findings.

### 6.2.1 METHODS

Regional Water Board staff collected water samples from streams within the study area that drain subwatersheds primarily composed of one type of land use only, as a way of isolating the influence of different land uses on fecal indicator bacteria concentrations<sup>19</sup>.

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<sup>17</sup> ~~The U.S. EPA (2012) criteria for *E. coli*, which represents no more than 32 gastrointestinal illnesses per 1000 recreators, is identical to the draft statewide objective.~~

<sup>18</sup> [http://www.waterboards.ca.gov/northcoast/water\\_issues/programs/tmdls/russian\\_river/](http://www.waterboards.ca.gov/northcoast/water_issues/programs/tmdls/russian_river/)

<sup>19</sup> All the sampling locations drained watersheds with 50% or more of their area in one type of land cover category, except for sampling locations representing the developed non-sewered category. There was a

Five land cover categories were selected. These land cover categories were based on the National Land Cover Dataset (Fry et al. 2011) and Urban Service Areas (PRMD 2010). The land cover categories were defined through remote sensing by Anderson et al. (1976), and are summarized as follows:

- **Forest Land** – Areas with a 10 percent or more tree-crown areal density (crown closure percentage).
- **Shrubland** – Areas where the potential natural vegetation is predominantly grasses, grass-like plants, forbs, or shrubs. Anderson et al. (1976) previously defined this land cover as “Rangeland.” These areas do not include animal pastures or dry croplands.
- **Agriculture** – Areas were defined by visual indications of agricultural activity through distinctive geometric field or road patterns and the traces produced by livestock or mechanized equipment.
- **Developed Sewered** - Urban and residential areas identified by Fry et al. (2011) where much of the land is covered by structures including cities, towns, villages, strip developments along highways, transportation, power, and communications facilities. Residential land uses range from low density (where houses are on lots of more than an acre) to high density, multiple-unit structures. The boundaries of the Urban Service Areas (PRMD 2010) were used to identify those urban and residential areas that are sewered to receive domestic wastewater treatment.
- **Developed Non-Sewered** – Residential land uses identified by Fry et al. (2011) where the houses are outside of the boundaries of the Urban Service Areas (PRMD, 2010) and assumed to use individual onsite wastewater treatment systems (OWTS), cesspools, or direct discharges for disposal of domestic waste.

For each of the five land cover categories, six water samples were collected at three different locations during both wet and dry periods. Samples were analyzed for *E. coli*, enterococci, human-specific *Bacteroides*, and bovine-specific *Bacteroides* bacteria. Visual comparison and statistical hypothesis tests were made between different data groupings. More information on the assessment methods is available in Butkus (2013a).

The assessment of data was conducted prior to the adoption in August 2018 of statewide bacteria objectives for *E. coli* and enterococci. As such, the *E. coli* and enterococci data evaluated as part of the Land Cover Study were assessed using the national criteria for these indicators, choosing the criteria representing 32 gastrointestinal illnesses per 1,000 recreators. Importantly, the exceedance of the geometric mean criteria was calculated in a static manner, rather than a rolling manner as is now required by the new statewide objectives. The results of the Land Cover Study as first published in Butkus (2013a) and summarized in the 2015 draft Staff Report and again in the 2017 draft Staff Report have not been altered. Staff assert that the differences between the two methods of calculation though real are insignificant with respect to the purpose of the study. The numeric

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relatively low percentage of land in this category as developed non-sewered areas are interspersed with other categories, especially agricultural lands.

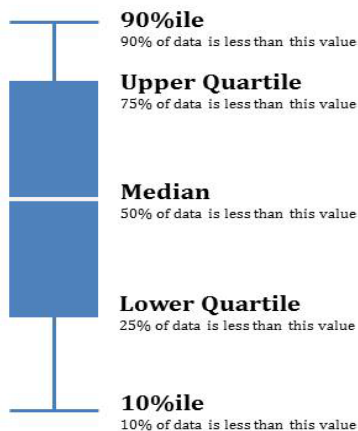


Figure 6.1 Data Example:  
Reading A Box And  
Whisker Plot

thresholds for both the national criteria reported here and the statewide bacteria objectives are identical.

## 6.2.2 RESULTS

The results of the land cover analysis are presented in box-and-whisker plots in Figures 6.2 through 6.5. A separate box and whisker plot is produced for each land cover type, each sampling season, and for each FIB. Figure 6.1 provides a visual explanation of how to read a box and whisker plot.

One of the key findings of the land cover assessment is that there is evidence of fecal waste discharge from all of the land cover categories evaluated. This is consistent with the findings reported in ~~Evidence of Pollution~~, Chapter 4. Also consistent with the findings in Chapter 4, the concentrations of FIB measured in surface waters is higher during the wet season than during the dry season.

While all land cover categories are associated with FIB, the concentrations measured in association with the Forestland cover type are significantly less than those measured in association with the other land cover types. Importantly, elevated public health risks, as measured by *E. coli* bacteria, appear to be most strongly associated with unsewered developed areas and shrubland<sup>20</sup> during both the dry and wet seasons. This finding points to onsite wastewater treatment systems (OWTS) as a potential year-round source of human fecal waste. Similarly, *E. coli* data is strongly associated with sewerred and unsewered developed areas during the wet season, suggesting that there are connections between sources of human fecal waste and storm water collection systems.

A stable isotope analysis, which measures oxygen and nitrogen in the water sample, was also conducted on samples from different land use categories to help identify the source of the water associated with the bacteria in samples. The results show that most of the nitrate measured in the samples was from soil, which was likely carried into the water column through rainfall-induced erosion. The results also show that several of the samples collected during wet weather in both sewerred and unsewered (OWTS) developed areas were likely derived from domestic wastewater, which suggests that storm events may be transporting untreated domestic wastewater from sanitary sewer overflows and exfiltration, failing sanitary sewer pipelines and sewer laterals, and failing septic systems into streams. Sampling under this study was conducted in such a manner as to prevent capture of permitted surface water discharges from municipal wastewater treatment facilities, by collecting samples upstream of treated effluent discharge locations.

Summary of Findings of the Land Cover Assessment: (Butkus 2013):

<sup>20</sup> Shrubland does not include animal pastures or dry cropland. But, it likely includes rural residential sites.

- ~~Human source *Bacteroides* bacteria are present in all locations and in all land use categories, demonstrating pervasive discharge of human fecal waste to surface waters of the Russian River Watershed.~~
- *E. coli*, enterococci, and *Bacteroides* bacteria concentrations in wet periods have statistically-significant higher concentrations than dry periods, indicating that fecal waste discharge is strongly influenced by storm water runoff patterns.
- Runoff from forest lands has statistically-significant lower concentrations of fecal indicator bacteria than runoff in all other assessed land cover categories. This suggests that inventorying potential sources of fecal waste from forestlands is relatively unimportant to the goal of reducing human fecal waste discharge.
- Runoff from shrublands, agricultural areas, and forested areas have statistically-significant lower *E. coli*, and enterococci, ~~and *Bacteroides* bacteria~~ concentrations than runoff from developed areas (both sewerred and non-sewerred areas). This suggests that inventorying potential sources of fecal waste in developed areas is relatively important to the goal of reducing human fecal waste discharge.
- *Bacteroides* bacteria concentrations are statistically the same for wet and dry period runoff draining from developed sewerred areas, developed areas with OWTS, agricultural areas and shrublands. This suggests that ~~there pervasive sources of fecal waste indicator bacteria may recognize the human signature associated with the potential to enter the surface waters of the Russian River Watershed during all times of the year~~ managed land cover types.
- *E. coli*, enterococci, and *Bacteroides* bacteria concentrations are statistically the same for wet and dry period runoff draining from developed sewerred areas and developed areas with OWTS. This suggests that ~~there are certain common features such as leaking septic system/sewer lines may be pervasive sources of fecal waste in developed areas, which have the potential to impact public health during all times of the year.~~

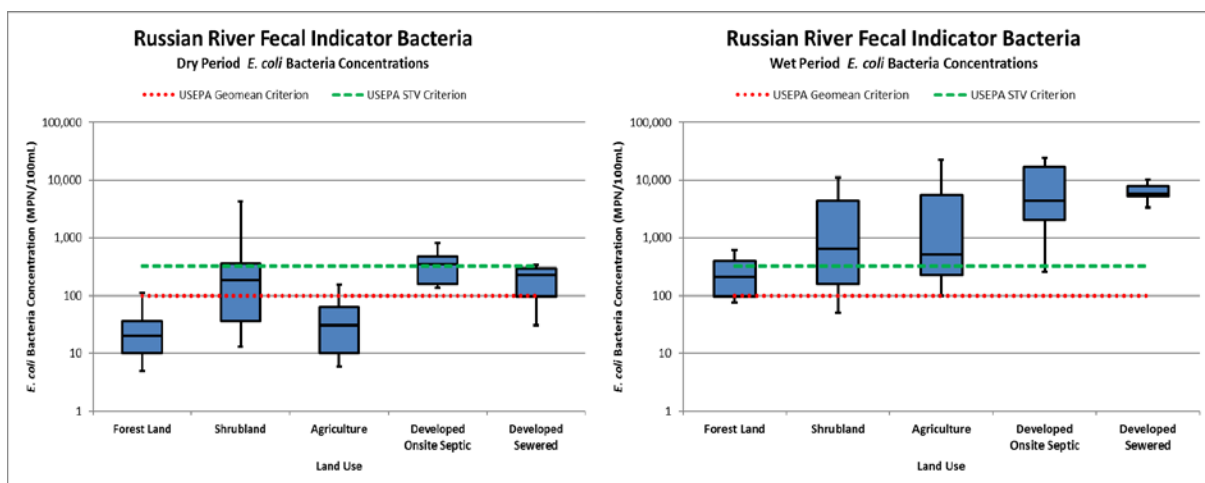


Figure 6.2: *E. Coli* Bacteria Concentrations Measured In The Russian River Watershed By Land Cover Category.

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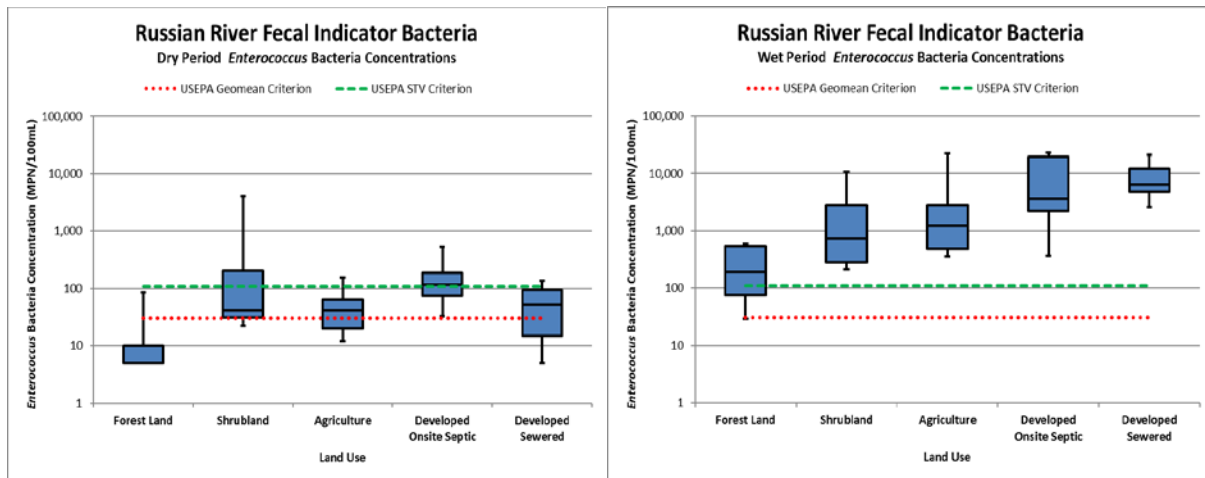


Figure 6.3: Enterococci Bacteria Concentrations Measured In The Russian River Watershed By Land Cover Category.

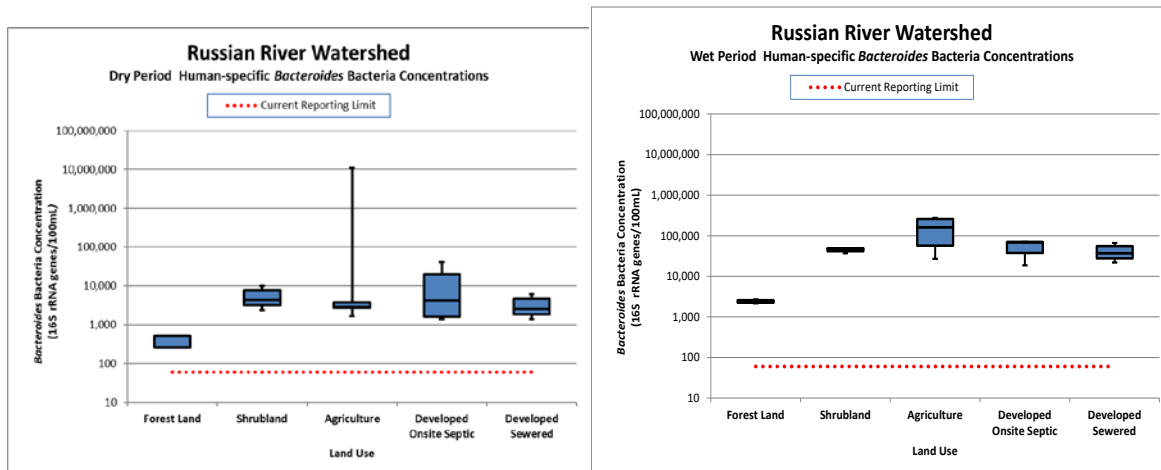


Figure 6.4: Human-Specific Bacteroides Bacteria Concentrations Measured In The Russian River Watershed By Land Cover Category.

Human-specific Bacteroides were analyzed with the HuBac genetic marker following U.S. EPA (2010) Method B.



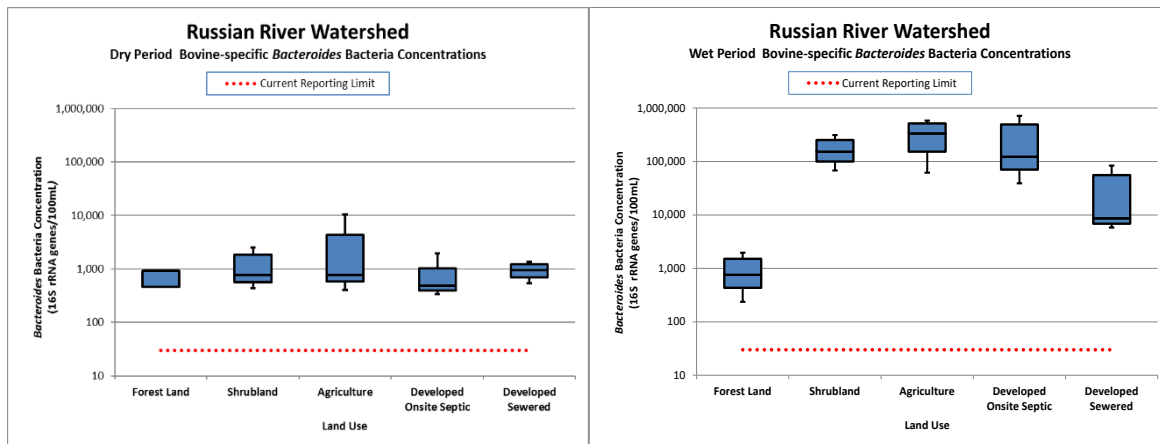


Figure 6.5: Bovine-Specific Bacteroides Bacteria Concentrations Measured In The Russian River Watershed During Dry Periods By Land Cover Category.

Bovine-specific Bacteroides were analyzed with the BoBac genetic marker following U.S. EPA (2010) Method B.

## 6.2.3 CONCLUSIONS

These data indicate that the inventory of potential sources of fecal waste must thoroughly consider all potential sources in developed areas, both sewered and unserved. It is the developed areas where fecal waste appears to be reaching surface waters of the Russian River Watershed during all times of the year, though in significantly higher concentrations during the wet season. It is also in the developed areas where the predominant fecal waste signature is from human sources, representing a higher potential for elevating exposure to illness-causing pathogens to those who recreate in the Russian River.

Storm water runoff appears to be a major pathway by which fecal waste enters surface waters of the Russian. Sources of fecal waste that have the potential to enter storm water collection systems will be important to inventory and evaluate. Similarly, sources of fecal waste in agricultural areas and shrublands, which have the potential to runoff the landscape during storms, are also important to inventory and evaluate. Conversely, inventorying fecal waste sources on forestlands is relatively unimportant to the overall goals.

## 6.3 POINT SOURCE FACILITIES AND ACTIVITIES

This section describes potential point sources of pathogens in the Russian River Watershed. Clean Water Act section 402 addresses direct discharges of waste into navigable waters. "Point source", as defined in the Clean Water Act, means any discernible, confined, and discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, or vessel or other floating craft. This term does not include agricultural storm water discharges and return flows from irrigated agriculture. (33 U.S.C. §1362). Point

source discharges to waters of the United States are regulated under the federal National Pollutant Discharge Elimination System (NPDES) program, through NPDES permits. Point source discharges to waters of the state are regulated in accordance with the Porter-Cologne Water Quality Control Act through waste discharge requirements (WDRs) that also serve as NPDES permits.

The point sources described in this section were identified by querying the California Integrated Water Quality System (CIWQS) database for existing facilities regulated by a NPDES permit.

### **6.3.1 WASTEWATER DISCHARGES TO SURFACE WATERS**

Wastewater discharges to surface waters in the Russian River Watershed occur from both direct permitted discharges of treated effluent and from unpermitted spills and leaks. The following sections identify potential sources in the watershed.

#### **6.3.1.1 MUNICIPAL WASTEWATER DISCHARGES TO SURFACE WATERS**

The watershed contains nine municipal wastewater treatment facilities authorized under NPDES permits to discharge treated domestic wastewater into surface waters. Table 6.1 summarizes these facilities (per information obtained from CIWQS in Nov. 2013) and describes their level of treatment. Figure 6.6 shows the locations of these facilities in the watershed. All facilities in the watershed treat to secondary or tertiary levels. Secondary treatment refers to physical, chemical, and biological unit processes used to meet federal standards in 40 C.F.R. §133.102 for biochemical oxygen demand (BOD), total suspended solids (TSS), and pH. Tertiary treatment is generally defined as treatment beyond secondary levels to achieve a higher level of BOD or TSS removal or to remove constituents of concern such as nutrients or toxic compounds.

To achieve water quality objectives, protect beneficial uses, protect public health, and prevent nuisance, surface water discharges within the Russian River are prohibited from May 15 through September 30. During the remainder of the year, discharges are limited to one percent of the flow volume in the receiving water unless specifically exempted in the NPDES permit. For authorized discharges of wastewater to the Russian River and its tributaries during October 1 through May 14, the Basin Plan requires that discharges of municipal waste “*shall be of advanced treated wastewater in accordance with effluent limitations contained in NPDES permits for each affected discharger, and shall meet a median coliform level of 2.2 MPN/100 mL.*” The Regional Water Board has defined advanced wastewater treatment in individual permits as treated effluent meeting, in part, disinfection standards, including total coliform thresholds, consistent with tertiary treated recycled water requirements set forth in title 22 of the California Code of Regulations.

Disinfection standards in existing municipal NPDES permits consist of effluent limitations for total coliform bacteria and other process requirements to ensure adequate effluent

disinfection. For surface water discharges, municipal NPDES permits are prescribed uniform effluent limitations for total coliform bacteria that require:

- The 7-day median concentration not exceed an MPN of 2.2 per 100 mL;
- The number of coliform bacteria not exceed an MPN of 23 per 100 mL in more than one sample in any 30-day period; and
- No single sample exceed an MPN of 240 total coliform bacteria per 100 mL.

In addition to effluent limitations for total coliform bacteria, existing municipal NPDES permits also require compliance with disinfection process requirements depending on the permitted facility's method of disinfection. For wastewater treatment facilities that employ an ultraviolet (UV) disinfection process, permittees are required to ensure a minimum UV dose, maintain a minimum UV transmittance, and perform appropriate operation and maintenance activities specified by Division of Drinking Water of the State Water Resources Control Board.

For wastewater treatment facilities that utilize chlorine as a means of disinfection, permittees must demonstrate a continuous chlorine residual after treatment or provide a minimum CT (the product of total chlorine residual and modal contact time) value of not less than 450 mg-min/L at all times.

Regional Water Board staff used discharger-specific effluent monitoring data from self-monitoring reports to assess total coliform bacteria concentrations in the effluent from these facilities. Table 6.1 shows that disinfection methods are highly effective at meeting effluent limitations for total coliform bacteria. Consequently, direct discharges to surface water of treated municipal wastewater that meet effluent limitations for bacteria and discharge specifications for disinfection are not considered a significant source of bacteria. See Section 6.3.1.2 for discussion of the potential for bacterial contamination from discharges from holding ponds.

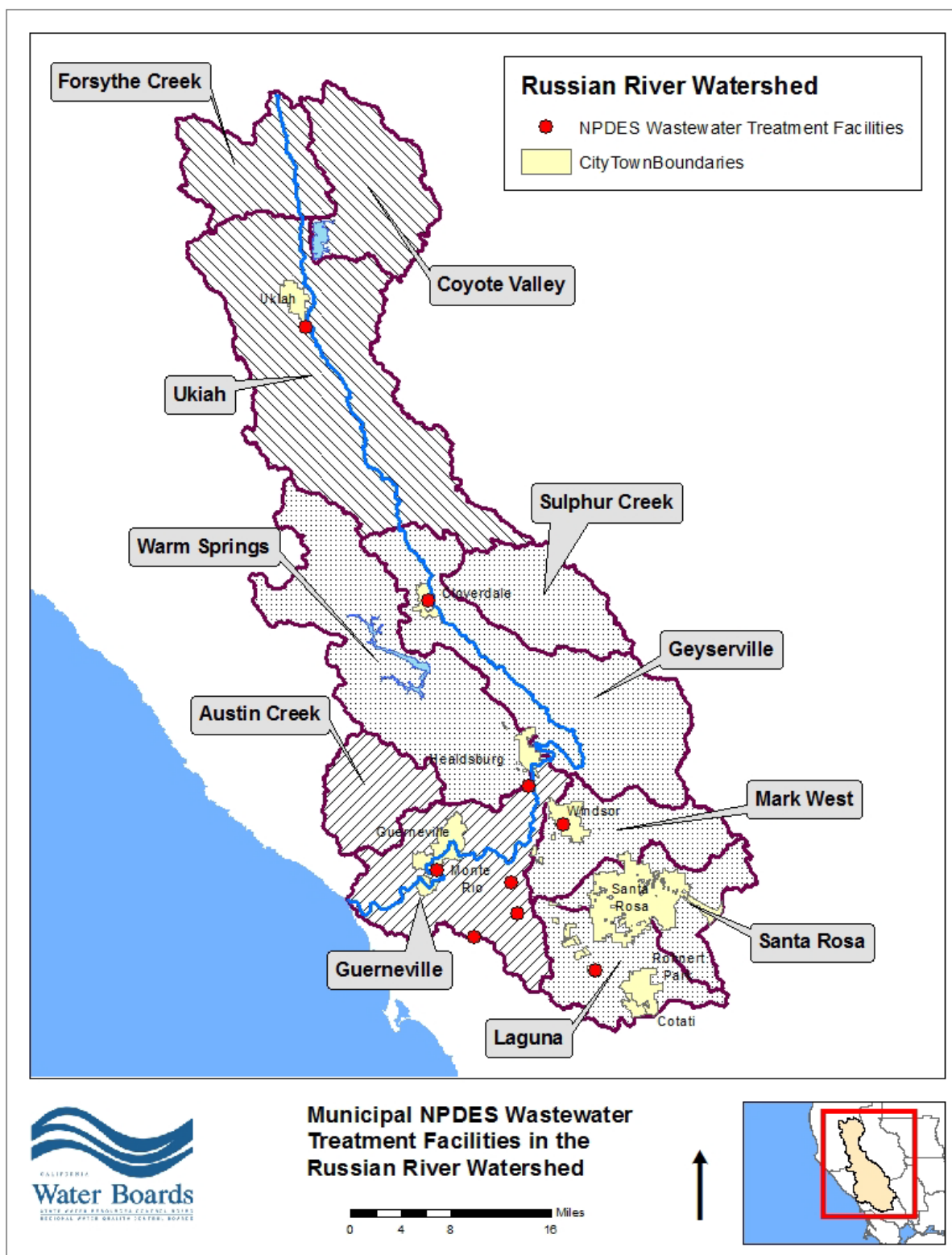


Figure 6.6: Municipal NPDES Wastewater Treatment Facilities In The Russian River Watershed

### 6.3.1.2 RECYCLED WATER HOLDING PONDS

The beneficial reuse of treated wastewater, which is also known as recycled water, is common in the Russian River Watershed as a means to conserve scarce potable water supply and to comply with stringent discharge requirements imposed in NPDES permits in the watershed, including the Basin Plan's prohibition against summertime discharges of waste to the Russian River and its tributaries. For these and other reasons, storage ponds for many wastewater treatment facilities serve a dual purpose: 1) to temporarily store recycled water in large holding ponds for later distribution to recycled water users or 2) to temporarily store treated wastewater until conditions are suitable and permitted for discharge to surface waters. It is the experience of Regional Water Board staff that discharges from holding ponds to surface waters outside of the prescribed discharge season or as a result of rain-induced pond overflows are rare, and are not considered a significant source of fecal bacteria in the Russian River Watershed.

Although advanced wastewater treatment systems in the Russian River Watershed are operated to produce recycled water that is essentially pathogen-free and suitable for water recycling, compliance with effluent limitations for bacteria has been historically measured at municipal treatment plants at a point immediately after completion of the disinfection process. The point at which disinfection is complete, for example, at the end of a chlorine contact chamber, may be separated from the surface water discharge by both distance and time. As a result, this same recycled water, when stored in open-air holding ponds, may become contaminated as a result of regrowth of bacteria or through contribution of fecal waste from wildlife, particularly birds that frequent the storage ponds. Thus, the original bacterial water quality of the recycled water demonstrated immediately after disinfection cannot be guaranteed during storage.

Many studies document the occurrence of fecal indicator bacteria and other opportunistic pathogens in open-air reservoirs, but the public health risk associated with pathogens in recycled water storage ponds has not been well-documented. Regional Water Board staff evaluated monitoring data for treated effluent discharges from the open-air, recycled water storage ponds at Vintage Greens used by the Town of Windsor. Monitoring results from the Town of Windsor for the period 2007-2011 indicate ~~measurable~~ measurable concentrations of *E. coli* recycled water storage ponds after completion of disinfection. These results are shown in Figure 6.7.

In the Russian River Watershed, municipal wastewater treatment facilities that discharge to surface waters directly or indirectly after storage employ either chlorine or ultraviolet light as a means of wastewater disinfection. Research assessing the regrowth or photoreactivation of bacteria or pathogens in storage ponds is sparse; most recent work has focused on photoreactivation after exposure to ultraviolet light. One study reviewed by Regional Water Board staff used biochemical fingerprinting to show that the fecal contamination in a golf course pond supplied with chlorine-disinfected recycled water was not related to the recycled water and that the fecal indicator bacteria did not regrow in the ponds (Casanovas-Massana 2012). Another case study (Basu 2007) of fecal coliform

bacteria regrowth in a full-scale operating wastewater treatment facility using ultraviolet disinfection concluded that bacterial regrowth in recycled water systems is a concern, but that exceedances of effluent limitations for fecal coliform in this study could be attributed to poor effectiveness of the ultraviolet disinfection system. The report also summarized recent research on the topic, indicating that photoreactivation of bacteria diminishes drastically after exposure to dosages of ultraviolet radiation above 50 MJ/cm<sup>2</sup>.

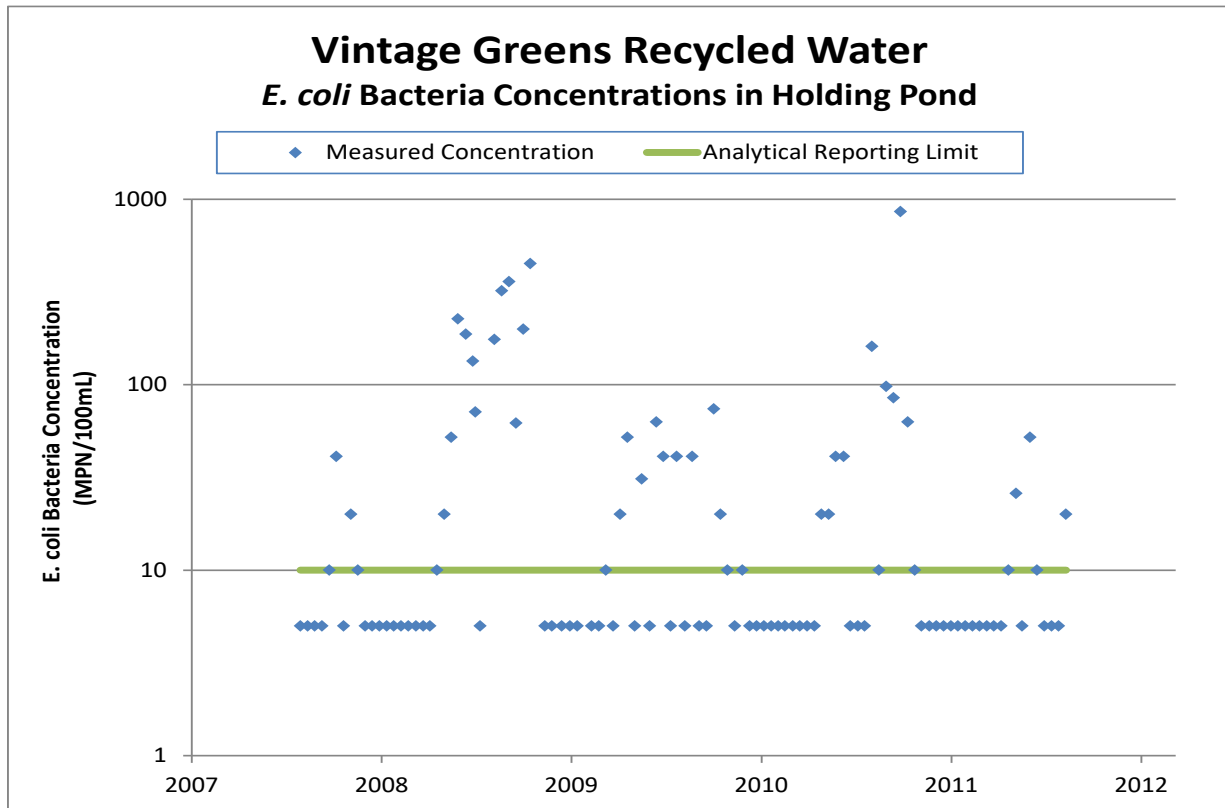


Figure 6.7: *E. Coli* Bacteria Concentrations In A Recycled Water Holding Pond At Vintage Greens In Windsor.

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**Table 6.1 Municipal NPDES Wastewater Treatment Facilities in the Russian River Watershed and Percent Compliance with Total Coliform Effluent Limitations**

Hydrologic Area Name	Hydrologic Subarea Name	Facility Name	Permit No.	Capacity (mgd)	Treatment Type	Percent Compliance		
						Daily Max.	7-Day Median	Monthly Max.
Upper Russian River	Ukiah	City of Ukiah Wastewater Treatment Plant	CA0022888	3.01	Tertiary	100.0 %	93.9%	100.0%
Middle Russian River	Geyserville	City of Cloverdale Wastewater Treatment Plant	CA0022977	1.0	Secondary	100.0 %	100.0%	100.0%
	Warm Springs	City of Healdsburg Water Reclamation Facility	CA0025135	1.4	Tertiary	100.0 %	98.4%	100.0%
	Santa Rosa, Laguna, Mark West	Santa Rosa Subregional Water Reclamation System	CA0022764	21.34	Tertiary	99.9 %	100.0%	99.9%
	Mark West	Town of Windsor Wastewater Treatment, Reclamation, and Disposal Facility	CA0023345	1.9	Tertiary	100.0 %	96.1%	100.0%
Lower Russian River	Guerneville	Graton Community Services District Wastewater Treatment, Reclamation, and Disposal Facility	CA0023639	0.397	Tertiary	100.0 %	100.0%	100.0%
		Forestville Water District Wastewater Treatment, Reclamation, and Disposal Facility	CA0023043	0.130	Tertiary	99.9 %	83.6%	99.7%
		Russian River County Sanitation District Wastewater Treatment Facility	CA0024058	0.71	Tertiary	100.0 %	100.0%	100.0%
		Occidental County Sanitation District Wastewater Treatment Facility	CA0023051	0.05	Secondary	100.0 %	97.6%	100.0%

Based on these studies reviewed by Regional Water Board staff, discharges of treated wastewater from recycled water holding ponds may contain *E. coli* and in concentrations above the TMDL targets- (i.e., National criteria or statewide objectives). However, the studies indicate that the sources of detected *E. coli* bacteria in recycled water storage ponds are not necessarily of human origin and therefore may not pose a more significant threat to public health or be relevant to protection of the REC-1 beneficial use. More site-specific information is necessary to determine the sources of *E. coli* or other fecal indicator bacteria in recycled water storage ponds and whether the discharge from a recycled water storage pond contains ~~human~~ pathogens that risk human illness before the holding pond can be eliminated as a pathogen source.

### **6.3.1.3 SANITARY SEWER SYSTEMS**

Sanitary sewer systems collect and transport municipal wastewater from private residences, commercial buildings, industrial facilities, and institutional buildings to a wastewater treatment facility for treatment and disposal and/or reuse. Some sanitary sewer systems also convey storm water and groundwater that may inadvertently enter the system. Sanitary sewer infrastructure is comprised of some or all of the following components: service laterals, collector sewers, connections between laterals and collector sewers, interceptor sewers, manholes and cleanouts, pump stations, and force mains. Typically a public entity (e.g., municipality or county sanitation district) owns and is responsible for maintaining all components of the system except the service laterals, which connect the individual building to the sewer system and are located on private property. Where sewers are installed on private property such as a mobile home park or apartment complex, ownership and maintenance responsibility, including the connection point, is the responsibility of the property owners unless there are subdivision covenants or written agreements and easements which clearly indicate otherwise.

There are nineteen ~~publically~~publicly-owned sanitary sewer systems within the Russian River Watershed, as shown in Table 6.2 and based on the most recent Questionnaire data.



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**Table 6.2 Sanitary Sewer Systems in the Russian River Watershed**

Hydrologic Area Name	Hydrologic Subarea Name	Sanitary Sewer System	Population Served	Number of Service Connections	Miles of Force Main	Miles of Gravity Sewer	Miles of Publicly-owned Laterals
Upper Russian River	Ukiah	Calpella County Water District	450	110	0.3	2.9	1
		Hopland Public Utility District	1,200	288	0.6	4.4	6
		Ukiah Valley Sanitation District	5,000	4,971	1	43	44
		City of Ukiah	16,500	5,642	0	44	44
Middle Russian River	Geyserville	City of Cloverdale	8,500	3,200	0.1	32.3	21
		City of Healdsburg	11,564	4689	2.9	54	90
		Geyserville Sanitation Zone	782	267	1	4.3	1.3
		Laguna	City of Cotati	7,265	2,300	1	32
	City of Rohnert Park		40,794	8,427	7.5	77	71.8
	City of Sebastopol		7,507	2,800	2.7	25.6	53
	Sonoma State University		10,000	19	0	2.5	1.2
	South Park County Sanitation District		10,400	1,717	0	18.4	16
	Santa Rosa	City of Santa Rosa	165,267	47,801	6.4	562	434
	Mark West	Airport/Larkfield/Wikiup Sanitation Zone	9,306	1,937	1	10	9.2
		Town of Windsor	26,950	8,250	1	92	60
Lower Russian River	Guerneville	Forestville Water District	865	438	1.5	6	3.4
		Graton Community Services District	1,815	445	0.3	6.5	4
		Occidental County Sanitation District	610	71	1.5	1	0.3
		Russian River County Sanitation District	7,377	2,467	5	35	11.7
		Totals	333,226	96,543	33	1,070	899

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Overflows of wastewater from the sanitary sewer can be caused by grease blockages, root blockages, sewer line flood damage, pump station power or mechanical failures, and surcharged pipe conditions from excessive storm water or groundwater inflow and infiltration (I/I). Releases of wastewater from the sanitary sewer can also occur as a result of poor sewer design, pipe or material failures, construction-related damage, or lack of a preventive maintenance program, which includes sufficient planning for system rehabilitation and replacement. Private building laterals can crack, become disjointed or displaced, and blocked with roots or other debris and result in an overflow. Untreated sewage from sanitary sewer system releases can contain high levels of pathogenic microorganisms and other pollutants.

All federal and state agencies, municipalities, counties, districts and other public entities that own or operate sanitary sewer systems greater than one mile in length that collect and/or convey untreated or partially treated wastewater to a wastewater treatment facilities are required to enroll for coverage under General Waste Discharge Requirements for Sanitary Sewer Systems, Water Quality Order No. 2006-0003-DWQ (General Order). The General Order establishes minimum requirements to prevent sanitary sewer overflows (SSOs). Reporting requirements are included to ensure adequate and timely notifications are made to appropriate local, state, and federal authorities in the event of SSOs from publicly-owned sewer infrastructure. Table 6.3 lists the details for SSOs reported to the CIWQS SSO database since 2007, resulted in a discharge to a drainage channel and/or surface waters, or discharged to a storm drain and were not fully captured and returned to the sanitary sewer system. These data are based on information retrieved from CIWQS in July 2017. Though any SSO is a violation of permit conditions, the reported levels shown in Table 6.3 indicate that SSOs from publicly-owned sewer infrastructure are not a large source of bacterial contamination of the Russian River Watershed. However, SSO reporting from small communities is inconsistent, which may result in under reporting of SSOs.

Private sewer laterals are owned and maintained by the property owner. Private sewer laterals are not regulated under the General Order and, therefore, owners of private laterals are not required by permit to report SSOs that occur as a result of a failure or blockage in the lateral. Because of the sheer number of private laterals connected to a municipal sewer system and the limited jurisdiction that municipalities have over sewer laterals on private property, SSOs from private sewer laterals often go unreported and corrective actions to stop the SSO may be delayed. Most municipalities have established local ordinances that require property owners connected to the municipal system to design and install new laterals in accordance with local standards and maintain existing service laterals and cleanouts in good working order at the owner's expense. Local ordinances that require property owners to inspect their private service laterals at a property transfer, in response to chronic SSOs, or changes in use are rare in the Russian River Watershed. At least two public sanitation districts within the Russian River Watershed offer a program that enables eligible ratepayers to replace leaking or deteriorating service laterals at the expense of the municipality.

The available information indicates that the volume of SSOs from publicly-owned sewer systems that reach surface waters within the Russian River Watershed is relatively low, with the exception of a few SSOs caused by excessive inflow and infiltration or major pipeline failure. Because of the lack of consistent and complete reporting of SSOs from private sewer laterals, private lateral SSOs are potentially a significant source of pathogens as measured by fecal indicator bacteria in surface waters within the Russian River Watershed.

**Table 6.3 Sanitary Sewer Overflows in the Russian River Watershed from 2007 to July 2017**

Hydrologic Area Name	Hydrologic Subarea Name	Responsible Agency	Number of SSOs	Volume of SSO (gallons)	Volume that Reached Surface Water (gallons)	% that Reached Surface Water
Upper Russian River	Ukiah	Calpella County Water District	2	2,250	1000	44%
		Hopland Public Utility District	3	295	0	0%
		City of Ukiah	31	4,247	1,688	40%
		Ukiah Valley Sanitation District	4	1,800	1,100	61%
Middle Russian River	Geyserville	City of Cloverdale	0	0	0	NA
		City of Healdsburg	74	45,465	27,575	61%
		Geyserville Sanitation Zone	1	200	0	0%
	Laguna	City of Cotati	12	2,012	98	5%
		City of Rohnert Park	10	1268	341	27%
		City of Sebastopol	32	210,369	198,029	94%
		Sonoma State University	6	22,867	0	0%
		South Park County Sanitation District	5	7,753	0	0%
	Santa Rosa	City of Santa Rosa	42	69,567	49,272	71%
	Mark West	Airport/Larkfield/Wikiup Sanitation Zone	3	510	50	10%
		Town of Windsor	19	15,090	4,317	29%
Lower Russian River	Guerneville	Forestville Water District	5	397	70	18%
		Graton Community Services District	3	850	200	24%
		Occidental County Sanitation District	4	506	216	43%
		Russian River County Sanitation District	19	1,448,554	1445969	100%
Total SSOs since 2007			275	1834000	1729925	94%

#### **6.3.1.4 SANITARY SEWER EXFILTRATION**

Exfiltration is different from SSOs. Sanitary sewer overflows from small diameter pipelines are usually caused by pipe blockages. In larger diameter pipelines, excessive infiltration and inflow (I/I) can lead to surcharged pipe conditions. These conditions can result in direct overflows to surface water or land or cause sewer backups into residential or commercial buildings. In contrast, exfiltration is generally described as a sewer leaking from its inside to its surrounding outside and occurs primarily at defective joints and cracks in service laterals, local mains and trunk sewer lines. Factors that contribute to exfiltration include: size and length of sewer lines, age of sewer lines, construction materials, and depth of flow in the sewer. Geological and climatic conditions that contribute to exfiltration include groundwater depth, soil type, faults, and rainfall.

Compliance with requirements for proper operation and maintenance of public sanitary sewer systems set forth in the Sanitary Sewer Systems General Order may help reduce or eliminate exfiltration over time. The occurrence of exfiltration is thought to be limited to those areas where sewer elevations lie above the groundwater table. Since groundwater elevations near surface waterbodies are typically near the ground surface, sewers near surface waterbodies generally are below the groundwater table and infiltration (rather than exfiltration) might be expected to dominate the mode of sewer leakage in these areas.

Where conditions and other factors are present that could result in exfiltration of untreated wastewater from sanitary sewer system, sanitary sewers systems are potential sources of pathogens, measured as fecal indicator bacteria to surface waters in the Russian River Watershed.

#### **6.3.1.5 OTHER NPDES FACILITIES**

##### Fish Hatcheries

There is one fish hatchery within the Russian River Watershed: Warm Springs Dam Fish Hatchery. The facility is owned by the U.S. Army Corps of Engineers and is operated by the California Department of Fish and Wildlife located at the base of Warm Springs Dam in Healdsburg. The facility is regulated under Waste Discharge Requirements Order No. 97-61 (NPDES Permit No. CA0024350).

The facility is designed to raise approximately 161,000 pounds (800,000 fish) per year for release to the Russian River, and it feeds up to 40,000 pounds of feed during the month of maximum feeding. Influent to the facility comes from Warm Springs Dam (Lake Sonoma) and, if necessary, from a series of wells adjacent to Dry Creek. Influent flow is aerated and routed to twenty ponds/raceways, which discharge to a single pollution control pond with a minimum detention time of 2.5 hours. Treated wastewater from the pollution control pond is discharged to Dry Creek, which is tributary to the Russian River, and also is used for landscape irrigation on less than five acres at an adjacent visitor center and day use area.

Waste Discharge Requirements Order No. 97-61 contains effluent limitations and monitoring requirements for effluent flow, suspended solids, settleable solids, and chloride. Fish intestines have been shown to contain *E. coli* bacteria, but the bacteria comes from ingestion of the bacteria from other sources and are not produced within the fish. A study of the role of fish as contributors of *E. coli* bacteria showed that the source of the *E. coli* in fish feces were likely from ingested bacteria from sediments, Canada geese, mallard ducks, and wastewater. Fish simply serve as a transport vehicle for *E. coli* bacteria transmission from other sources (Hansen et al. 2008). The fish themselves are not a direct source of bacteria. Therefore, fish hatcheries are not considered a source of *E. coli* bacteria for this TMDL.

#### Other Permittees

There are a number of other permittees in the Russian River Watershed that are regulated under NPDES permits for waste discharges to surface waters, but do not receive, treat or discharge domestic wastewater under conditions of the permit (Table 6.4). Domestic wastewater from the Sonoma West Holdings Food Processing Facility is treated in a lined aerated pond, then filtered and disinfected before application to land. Treated discharges are required to meet effluent limitations for total coliform bacteria as a condition of discharge. Discharges permitted under the aquatic herbicide and aquatic pesticide general NPDES permits and for JDS Uniphase, which is covered under an individual NPDES permit, are not expected to contain human or animal waste, and are therefore not probable sources of fecal bacteria. Utility structures may contain pathogens as measured by fecal indicator bacteria from natural sources or as a result of pass-through from municipal separate storm sewer systems. Even though there is a potential for bacteria to be present in these discharge, these permitted discharges are not expected to be an original source of pathogens that contribute to the pathogen impairment in the watershed.

<b>Table 6.4 Other NPDES Facilities in the Russian River Watershed</b>				
<b>Hydrologic Area Name</b>	<b>Hydrologic Subarea Name</b>	<b>Permittee Name</b>	<b>Permit No.</b>	<b>Facility Type</b>
Upper Russian River	Coyote Valley	Potter Valley Irrigation District	CAG990005	Aquatic Herbicide
	Ukiah	Mendocino Forest Products Ukiah Sawmill	CA0005843 (terminated)	Sawmill
Middle Russian River	Laguna	Sonoma West Holdings Plant #2 Facility	CA0023655	Food Processing
		JDS Uniphase	CAG911001	Laboratory
Upper, Middle and Lower Russian River	Multiple HSAs	AT&T Statewide Cable System	CAG990002	Utility Structure
		Pacific Bell (AT&T)	CAG990002	Utility Structure
		Pacific Gas & Electric Company	CAG990002	Utility Structure
		Sprint	CAG990002	Utility Structure
		Verizon California	CAG990002	Utility Structure

**Table 6.4 Other NPDES Facilities in the Russian River Watershed**

	Sonoma County Water Agency	CAG990005	Aquatic Herbicide
	Marin/Sonoma Mosquito and Vector Control District	CAG990004	Pesticide/Vector Control
	City of Santa Rosa	CAG990005	Aquatic Herbicide
	Sonoma County Regional Parks	CAG990005	Aquatic Herbicide

### 6.3.2 STORM WATER

The NPDES Storm Water Program regulates storm water discharges from municipal separate storm sewer systems (MS4s), construction activities, industrial facilities, and state highways. Permitted facilities in the watershed are listed in Table 6.5. Most storm water discharges are considered point sources, and operators of these sources may be required to receive an NPDES permit before they can discharge. In 1987, the U.S. Congress broadened the definition of "point source" to include construction and industrial storm water discharges and municipal separate storm sewer systems (CWA §402(p)). As described below, storm water discharges to the Russian River Watershed are considered an important source of fecal waste in the watershed.

**Table 6.5 Permitted Storm Water Facilities in the Russian River Watershed**

Program	Number of Enrollees
Municipal Phase I MS4	10
Municipal Phase II MS4	1
Municipal Phase II MS4 (Small Non-Traditional)	1
Storm Water Construction	83
Storm Water Industrial	169
Caltrans	1
Total	265

#### 6.3.2.1 MUNICIPAL STORM WATER

The 1987 amendments to the Clean Water Act required the U.S. EPA to address storm water runoff in two phases. Phase I of the NPDES Storm Water Program began in 1990 and applied to large (serving 250,000 people or more) and medium (serving between 100,000 and 250,000 people) municipal separate storm sewer systems (MS4) and eleven industrial categories including construction sites disturbing five acres of land or more. Phase II of the NPDES Storm Water Program began in 2003 and applies to small MS4s (serving less than 100,000 people) including non-traditional small MS4s, which are facilities such as military bases, public campuses, prison and hospital complexes and construction sites disturbing from one up to five acres of land. The CWA requires that MS4 permits must "require

controls to reduce the discharge of pollutants to the maximum extent practicable (MEP), including management practices, control techniques and systems, design engineering methods and such other provisions as the [U.S. EPA] Administrator or the State determines appropriate for the control of such pollutants.” (33 U.S.C. 1342(p)(3)(B)(iii).).

A MS4 is defined in 40 CFR 122.26(b)(8) as a conveyance or system of conveyances (including roads w/drainage systems, municipal streets, catch basins, curbs, gutters, ditches, manmade channels, or storm drains) that is:

1. Owned or operated by a State, city, town, borough, county, parish, district, association, or other public body (created by or pursuant to State law) including special districts under State law such as a sewer district, flood control district or drainage district, or similar entity, or an Indian tribe or an authorized Indian tribal organization, or a designated and approved management agency under section 208 of the CWA that discharges into waters of the United States.
2. Designed or used for collecting or conveying storm water.
3. Which is not a combined sewer.
4. Which is not part of a Publicly Owned Treatment Works (POTW), as defined in 40 CFR 122.2.

The current Phase I MS4 Permit, Order No. R1-2015-0030 (NPDES Permit No. CA0025054), names the County of Sonoma, City of Cloverdale, City of Cotati, City of Healdsburg, City of Rohnert Park, City of Santa Rosa, City of Sebastopol, Sonoma County Water Agency<sup>21</sup>, City of Ukiah, Town of Windsor as co-permittees. Portions of Unincorporated Mendocino County within the Russian River Watershed are enrolled as Traditional MS4s under the Phase II Small MS4 Permit (Order No. 2013-0001- DWQ effective July 1, 2013). Sonoma State University is regulated under the Phase II Permit as a Non-Traditional Small MS4.

Under terms of the Phase I MS4 Permit, permittees are required to possess the legal authority to prohibit discharges of non-storm water to the MS4 from dumping and disposal of materials such as litter, household refuse, and other materials that have the potential to impact water quality, including sources of pathogens as measured by fecal indicator bacteria. Phase I permittees are also required to implement, in coordination with other public entities, as appropriate, a Public Information and Participation Program (PIPP) that includes education materials to inform the public on the proper disposal and storage of animal wastes.

The Phase II MS4 Permit specifies actions needed by the permittee to reduce the discharge of pollutants in storm water to the maximum extent practicable to achieve compliance with water quality standards and objectives. Like the Phase I MS4 Permit, the Phase II Permit prohibits non-storm water discharges into municipal storm drain systems and

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<sup>21</sup> The Sonoma County Water Agency does not have land use authority and can only control activities conducted by Sonoma County Water Agency staff or conducted on its own property. Therefore, not all requirements in the Phase I MS4 Permit are applicable to the Sonoma County Water Agency



watercourses within the permittees' jurisdiction. The Phase II MS4 Permit also identifies special provisions for non-traditional MS4 permittees to comply with including the requirement for an Education and Outreach Program, an Illicit Discharge Detection and Elimination Program, and a Pollution Prevention and Good Housekeeping Program.

Except for Sonoma State University, there are currently no other Phase II Small MS4 permittees in the Russian River Watershed designated as Non-traditional MS4s. However, other regional water boards have identified special districts that own and/or operate within transportation corridors as non-traditional MS4s needing coverage under the Phase II MS4 Permit, in recognition that these are sources of trash and human waste from homeless encampments entering MS4s and watercourses. Examples of special districts regulated as non-traditional MS4s include, AMTRAK, Bay Area Rapid Transit (BART), and CalTrain.

*Pathogens in Urban Storm Water Systems* was prepared by Urban Water Resources Research Council (UWRRC 2014). The report describes potential sources of fecal bacteria in urbanized areas (areas within MS4 boundaries) to include SSOs, illicit discharges to storm sewer systems (e.g., power washing), failing OWTS, wastewater treatment plants, urban wildlife, domestic pets, and agriculture. Further, the report found fecal indicator bacteria concentrations in wet weather discharges from urban MS4s orders of magnitude above primary contact recreation standards. Storm water samples are collected as a requirement of the MS4 permit for the City of Santa Rosa, County of Sonoma, and Sonoma County Water Agency. Single storm water samples were collected from Santa Rosa Creek upstream and downstream of the urban area. These single samples cannot be directly assessed with the Basin Plan water quality objective for fecal coliform bacteria which requires 5 samples collected in a 30-day period. However, the fecal coliform concentrations measured in Santa Rosa Creek during storm events range from 170 – 5,000,000 MPN/~~100mL~~100 mL. These very high concentrations supplement other evidence that Santa Rosa Creek is impaired due to high bacterial loads, especially during wet weather.

Additionally, the wet weather measurements of *E. coli* and enterococci bacteria concentrations draining from developed and sewered areas described in Section 6.2 were much higher than the U.S. EPA (2012) criteria and the ~~draft~~ state water quality objectives. *E. coli* bacteria concentration measurements showed a geometric mean of 5,372 MPN/~~100mL~~100 mL, as compared to the numeric target of 100 MPN/~~100mL~~100 mL. Enterococci bacteria concentrations measurements showed a geometric mean of 6,860 MPN/~~100mL~~100 mL, as compared to the numeric target of 30 MPN/~~100mL~~100 mL. These results confirm that municipal storm water draining from developed and sewered areas is an existing source of pathogens as measured by fecal indicator bacteria.

#### **6.3.2.1.1 PET WASTE**

Domesticated pets can be a major source of pathogens as measured by fecal indicator bacteria, especially dogs and cats. Domesticated dogs can be a significant source of fecal waste based on their population density, high defecation rate, and pathogen infection rates

(Schueler 2000). A single gram of dog feces contains 23 million fecal coliform bacteria (van der Wel 1995). Dogs have been found to be significant hosts for *Giardia*, *Salmonella*, and *Pseudomonas* bacteria (Pitt 1998). Lim and Oliveri (1982) concluded that dog feces were the single greatest source contributing fecal coliform and fecal streptococcus bacteria in urbanized Baltimore catchments. Trial et al. (1993) reported that cats and dogs were the primary source of fecal coliform bacteria in urban catchments in the Seattle area.

Improper pet waste disposal has the potential to deliver pathogens to surface waters through storm water discharges. ~~Since~~Because storm drains do not normally connect to treatment facilities, untreated animal feces often end up in surface waters.

Most pet waste management programs focus on increasing public awareness. Many communities implement pet waste management programs by posting signs in parks or other pet-frequented areas, by mass mailings, and by broadcasting public service announcements. Sign posting is one of the most common outreach strategies. Signs can designate areas where dog walking is prohibited, where waste must be recovered, or where dogs can roam freely. A "pooper-scooper" ordinance may be an effective solution. Many communities have pooper-scooper laws that mandate pet waste cleanup. Because pet waste management is focused on individual pet owners, the program is dependent on the participation and cooperation of all pet owners, and pet waste management programs must be enforced. With an increase in public knowledge of storm water regulations, proper disposal of pet wastes can lead to a significant reduction of bacteria discharged in storm water.

The monitoring and source assessment completed for the Russian River Watershed did not explicitly evaluate the contribution of pet waste to bacteria concentrations in surface waters. However, given the human population density in the watershed, it is assumed that pet waste is a source of indicator bacteria in the watershed. Because the pathogen load from pet waste is presumed to be closely associated with storm water discharges, pet waste management within the Russian River Watershed is being implemented by the NPDES MS4 co-permittees through work plans (i.e. Pathogen Reduction Plans).

#### **6.3.2.2 INDUSTRIAL STORM WATER**

The most common pollutants of concern in industrial storm water are suspended solids, oxygen-demanding substances (BOD), nutrients, and heavy metals. Most industrial categories are related to heavy industry and certain light industrial facilities and are unlikely to discharge a significant level of bacteria or other pathogens found in human domestic waste. However, some facilities that require coverage under a storm water permit, such as solid waste transfer stations, sewage treatment plants, and composting operations, are potential sources of pathogens and other public health-related pollutants.

Storm water discharges associated with industrial activities, unless otherwise excluded, are regulated under NPDES Industrial General Permit (Order 2014-0057-DWQ, NPDES No. CAS000001). Beginning on July 1, 2015, storm water discharges associated with industrial

activities, unless otherwise excluded, are regulated under the NPDES Industrial General Permit (Order 2014-0057-DWQ). Industrial facilities obtain permit coverage based on whether or not their Standard Industrial Classification (SIC) code is included in those specific categories. The Industrial General Permit requires the implementation of Best Available Technology Economically Achievable (BAT) and Best Conventional Pollutant Control Technology (BCT) to reduce or prevent pollutants in storm water discharges and authorized non-storm water discharges.

Compliance with requirements in the General Permit will ensure that storm water discharges from industrial sites are not a significant source of pathogens as measured by fecal indicator bacteria.

### **6.3.2.3 CONSTRUCTION STORM WATER**

Construction activities that result in a land disturbance equal to or greater than one acre are required to have coverage under the Construction General Permit (Order 2009-0009-DWQ, as amended by Order 2010-0014-DWQ and Order 2012-006-DWQ). The objective of the Construction General Permit is to prevent or minimize the discharge of construction-related pollutants from sites during and after construction.

The primary potential sources of pathogens at construction sites are temporary sanitary facilities on sites that are poorly designed or maintained and thus are a potential source of pathogens as measured by fecal indicator bacteria. Operators of construction sites where there are no permanent sanitary facilities or where permanent facilities are too far from the construction site will provide sanitary facilities for construction personnel in one or more locations throughout the site. A well-designed and maintained site will include BMPs for portable sanitary facilities that include setbacks from waterbodies, storm drains, and gutters, location of toilets on surface areas that will absorb spills instead of transporting contamination to surface waters, and provisions to prevent vandalism and toppling of the enclosures due to exposure to high winds. Recommended maintenance activities include establishment of an appropriate cleaning and maintenance schedule, and inspection schedules to detect damage, leaks, and spills, and disposal for rinse water from cleaning activities into a sanitary sewer system.

Compliance with requirements in the Construction General Permit will ensure that storm water discharges from construction sites are not a significant source of pathogens as measured by fecal indicator bacteria.

### **6.3.2.4 CALTRANS STORM WATER**

The California Department of Transportation (Caltrans) is responsible for the design, construction, management, and maintenance of the state highway system, including freeways, bridges, tunnels, and associated properties. Major state highways in the Russian River Watershed include Highways 101, 116, 128, and 12.

Caltrans is subject to the storm water permitting requirements of Clean Water Act section 402(p). Caltrans is currently operating under a statewide storm water permit (Order 2012-011-DWQ) that regulates all storm water and non-storm water discharges from Caltrans MS4s and maintenance facilities. Caltrans' Storm Water Management Plan, which is updated annually, describes the procedures and practices used to reduce or eliminate the discharge of pollutants to storm drainage systems and receiving waters. Construction activities associated with Caltrans projects are covered by Order 2009-0009-DWQ, as amended.

The State Water Board adopted Order 2014-0077-DWQ as an amendment to the Caltrans permit to add requirements related to completed TMDLs. Under the statewide permit and TMDL amendment, Caltrans is required to prioritize reaches across the state and then to implement best management practices and control measures to achieve 1,650 Compliance Units each year in the highest priority reaches. One Compliance Unit is equal to one acre of Caltrans right-of-way from which runoff is retained, treated, or otherwise controlled prior to discharge to the relevant reach. Caltrans is encouraged to establish cooperative implementation agreements with other parties that have responsibility to attain a TMDL.

Also under the statewide storm water permit, Caltrans is required to prepare a TMDL Status Review Report to be submitted with each Annual Report. The TMDL Status Review Report includes (1) a summary of the effectiveness of the control measures installed for each reach that has been addressed, as a result of BMP effectiveness assessment, (2) a determination as to whether the control measures have been or will be sufficient to achieve WLAs and other performance standards by the final compliance deadlines, (3) where the control measures are determined not to be sufficient to achieve WLAs or other performance standards by the final compliance deadlines, a proposal for improved control measures to address the relevant pollutants, and (4) a summary of the estimated amount of pollutants that were prevented from entering into the receiving waters.

Homeless encampments within the Caltrans right-of-way are a source of both trash and pollutants in waterways. As described in a 2013 study for the Contra Costa County Flood Control and Water Conservation District, larger, well-established encampments usually have a designated "toilet area," but it is likely that occupants also use the water to dispose of waste (DeVuomo-Powell 2013). Where the disposal of urine and human fecal waste in water occurs, there is a high potential that this is a source of pathogens as measured by fecal indicator bacteria. In areas within Caltrans rights-of-way that do not contain bacteria-generating sources such as homeless encampments, restroom facilities, garbage bins, etc., Caltrans finds that the contribution of fecal bacteria to waterbodies is not believed to be a significant source of pathogens that present a human health risk (Caltrans 2012).

### 6.3.3 POINT SOURCE CONCLUSIONS

Direct discharges to surface water from treated municipal wastewater that meet effluent limitations for bacteria and discharge specifications for disinfection, fish hatcheries and other NPDES covered activities in the watershed are not expected to be significant sources

of pathogens that contribute to the impairment in the watershed. Similarly, requirements in the industrial and construction General Permits are designed to ensure that storm water discharges from industrial and construction sites are not a significant source of fecal indicator bacteria and pathogens. As discussed below, monitoring data of storm water discharges from MS4s demonstrate that these areas can be a significant source of pathogens as measured by fecal indicator bacteria. The reported levels and frequencies indicate that SSOs from publicly-owned sewer infrastructure are not a large source of bacterial contamination of the Russian River Watershed.

More site-specific information is necessary, however, to determine the sources of *E. coli* or other fecal indicator bacteria in recycled water storage ponds and whether the discharge from a recycled water storage pond contains ~~human illness-causing~~ pathogens before the holding pond can be eliminated as a pathogen source. Where conditions and other factors are present that could result in exfiltration of untreated wastewater from sanitary sewer system, sanitary sewers systems are potential sources of pathogens, measured as fecal indicator bacteria to surface waters in the Russian River Watershed.

Untreated sewage from sanitary sewer system releases can contain high levels of pathogenic microorganisms and other pollutants. SSOs from private sewer laterals are potentially a significant source of pathogens as measured by fecal indicator bacteria in surface waters within the Russian River Watershed. Homeless encampments within the Caltrans right-of-way are a source of both trash and pollutants in waterways. In areas within Caltrans rights-of-way that do not contain bacteria-generating sources such as homeless encampments, restroom facilities, garbage bins, etc., Caltrans finds that the contribution of fecal bacteria to waterbodies is not believed to be a significant source of pathogens that present a human health risk (Caltrans 2012).

Additionally, the wet weather measurements of *E. coli* and enterococci bacteria concentrations draining from developed and sewered areas described in Section 6.2 were much higher than the statewide objective for *E. coli* and U.S. EPA (2012) criteria for enterococci. *E. coli* bacteria concentration measurements showed a geometric mean of 5,372 MPN/~~100mL~~ 100 mL, as compared to the numeric target of 100 MPN/~~100mL~~ 100 mL. Enterococci bacteria concentrations measurements showed a geometric mean of 6,860 MPN/~~100mL~~ 100 mL, as compared to the numeric target of 30 MPN/~~100mL~~ 100 mL. These results confirm that municipal storm water is an existing source of pathogens as measured by fecal indicator bacteria.

In summary, the Russian River Watershed has widespread point sources throughout the watershed that have the potential to deliver pathogens to surface waters. Assessment of potential fecal waste sources and fecal bacteria do not inform relative ~~load~~ contributions between the point sources (waste loads) and/or nonpoint sources (loads). All identified potential point sources of fecal waste to surface waters provide an elevated risk of pathogen discharge and impairment of REC-1 beneficial uses. As such, all identified potential point sources of fecal waste to surface waters require a program of implementation and monitoring to prevent and assure that fecal waste and potential

pathogens are not discharged to surface waters. *Chapter 9 – Implementation* describes the implementation and *Chapter 10 – Watershed Monitoring* describes the monitoring program designed to assure the TMDL ~~targets waste load and load allocations~~ are achieved.

## 6.4 WASTE DISCHARGES TO LAND

The following sections identify known waste discharges to land in the Russian River Watershed and discuss the likelihood that these discharges are sources of fecal waste and pathogens to the Russian River and its tributaries via indirect discharge. This TMDL treats these potential sources as nonpoint sources because direct discharges to the Russian River and its tributaries from these facilities are not authorized in accordance with an NPDES permit.

### 6.4.1 MUNICIPAL WASTEWATER DISCHARGES TO LAND

The Russian River Watershed contains five municipal wastewater treatment facilities that are authorized under WDRs to discharge treated domestic wastewater to land (Figure 6.8). Table 6.6 summarizes these facilities (based on information obtained from CIWQS in November 2013) and describes their treatment capabilities and methods of effluent disposal or reuse.

Municipal wastewater treatment facilities discharging to land in the watershed rely primarily on aerobic pond systems for waste treatment to achieve the effluent quality necessary to protect groundwater quality. Disinfection using chlorine is commonly used to comply with an average monthly effluent limitation for total coliform of 23 MPN/100 mL. Final disposal of treated effluent is through percolation or irrigation to pasture land. The eventual receiving water for these discharges is groundwater. Through adequate treatment and disposal system design, which includes disinfection units and separation of the disposal area from streams, lakes, and reservoirs, the risk of transport of pathogens to surface waters is low.

Municipal wastewater disposed through surface irrigation from facilities that are operating properly, irrigating at agronomic rates, and whose discharge conforms ~~conforming to~~ conditions prescribed in waste discharge requirements is not expected to cause ~~bacterial~~ pathogenic contamination of groundwater or surface waters. Municipal wastewater discharged to percolation ponds that are proximate to surface waters have the potential to contribute to ~~bacterial~~ pathogenic loading in surface waters via shallow groundwater connection to surface water as do unpermitted releases, depending on site specific conditions. Importantly, groundwater monitoring data to assess the water quality impact of wastewater discharges to land in the Russian River Watershed is currently lacking and should be addressed in future permit updates.

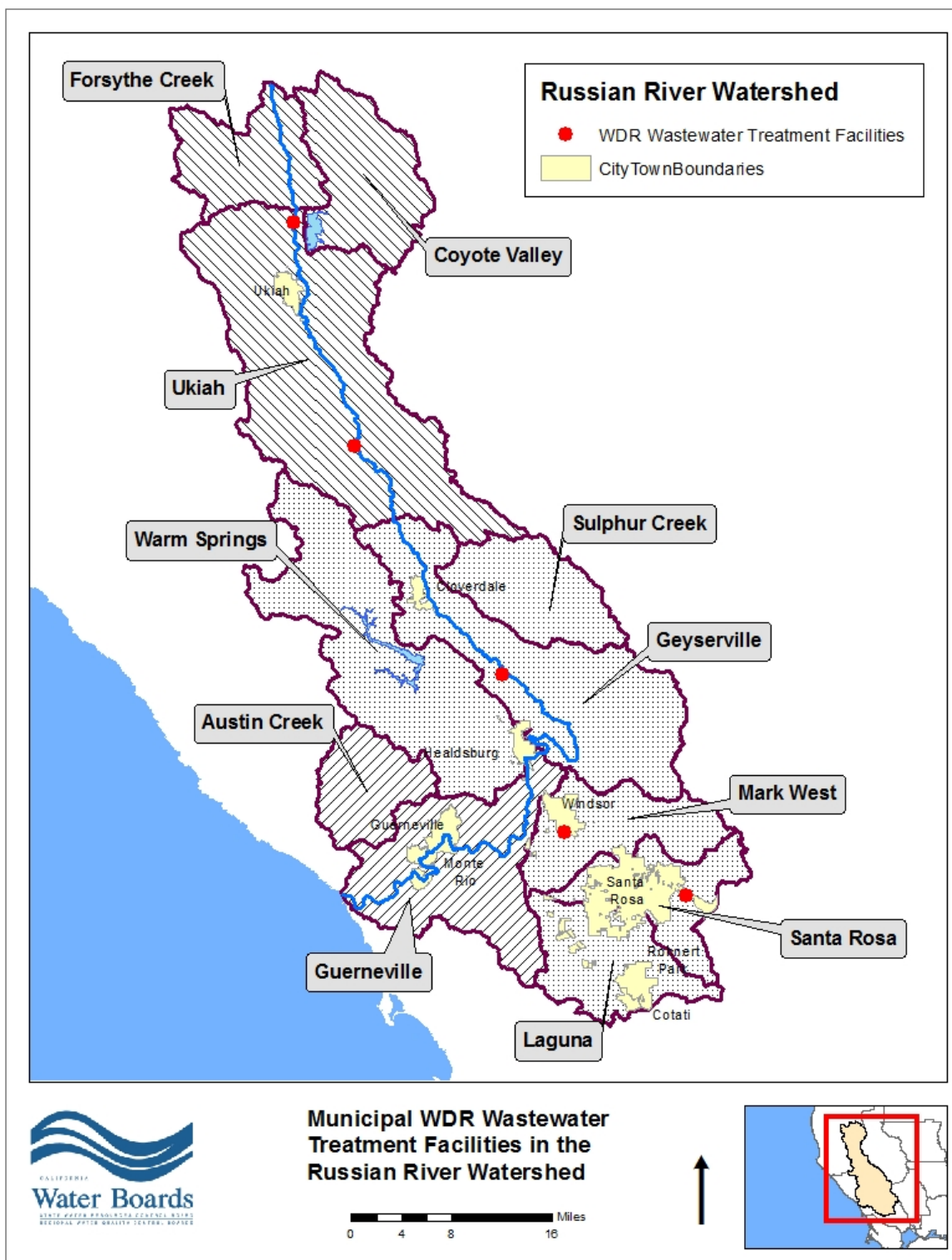


Figure 6.8: Municipal WDR Wastewater Treatment Facilities In The Russian River Watershed

<b>Table 6.6 Municipal WDR Wastewater Treatment Facilities in the Russian River</b>					
<b>Hydrologic Area Name</b>	<b>Hydrologic Subarea Name</b>	<b>Facility Name</b>	<b>Permit No.</b>	<b>Capacity (mgd)</b>	<b>Treatment Type/Disposal Method</b>
Upper Russian River	Ukiah	Calpella County Water District	86-16	0.04	Aerated pond treatment, disinfection and percolation disposal
		Hopland Public Utility District	R1-2008-0003	0.09	Aerated pond treatment, disinfection, and percolation disposal
Middle Russian River	Geyserville	Geyserville Sanitation Zone	97-67	0.092	Aerated pond treatment, disinfection, and percolation disposal
	Mark West	Airport-Larkfield-Wikiup Sanitation Zone	R1-2001-0069	0.9	Aerated pond treatment, microfiltration, disinfection, and spray irrigation disposal

#### 6.4.2 LAND APPLICATION OF MUNICIPAL BIOSOLIDS

Both Class A (Exceptional Quality) and Class B municipal biosolids contain pathogens, including bacteria, parasites, and viruses. Exposure to these pathogens may occur through direct contact with biosolids, through inhalation, ingestion of food that has come into contact with biosolids or through contact with vectors (flies, mosquitos, birds, rodents, etc.) that can transport pathogens from biosolids to humans. Federal regulations establish minimum standards for the regulation of biosolids using various risk assessment methodologies. (40 C.F.R. part 503.) Compliance with these regulations will minimize the human health risk associated with the land application of municipal biosolids.

In July 2004, the State Water Board adopted General Waste Discharge Requirements for the Discharge of Biosolids to Land for Use as a Soil Amendment in Agricultural, Silvicultural, Horticultural, and Land Reclamation Activities, Water Quality Order No. 2004-12-DWQ (General Order). The General Order incorporates the minimum standards established by the Part 503 Rule and expands upon them to fulfill requirements of the California Water Code.

When biosolids are applied to ground surfaces where there is an increased risk that biosolids may migrate off the application site, the Regional Water Board Executive Officer may require an Erosion Control Plan to assure containment of biosolids on the application site. Site specific conditions that may require submission of an Erosion Control Plan include, but are not limited to, sites where ground slopes are greater than 10 percent and areas with minimal riparian buffer between the biosolids application area and surface waters.



The City of Santa Rosa is the only public or private entity that is permitted to apply municipal biosolids to land in the Russian River Watershed. The City of Santa Rosa currently land applies Class B biosolids at three city-owned properties: Alpha Farm, Brown Farm, and Stone Farm, all of which are located within the Laguna Hydrologic Subarea. There is no available evidence that biosolids applied to land by the City of Santa Rosa have migrated outside the authorized application areas and entered surface waters. However, mobilization pathways may present a risk of pathogen discharge where biosolids are applied on sites near waterbodies with erosion potential.

#### **6.4.3 RECYCLED WATER DISCHARGES FROM LANDSCAPE IRRIGATION**

Although advanced wastewater treatment systems in the Russian River Watershed are operated to produce recycled water that is essentially pathogen-free and suitable for water recycling, this same recycled water, when stored in open-air holding ponds, may become contaminated as a result of regrowth of bacteria or through contribution of fecal waste from wildlife, particularly birds that frequent the storage ponds.

Most major municipalities in the watershed are either actively participating in water recycling programs or are contemplating becoming involved. The largest water recycling program in the region, the Santa Rosa Subregional Water Reclamation System, accepts and treats municipal wastewater from the communities of Santa Rosa, Cotati, Rohnert Park, and Sebastopol for use as recycled water for urban and agricultural irrigation on over 6,400 acres of land. Other communities, such as the Town of Windsor, Guerneville, and the Airport-Larkfield-Wikiup communities also use recycled water for local irrigation projects. In Mendocino County, the City of Ukiah is developing a project that would use recycled water for landscape irrigation within the Russian River Watershed. Recycled water producers in the North Coast Region are regulated under General Waste Discharge Requirements (Order 2014-0090-DWQ) or individual waste discharge requirements.

In addition, the Santa Rosa non-storm water Discharge Best Management Practices (BMP) Plan was required by NPDES MS4 Permit Order No. R1-2015-0030 and sets forth approved protective measures that are required of all applicable recycled water uses in order to minimize or prevent the effects of non-storm water discharges (City of Santa Rosa 2013). The BMP Plan describes runoff control measures to be implemented for both landscape irrigation in urban settings and agricultural irrigation in rural settings. By controlling runoff from recycled water use areas, these BMPs will also help reduce human-source bacteria entering receiving waters.

Although local recycled water programs are well-managed, unintentional spills of recycled water occur periodically. Large volume spills are rare and usually the result of broken recycled water lines in rural properties. Large volume spills of recycled water have the potential to adversely impact water quality; but are a low risk to contribute pathogens as measured by fecal indicator bacteria because the recycled water has been disinfected to meet tertiary treatment standards prior to entering the recycled water distribution system. Small volume spills occur more frequently, though not common, as a result of unintentional

overspray, mechanical breaks, vandalism, or other unforeseen conditions. The contribution of ~~fecal bacteria~~pathogens from small volume spills and other incidental runoff events is de minimus and not expected to be a source of ~~pathogens~~fecal indicator bacteria in amounts that contribute to ~~the pathogen impairment in the watershed~~exceedances of water quality standards.

#### **6.4.4 PRIVATE DOMESTIC WASTEWATER DISCHARGES TO LAND (WITH FLOW GREATER THAN 10,000 GALLONS PER DAY)**

Discharges of domestic wastewater or combined industrial/domestic wastewater systems to the ground surface and discharges to the subsurface where the projected wastewater flow is greater than 10,000 gallons per day (gpd) are regulated under state-issued WDRs or individual waste discharge requirements. Discharges of domestic wastewater to the subsurface under 10,000 gpd may be authorized by a local agency under a Local Agency Management Plan (LAMP) approved by the Regional Water Board in accordance with the *Water Quality Control Policy for Siting, Design, Operation, and Maintenance of Onsite Wastewater Treatment Systems* (OWTS Policy).

There are nineteen large and medium-sized private domestic wastewater treatment facilities in the Russian River Watershed currently regulated under WDRs that discharge to land through conventional septic tank/leachfield systems, subsurface drip irrigation systems, percolation ponds, or spray irrigation. Table 6.7 summarizes these facilities and describes their treatment capabilities and methods of disposal.

WDRs for large wastewater discharges include effluent limitations, discharge prohibitions, and other conditions established to protect water quality and beneficial uses. Septic systems are designed in accordance with minimum standards for siting, design, and operation contained in the Basin Plan and other requirements set forth by the applicable local regulatory agency. Minimum standards that are critical to effective onsite treatment and disposal of waste include adequate separation to groundwater and drinking water sources, favorable soil characteristics and geology to maximize soil treatment, and suitable waste application rates. Land disposal systems conforming to prescribed minimum standards and operating properly are not expected to cause bacterial contamination of groundwater and surface waters. But, land disposal through percolation ponds that are proximate to surface waters have the potential to contribute to bacterial loading in surface waters, depending on site specific conditions, and require site-specific evaluation. Importantly, groundwater monitoring data to assess the water quality impact of wastewater discharges to land in the Russian River Watershed is currently lacking and should be addressed in future permit updates.

<b>Table 6.7 Private Domestic WDR Wastewater Treatment Facilities in the Russian River Watershed (with flow greater than 1,500 gallons per day)</b>					
<b>Hydrologic Area Name</b>	<b>Hydrologic Subarea Name</b>	<b>Facility Name (Location)</b>	<b>Permit No.</b>	<b>Capacity (gpd)</b>	<b>Treatment Type/ Disposal Method</b>
Upper Russian River	Ukiah	Camp Wente (Ukiah)	97-10-DWQ	10,875	Conventional septic tank/leachfield system
		City of Ten Thousand Buddhas (Talmage)	WQ 2014-0153-DWQ	33,271	Subsurface flow wetland treatment followed by subsurface disposal to leachfield system
Middle Russian River	Warm Springs	EJ Gallo Winery (Healdsburg)	R1-2012-0099 (waiver)	3,060	Conventional septic tank/leachfield system
	Geyserville	Coppola Winery (Geyserville)	97-10-DWQ	12,000	Aerobic pretreatment, disinfection, and subsurface drip irrigation
		Jordan Vineyard and Winery (Healdsburg)	97-10-DWQ	3,500	Aerobic pretreatment and mound disposal
		Old Crocker Inn (Cloverdale)	97-10-DWQ	1,875	Conventional septic tank/leachfield system
		Rio Lindo Academy (Healdsburg)	87-094	75,000	Solids separation with evaporation/percolation disposal
		Salvation Army-Lytton Springs Rehabilitation Facility (Healdsburg)	97-10-DWQ	11,000	Aerated pond treatment, disinfection, and spray irrigation disposal
	Mark West	Camp Newman (Santa Rosa)	97-10-DWQ	20,000	Aerobic pretreatment with subsurface drip irrigation
		Humane Society of Sonoma County	R1-2003-0068	2,423	Aerobic pretreatment and mound disposal
		Kendall-Jackson Wine Center (Fulton)	97-10-DWQ	5,850	Aerobic pretreatment with subsurface drip irrigation
		Mayacamas Golf Club (Santa Rosa)	R1-2003-0029	4,900	Aerated pond, microfiltration, disinfection, spray irrigation
		Sonoma-Cutrer Vineyards (Santa Rosa)	97-10-DWQ	1,800	Aerobic pretreatment with subsurface drip irrigation
		Vintner's Inn (Santa Rosa)	R1-2002-0087	32,000	Activated sludge system with surface drip irrigation

Hydrologic Area Name	Hydrologic Subarea Name	Facility Name (Location)	Permit No.	Capacity (gpd)	Treatment Type/ Disposal Method
Lower Russian River	Guerneville	Bohemian Grove (Monte Rio)	R1-2006-0053	2,250,000	Aerated pond treatment, disinfection, and spray irrigation disposal
		Gurdjieff Foundation (Guerneville)	97-10-DWQ	2,490	Aerobic pretreatment with subsurface drip irrigation and at-grade disposal system
		Odd Fellows Recreation Club (Forestville)	98-125	45,000	Clustered, conventional septic tank/leachfield system
		Rodney Strong Vineyard (Healdsburg)	88-064	60,000	Aerated pond treatment, disinfection, and percolation disposal
		The Farmhouse Inn (Forestville)	97-10-DWQ	3,285	Aerobic pretreatment and subsurface drip irrigation
	Austin Creek	Camp Royaneh (Cazadero)	97-10-DWQ	16,600	Aerated pond treatment and percolation disposal

#### 6.4.5 WINE, BEVERAGE AND FOOD PROCESSORS

Wine, beverage, and food (WBF) processing facilities located within the Russian River Watershed include, but are not limited to alcoholic (e.g., wineries, breweries, cider houses) and non-alcoholic beverage producers, fruit and vegetable processors, meat wrapping, and dairy product manufacturers. These facilities range in size from small in-home operated, non-commercial establishments to large, industrial or commercial establishments. ~~The Regional Water Board currently regulates~~ In 2016, the Regional Water Board adopted General Waste Discharge Requirements for Discharges of Wine, Beverage and Food Processor Waste to Land, Order No. R1-2016-0002, and Conditional Waiver of Waste Discharge Requirements for Discharges of Wine, Beverage and Food Processor Waste to Land, Order No. R1-2016-0003, to regulate discharges to land from WBF processing facilities that could affect the quality of waters of the state through. A small number of WBF processors in the issuance of Watershed are regulated under facility-specific WDRs, enrollment under because they are not eligible for coverage under either general order or because permit coverage has not yet been transferred to a general WDR for wineries, or issuances of conditional waivers of WDRs order.

Process wastewater from these facilities is not expected to contain ~~human illness-causing pathogens as measured by fecal indicator bacteria~~, and not considered a source of fecal ~~indicator bacteria waste~~ in this TMDL. Domestic, human waste is commonly disposed of in individual onsite wastewater treatment systems (OWTS) separate from the process wastewater disposal systems and regulated by the local regulatory agency or by the Regional Water under WDRs. WBF processing facilities that combine process and domestic wastewater streams and dispose of the effluent through land application are potential

sources of fecal bacteria pathogens in surface waters unless permit conditions contain disinfection requirements or disposal requirements to prevent the migration of pathogenic organisms in the effluent to groundwater and surface water.

There are five food processing facilities in the Watershed that discharge process wastewater to land and are regulated under individual WDRs or a waiver of WDRs (Table 6.8). These facilities were identified as a result of a query of the CIWQS database in November 2013. None of these permits contain effluent limitations. Other food processing facilities in the watershed have been identified by Regional Water Board staff. It is expected many of these facilities will enroll under general WDRs or waiver of WDRs for WBF processors.

Generally, Good Manufacturing Practices (GMPs) and Sanitation Standard Operating Procedures (SSOPs) are the foundations for food safety programs for food processors. GMP regulations are designed to control the risk of contaminating foods with chemicals and microbes during their manufacture, and include practices for the cleaning and sterilization of equipment, pest control, and quality assurance assessment. SSOPs are specific, written procedures necessary to ensure sanitary conditions in the facility. SSOPs are required in all meat and poultry processing plants, in accordance with C.F.R. title 9 Part 416. Compliance with these practices and procedures will prevent contamination or adulteration of food products and will minimize the bacterial load discharged from the facility.

The concentration of bacteria associated with process wastewater effluent from food processors is not currently known. However, proper and appropriate sanitation safeguards implemented during food processing will ensure that bacterial contaminants do not enter the waste stream from the food processing stream. Domestic waste discharges related to the operation of food processing facilities are separate from the process wastewater stream and treated in domestic waste treatment system permitted by the State or authorized by local permits or programs. Consequently, Regional Water Board staff has determined that these facilities are not expected to be a source of pathogens that contributes to the pathogen impairment in the watershed.

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for the Action Plan for the Russian River Pathogen TMDL

<b>Table 6.8 Private Food Processors Individual WDR Wastewater Treatment Facilities in the Russian River Watershed</b>					
<b>Hydrologic Area Name</b>	<b>Hydrologic Subarea Name</b>	<b>Facility Name (Location)</b>	<b>Permit No.</b>	<b>Design or Permitted Flow</b>	<b>Treatment Type/ Disposal Method</b>
Middle Russian River	Warm Springs	Timber Crest Farms (Healdsburg)	No. 80-047	10,000 gpd	Discharges wash water from the five individual wineries and one food processor renting space from the former dehydrated fruit processing facility to a spray irrigation system during the processing season (June-September).
	Laguna	Olive Leaf Press (Sebastopol)	R1-2012-0116 (Waiver)	120,000 gallons storage capacity	Organic farm that produces olive oil from Sonoma County-grown olives. The facility is used for both the pressing of olives and grapes along with the manufacturing of olive oil. The facility is covered by the categorical waiver policy as an agricultural commodity. Wash water is stored in tanks and land applied to 50 acres of agricultural land.
		Santa Rosa Meat and Poultry Company (Santa Rosa)	No. 79-019	1,000 gpd	Specialty meat shop where industrial and domestic wastewater flows through a septic tank, one tank for industrial waste and one tank for domestic waste, the flows are then combined and chlorinated before disposal into an evaporation/percolation pond.
		Sonoma West Holdings-South (Sebastopol)	No. 88-071	50,000 gpd	Multi-tenant food and beverage processing facility that generates wash water. During dry weather, wash water is spray irrigated on 2.6 acres. Runoff from the spray fields is collected and re-irrigated, discharged to percolation beds, and/or retained in storage tanks. During wet weather, all wash water is directed to the percolation ponds and/or to storage tanks. Domestic wastewater is disposed of through an OWTs.
Lower Russian River	Guerneville	Manzana Products Company (Graton)	No. 85-079	25,000 gpd	Apple processing and canning plant that discharges wash water to a spray irrigation system during seasonal operations.

#### **6.4.6 MOBILE HOMES PARKS AND CAMPGROUNDS**

There are 133 mobile home and special occupancy (RV) parks in the Russian River Watershed (CDHCD 2014). About two-thirds of these mobile home parks, RV Parks, and campgrounds are located within municipal sewer districts and discharge domestic wastewater to treatment facilities. However, forty-one of these parks are located outside of sewer areas and consequently dispose of domestic waste onsite via individual septic systems. Figure 6.9 shows the locations of these facilities and provides an estimate of their wastewater flow volume based on the assumption that 250 gallons per day of wastewater is produced per mobile home or campground space (U.S. DHEW 1972). Septic systems associated with mobile home parks and campgrounds are commonly large capacity, located adjacent to surface waterbodies, and often poorly maintained or overloaded. Consequently, Regional Water Board staff determined that these facilities, when poorly sited, inadequately operated or maintained, are a probable source of pathogens as measured by fecal indicator bacteria in surface waters in the Russian River Watershed.

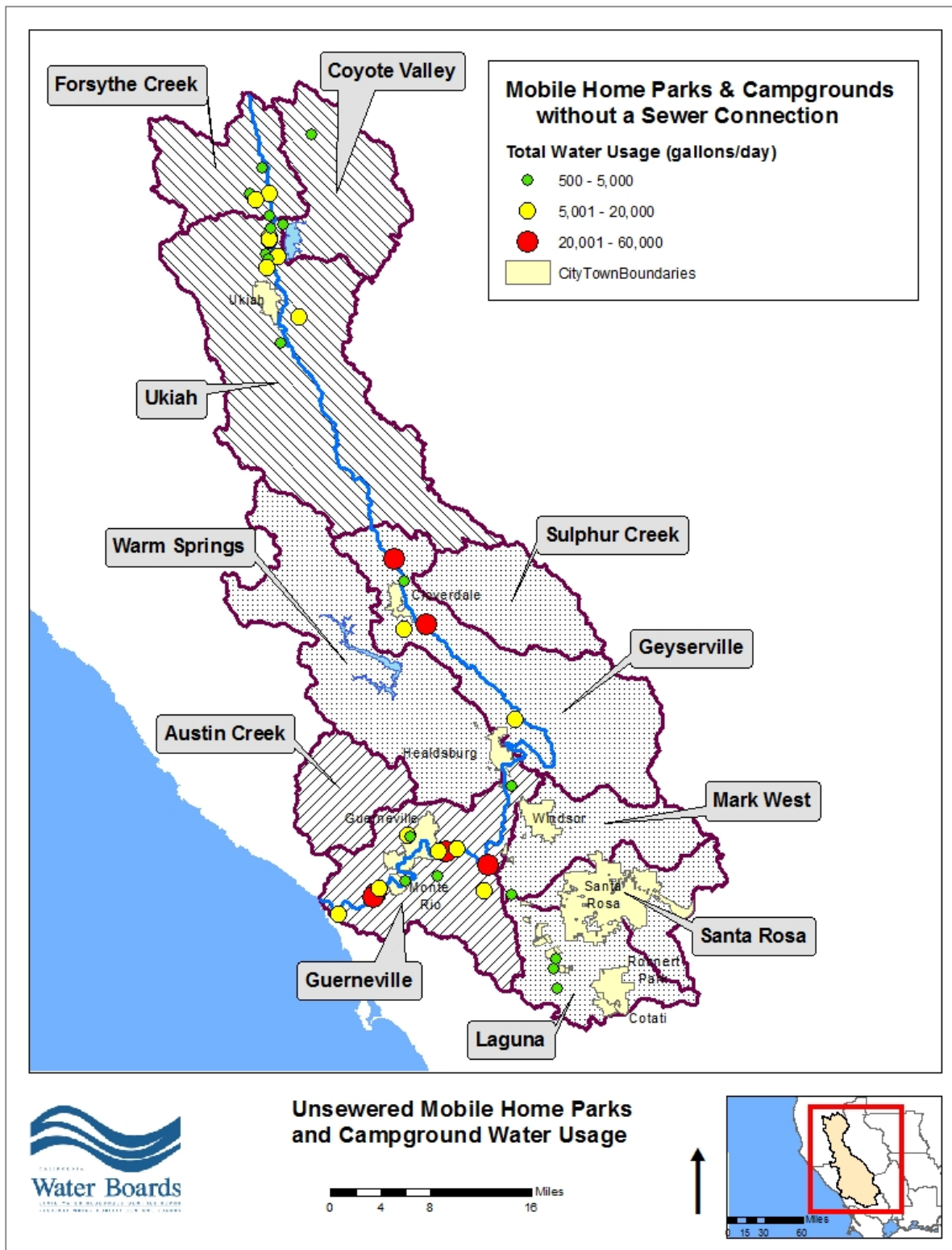


Figure 6.9: Unsewered Mobile Home Parks And Campgrounds



bacteria.

#### 6.4.7 ONSITE WASTEWATER TREATMENT SYSTEMS

For the purposes of this TMDL, OWTS are identified as a ~~nonpoint source~~ waste discharge to land since treated wastewater disperses through a leachfield with no intentional outlet to a surface waterbody. About one-fourth of all American households rely on onsite wastewater treatment systems (OWTS) to dispose of their wastewater, which translates to about 20 million individual systems nationwide (Wilhelm et al. 1994). Table 6.9 presents estimates of the houses and population that are connected to sanitary sewers in the Russian River Watershed. The estimates show that about 31% of the houses in the watershed are not connected to a sanitary sewer and are assumed to use OWTS for treatment of domestic waste. The estimates were made from the 2010 U.S. Census.

<b>Table 6.9 Estimates of Houses, Population &amp; Acres of Sewered and Non-Sewered Areas in the Russian River Watershed</b>						
<b>Areas</b>	<b>Houses</b>		<b>Population</b>		<b>Acres</b>	
	<b>Count</b>	<b>Percent</b>	<b>Count</b>	<b>Percent</b>	<b>Count</b>	<b>Percent</b>
Sewered	113,631	69%	288,225	72%	83,644	9%
Non-sewered	51,537	31%	111,147	28%	866,608	91%
Total within Russian River Watershed	165,168	100%	399,372	100%	950,252	100%

Conventional OWTS operate simply: after solids are trapped in a septic tank, typically a 1,000 to 1,500-gallon concrete or fiberglass tank, wastewater is distributed to a subsurface drain field and allowed to percolate through the soil. Bacteria in the wastewater are effectively removed by filtering and straining water through the soil profile. Viruses are not effectively filtered in soil because of their small size. Instead viruses are removed through adsorption to soil particles and by inactivation in the soil.

Effective pathogen removal in OWTS is dependent on proper siting and installation of the OWTS components, proper maintenance, and operation of the system within design specifications. ~~Pathogen~~ Pathogens may enter the groundwater and surface water from OWTS when wastewater rises to the ground surface, is intercepted by high groundwater, or passes through the soil profile without adequate treatment.

Regional Water Board staff conducted a focused study on the potential influence of OWTS on the ~~discharges~~ discharge of pathogens, as measured by fecal indicator bacteria concentrations in receiving surface waters. The sampling methods, results, and an analysis of the data are presented in the "Onsite Wastewater Treatment System Impact Study Report" (NCRWQCB 2013a). In this study, Regional Water Board staff selected catchments for monitoring based on the risk of FIB transport to surface waters and parcel density. Parcel density was determined using parcel data from the Sonoma County Assessor. Risk of FIB transport was determined using an in-house geospatial model developed based on risk factors derived from the Regional Water Board's "Policy on the Control of Water

Quality with Respect to On-Site Waste Treatment and Disposal Practices” in the Basin Plan (NCRWQB 2011). Three sample locations were selected to represent catchments draining each of the following four categories, for a total of twelve sites:

- High parcel density with a high risk of FIB transport from OWTS
- High parcel density with a low risk of FIB transport from OWTS
- Low parcel density with a high risk of FIB transport from OWTS
- Low parcel density with a low risk of FIB transport from OWTS

Three additional ~~sample~~sample locations were selected to represent catchments that drain areas served by OWTS that have high parcel density and are near a stream. Locations were selected from the Fitch Mountain area near Healdsburg, downtown Monte Rio, and Camp Meeker.

Water quality data was collected from each location five times during the study period, measuring for *E. coli*, enterococci, and *Bacteroides* bacteria. Statistical analyses were conducted to determine any correlations between the water quality data and catchment characteristics. Multiple potential characteristics were evaluated, including the modeled FIB transport risk, catchment size and parcel density. Of these characteristics, parcel density showed a positive correlation with water quality data. That is, when parcel densities were higher, so were downstream concentrations of FIB.

Figure 6.10 shows the distribution of these concentrations by parcel densities. High parcel densities range from 0.8 to 4 parcels per acre (0.2 to 1.3 acres/parcel). Low parcel densities ranged <0.1 parcels per acre (9 to 100 acres/parcel).

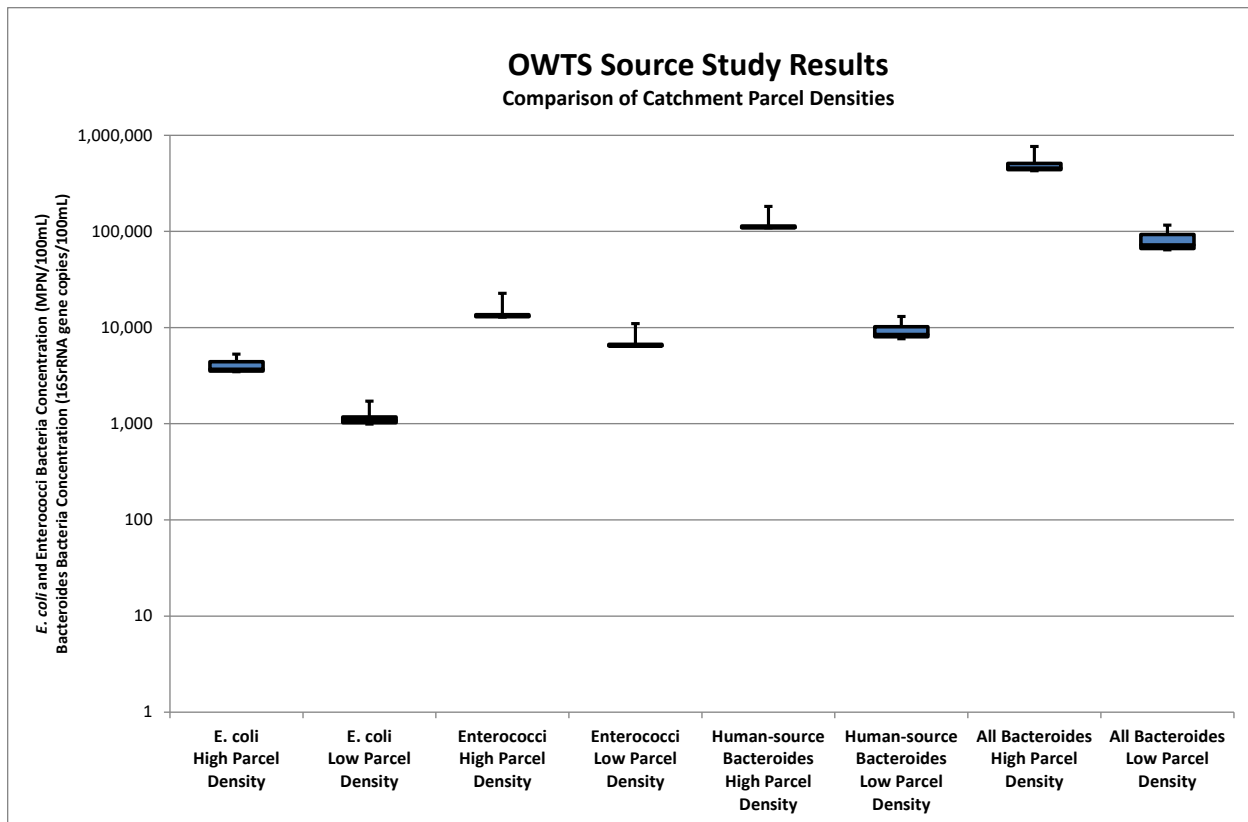


Figure 6.10: Comparison Of The Distribution Of E. Coli, Enterococci And Bacteroides Bacteria Concentrations By Parcel Densities.

*Bacteroides* bacteria were analyzed with the AllBac and HuBac genetic marker following U.S. EPA (2010) Method B.

These findings confirm that OWTS are a source of FIB, particularly from high parcel density areas. The findings indicate the need to consider parcel density when developing an Advanced Protection Management Program to evaluate and control discharges from OWTS in the Russian River Watershed.

#### 6.4.8 DISCHARGES TO LAND SOURCE CONCLUSIONS

The Russian River Watershed has numerous land discharge sources throughout the watershed, some of which have the potential to deliver pathogens to surface waters. Discharges from some of these land discharge categories are already controlled under a program of implementation that are working well to prevent pollution. Other identified land discharge sources of fecal waste either require a program of implementation and monitoring to prevent and assure that fecal waste and potential pathogens are not discharged to surface waters or require update. *Chapter 9 – Implementation* describes the implementation and monitoring program designed to assure the waste load and load allocations are achieved.

## 6.5 NONPOINT SOURCES

The term "nonpoint source" is defined as any source of water pollution that is not from a discernible, confined, and discrete conveyance. Per definitions in the Clean Water Act, agricultural discharges are also considered nonpoint sources even when conveyed through a pipe. Nonpoint source pollution typically comes from many diffuse sources and is caused by rainfall or snowmelt moving over and through the ground. As the runoff moves, it picks up and carries away natural and human-made pollutants, depositing them into streams and other waters.

This section primarily focuses on controllable nonpoint sources in developed areas and agricultural areas, since the runoff from these areas show the highest concentrations of fecal indicator bacteria.

### 6.5.1 RECREATION AT PUBLIC BEACHES

There are many public swimming beaches along the mainstem Russian River. Several of the most popular beaches are shown in Table 6.10 and Figure 6.11. Swimming and other water contact recreation in the river can be a source of bacteria and other pathogens through direct human urination or defecation in the water or along the shore. Pathogens may also be washed off the body during immersion.

Regional Water Board staff conducted a focused study on the potential influence of intensive recreation on fecal indicator bacteria concentrations at public beaches (NCRWQCB 2013b; Appendix B). Water samples were collected for analysis of *E. coli*, enterococci, and human-source *Bacteroides* bacteria at Veterans Memorial Beach and Monte Rio Beach during the week of the Independence Day holiday in 2013.

Table 6.10 Popular Swimming Beaches along the Russian River			
Hydrologic Area Name	Hydrologic Subarea Name	Recreational Beach Name	Location
Upper Russian River	Coyote Valley	Mill Creek Park	Potter Valley
	Forsythe Creek	Mariposa Swimming Hole	Redwood Valley
	Ukiah	Vichy Springs Park	Ukiah
		Mill Creek Park	Ukiah
Middle Russian River	Geyserville	Cloverdale River Park	Cloverdale
		Alexander Valley Campground	Healdsburg
	Guerneville	Veteran Memorial Beach	Healdsburg

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for the Action Plan for the Russian River Pathogen TMDL

<b>Table 6.10 Popular Swimming Beaches along the Russian River</b>			
<b>Hydrologic Area Name</b>	<b>Hydrologic Subarea Name</b>	<b>Recreational Beach Name</b>	<b>Location</b>
Lower Russian River		Riverfront Park	Windsor
		Mirabel Park Campground	Forestville
		Steelhead Beach	Forestville
		River Access Beach	Forestville
		Sunset Beach	Forestville
		Johnson's Beach	Guerneville
		Monte Rio Beach	Monte Rio
		Casini Ranch Campground	Duncans Mills



Figure 6.11: Popular Swimming Beaches Along The Russian River

Water samples were collected during the afternoon when human recreational use was the highest. Sonoma County Park staff counted recreators on the beach and in the water at Veterans Memorial Beach each day at 14:00 hours (Figure 6.12). Recreator counts were not available for Monte Rio Beach.

Relationships between these variables were investigated using the Spearman's rank correlation coefficient ( $\rho$ ) (Helsel and Hirsch 2002). Spearman's rank correlation coefficient is a nonparametric statistical measure of the dependence between two variables. Spearman correlation coefficients approach either plus one ( $\rho \sim +1.0$ ) or minus one ( $\rho \sim -1.0$ ), as the relationship become stronger. A small correlation coefficient (between -0.5 and 0.5) indicates a weak relationship between the variables.

The study found that the percentage of human-specific *Bacteroides* showed a relatively strong positive correlation (Spearman Correlation Coefficient = 0.72) with swimming recreation, with the higher percentages of human-specific *Bacteroides* observed on days with a larger number of people swimming. Moderately positive correlations were found for *E. coli* bacteria concentrations (Spearman Correlation Coefficient = 0.55) and enterococci bacteria concentrations (Spearman Correlation Coefficient = 0.51) with swimming recreation. The results indicate that intensive human contact recreation at public beaches on the most popular hot summer days contributes to *E. coli*, enterococci and *Bacteroides* bacteria concentrations in surface waters. The less intensive recreation periods that is more common during summer weekdays and throughout the non-summer season results in lower *E. coli*, enterococci and *Bacteroides* indicator bacteria concentrations compared with the times of high intensity use.

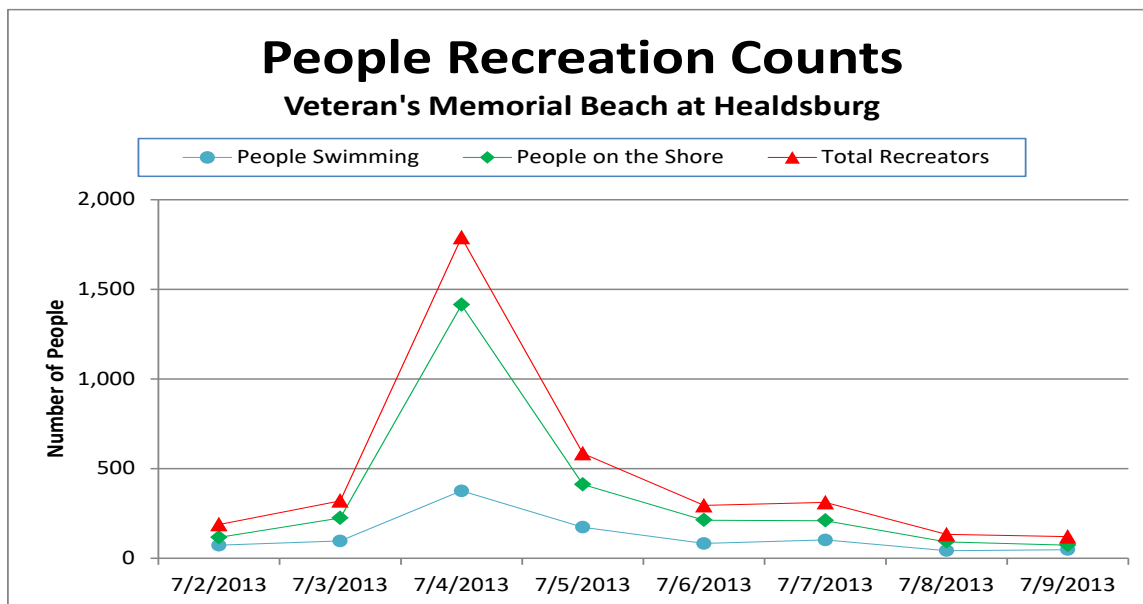


Figure 6.12: Counts Of People Recreating At Veterans Memorial Beach In Healdsburg.



### 6.5.2 HOMELESS ENCAMPMENTS

Homeless encampments and sites of other illegal camping are potential sources of ~~bacterial~~ pathogens. Many riparian areas within the Russian River Watershed attract homeless people and these areas most often do not have sanitary disposal facilities. The discharge of untreated human waste directly to surface waters within these riparian corridors from homeless encampments could be one of the causes of the presence of ~~human-source~~ fecal indicator bacteria found in undeveloped areas.

The Russian River Watershed covers large areas of Mendocino and Sonoma counties. Applied Survey Research (2005) estimates that 5,335 people were homeless in Mendocino County in 2005 and 78% of those were unsheltered. This represents 6% of the overall population of 90,816 people in Mendocino County. Applied Survey Research also estimates that 9,749 people were homeless in Sonoma County in 2005 and 77% of those were unsheltered. This represents 2% of the overall population of 484,102 people in Sonoma County.

The source analysis for this Pathogen TMDL did not attempt to assess the potential of pathogen contamination specifically associated with homeless encampments or sites of other illegal camping. However, monitoring results for Santa Rosa Creek downstream of known homeless encampments routinely indicate high levels of fecal indicator bacteria and. Further, anecdotal reports of poor waste disposal practices by the occupants of the encampments lead Regional Water Board staff to conclude that homeless encampments are a likely potential source of ~~human-source indication bacteria in surface waters~~ pathogens in surface waters as measured by fecal indicator bacteria. The same potential applies to sites of other illegal camping, in close proximity to surface water and without adequate sanitation facilities.

### 6.5.3 LIVESTOCK WASTE

A large number of ~~bacterial~~ pathogens found in manure from livestock have the potential to cause illness in humans. These organisms include, but are not limited to, *Salmonella*, *Campylobacter*, *E. coli*, *Leptospira*, and *Clostridium* bacteria (U.S. EPA 2009). Human-infectious pathogens relevant to livestock sources in the Russian River Watershed also include *Giardia* (cattle), *Campylobacter jejuni* (chickens), and hepatitis E serogroup C (hogs). Several viruses found in livestock waste have the potential to cross from animals to humans, and thus have the potential to cause disease in humans (Mattison et al. 2007; McAllister and Topp 2012). Pathogens can be discharged directly to watercourses when livestock have access to streams. They can also be carried to surface waters in storm water runoff or in runoff resulting from over-application of liquefied manure to pasture land. The estimated number of different types of animals in Sonoma and Mendocino counties is shown in Table 6.11. The Russian River Watershed covers large areas of both counties. Data presented in this table were obtained from several sources, as described below. Discussion of categories of livestock animals as potential sources of fecal waste to the Russian River Watershed is provided in greater detail in the following sections.



**Table 6.11 Inventory of Livestock Animals in Mendocino and Sonoma Counties**

Animal Type	Mendocino County		Sonoma County	
	Number of Animals	Citation	Number of Animals	Citation
Laying Hens and Pullets	8,973	USDA (2007)	5,764,700	Linegar (2013)
Cows	18,800	Morse (2012)	68,762	Linegar (2013)
Horses	2,509	USDA (2007)	17,794	Benito (2005)
Sheep and lambs	9,200	Morse (2012)	22,543	Linegar (2013)
Goats	1,454	USDA (2007)	2,146	Linegar (2013)
Hogs	1,450	Morse (2012)	1,029	Linegar (2013)

#### **6.5.4 DAIRIES, MANURE HOLDING PONDS, & LANDSCAPE APPLICATIONS OF MANURE**

Any release of manure to surface waters from holding ponds from confined animal facilities has a significant potential to impact bacterial water quality due to the large amount stored and the high concentration of bacteria in raw manure (up to 100 million fecal coliform per gram). Most commercial dairies in the Russian River Watershed store manure in large lagoons that can hold millions of gallons of liquid manure. Waste lagoons can break, spill, leak, or fail. Lagoon linings can crack and allow liquefied manure to seep into surface waters or shallow groundwater. Pipes and hoses connecting to lagoons or spray fields may fail or leak (Marks 2001). In addition, many dairies spread or spray liquefied manure on pasture land. When liquid waste is over-applied or inappropriately applied to farm fields through irrigation, runoff of manure to surface waters can result.

The Regional Water Board implements the Water Quality Compliance Program for Cow Dairies and Concentrated Animal Feeding Operations (CAFOs). Initiated in 2012, this program currently includes a NPDES permit for CAFOs that discharge directly to surface waters, a General WDR permit for dairies that do not meet minimum standards for the protection of surface water and groundwater, and a Conditional Waiver for dairies that meet minimum standards in title 27 of the California Code of Regulations for confined animal facilities. These regulatory tools require management of process water, manure, and other organic materials at dairy operations including holding ponds and the application of such materials to cropland. The General WDR is being revised in 2019. The Regional Water Board currently has no enrollees in the NPDES permit for CAFOs.

The dairy permits require retention ponds and manured areas at confined animal facilities in operation on or after November 27, 1984, to be protected from inundation or washout by overflow from any stream channel during 20-year peak stream flows. Retention ponds are required to be lined with, or underlain by, soils which contain at least 10 percent clay and not more than 10 percent gravel or artificial materials of equivalent impermeability. Manure ponds constructed after January 19, 2012, must include a pond liner that does not exceed a unit seepage rate of  $1 \times 10^{-6}$  centimeters per second. While these permit requirements protect against manure discharges from holding ponds, discharges can occur

when streams exceed the 20-year peak stream flow rate. The dairy permits (Order No. R1-2012-0002 and Order No. R1-2012-0003) specify that waste storage facilities constructed after January 19, 2012 shall be located outside of 100-year floodplains, unless site restrictions require location within a floodplain, in which case, the waste storage facility shall be protected from inundation or damage from a 100-year flood event. The dairy permits also authorize the application of manure and process waters to land only if such application is at rates that are reasonable for the crop, soil, climate, special local situations management systems, and type of manure.

As described in Section 6.2, wet weather measurements of *E. coli* and enterococci bacteria concentrations draining from agricultural areas were much higher than the statewide objective and U.S. EPA (2012) criteria, respectively. *E. coli* bacteria concentration measurements showed a geometric mean of 880 MPN/~~100mL~~100 mL, as compared to the numeric target of 100 MPN/~~100mL~~100 mL. Enterococci bacteria concentrations measurements showed a geometric mean of 1,556 MPN/~~100mL~~100 mL, as compared to the numeric target of 30 MPN/~~100mL~~100 mL. These results confirm that runoff from agricultural areas is an existing source of bacteria. Additionally, the results for grazer fecal waste are included in Chapter 4, Evidence of Pollution. ~~They are mapped in Figure 4.6. The ten locations with the highest grazer fecal waste measured are shown in Table 4.8. The majority of the sites with highest percent matches are in the~~ 7. Sites in the Upper Laguna de Santa Rosa Watershed and Lower Santa Rosa Creek HUC-12 subwatersheds showed strong evidence of grazer fecal waste pollution. The Upper Laguna de Santa Rosa HUC-12 subwatershed as a whole showed strong evidence of grazer fecal waste pollution.

Figure 6.13 shows the results of the Bovine-source *Bacteroides* bacteria concentration measurements and the locations of dairies in the Middle Russian River Hydrologic Area. Visual comparison shows that higher concentrations of Bovine-source *Bacteroides* bacteria are near or downstream of the dairies. Figure 6.14 shows the results of the grazer fecal waste gene sequence measurements (the percentage of the grazer fecal waste gene sequences are shown) and the locations of dairies in the Middle Russian River Hydrologic Area. Visual comparison shows that higher levels of grazer fecal waste gene sequence measurements are near or downstream of the dairies. This source analysis approach does not distinguish between the various types of grazers, and in particular between cattle and dairy cows. However, based on an assessment of the data and the known distribution of cattle versus dairy operations, general assumptions regarding the relative contribution from cattle versus dairy cows are appropriate and Regional Board staff conclude that dairy operations are a probable source of pathogens.

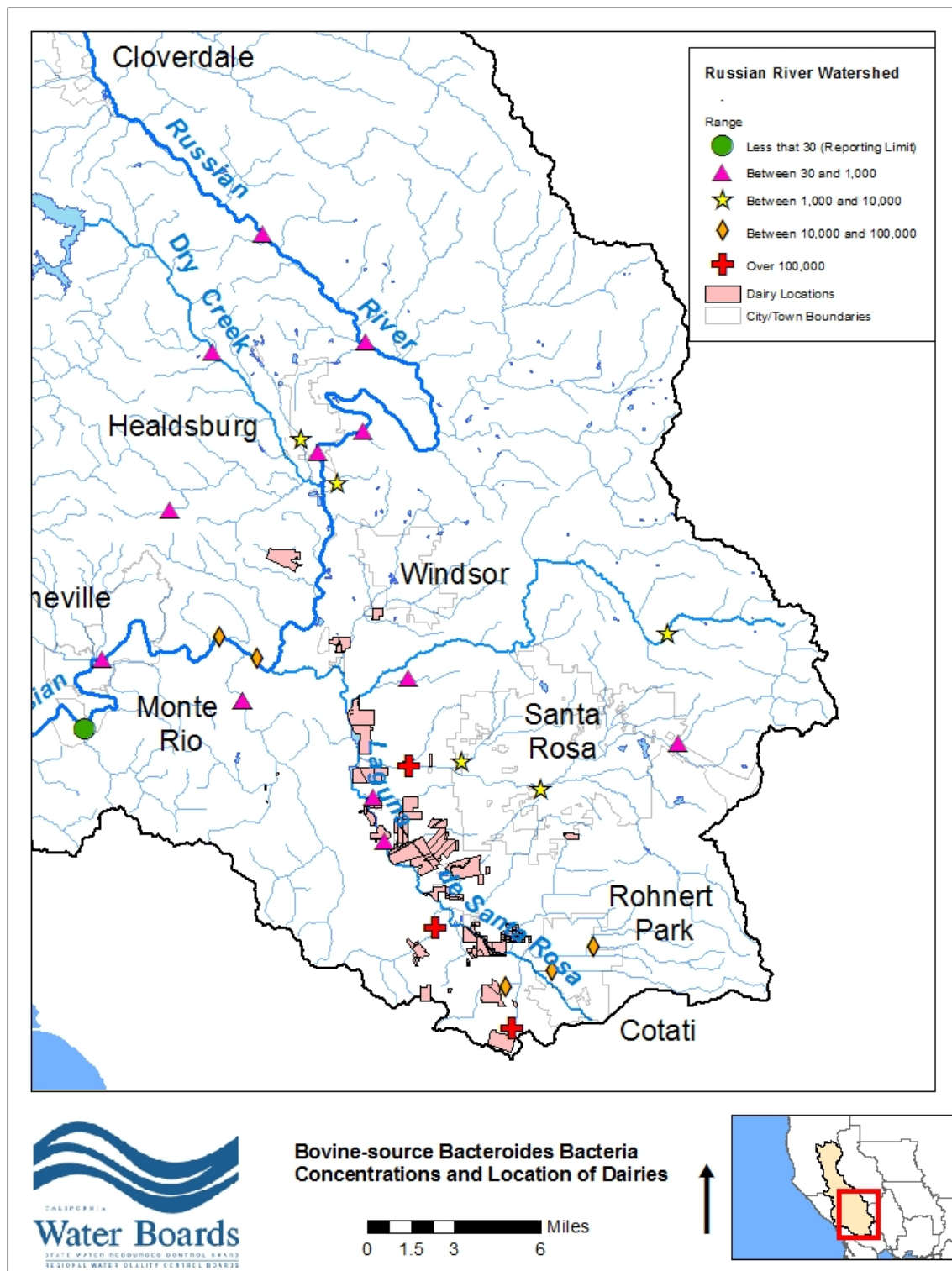


Figure 6.13: Locations Of The Bovine-Source Bacteroides Results And Dairies In The Middle Russian River Watershed.

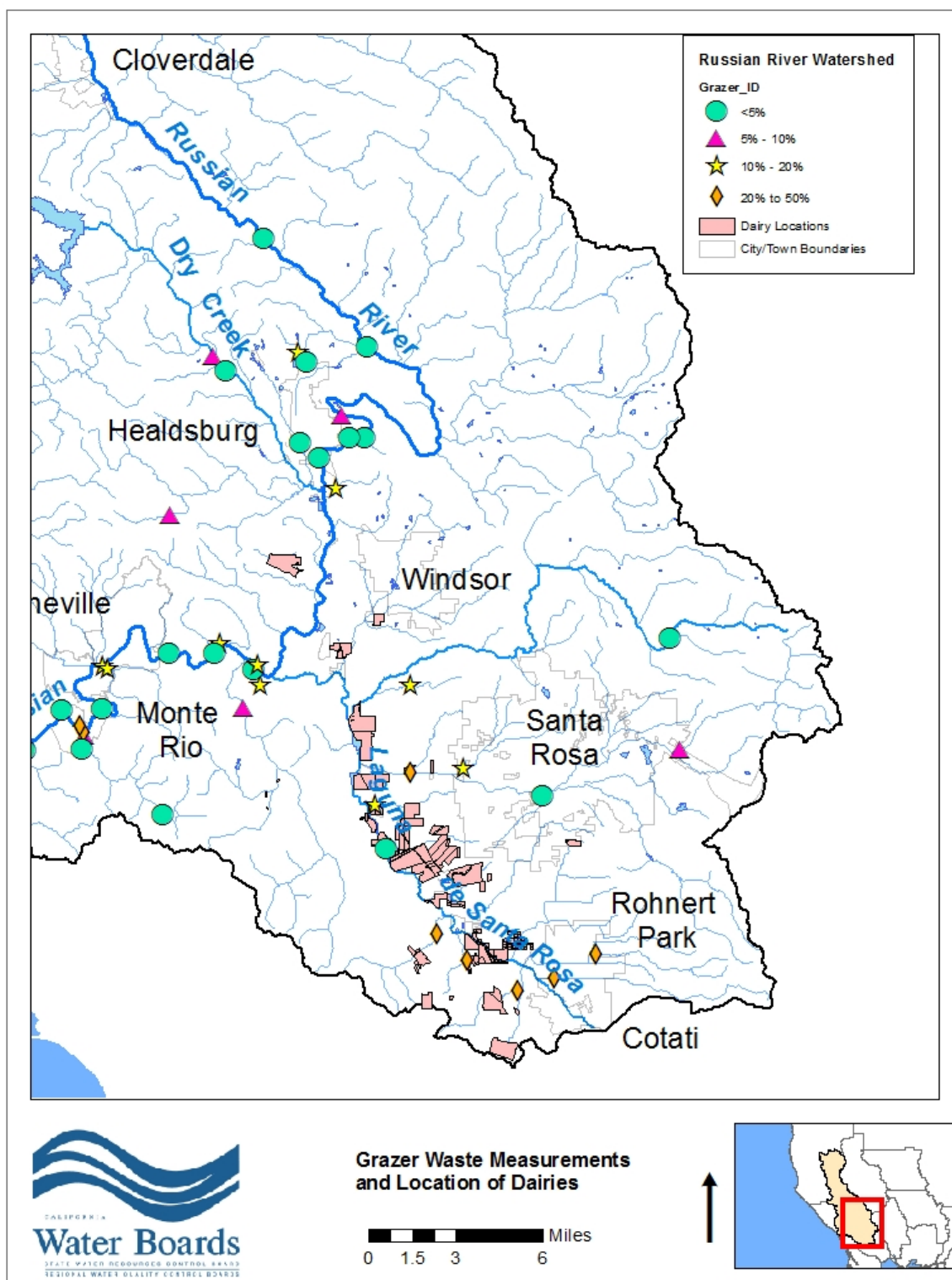


Figure 6.14: Locations Of The Grazer Waste Results And Dairies In The Middle Russian River Watershed.

### 6.5.5 NONPOINT SOURCE CONCLUSIONS

The Russian River Watershed has widespread nonpoint sources throughout the watershed that have the potential to deliver pathogens to surface waters. Assessment of potential fecal waste sources and fecal indicator bacteria do not inform relative load contributions between the point sources and/or nonpoint sources, including runoff from facilities that discharge waste to land. All identified potential nonpoint sources of fecal waste to surface waters provide an elevated risk of pathogen discharge and impairment of REC-1 beneficial uses. The primary nonpoint sources of fecal waste include ~~OWTS~~, homeless encampments, recreational water uses and users, and manure from dairies and non-dairy livestock. As such, all identified potential nonpoint sources of fecal waste to surface waters require a program of implementation and monitoring to prevent and assure that fecal waste and potential pathogens are not discharged to surface waters. *Chapter 9 – Implementation* describes the implementation and *Chapter 10 – Watershed Monitoring* describes the monitoring program designed to assure the ~~TMDL targets~~ waste load and load allocations are achieved.

### 6.6 SOURCE ANALYSIS CONCLUSIONS

Potential sources of fecal waste within the Russian River Watershed are many and widespread. A significant number of potential sources are already covered under an individual or general permit and are controlled through use of treatment or best management practices.

In summary, staff analyzed sources of fecal waste with the potential to enter the Russian River or its tributaries in two different ways:

- By assessing fecal indicator bacteria concentrations associated with different types of land uses; and
- By identifying the types of point source, discharge to land, and nonpoint source facilities and activities that discharge or have the potential to discharge fecal waste to surface waters.

The source analysis does not estimate the volume of fecal waste entering the Russian River Watershed from any given potential source, nor does it stratify the sources based on order of magnitude. But, the multiple lines of evidence provide an understanding of the locations within the watershed with greatest risk from fecal waste, the land uses of most concern, and the point and nonpoint sources deserving further evaluation- and/or control. For the purposes of this TMDL, the facilities/activities that discharge waste to land are considered nonpoint sources.

There is evidence of human and bovine fecal waste entering the waters of the Russian River Watershed during all times of the year, though higher during wet weather. Sewered and

non-sewered developed areas are associated with exceedances of ~~numeric targets~~statewide objectives for *E. coli* and national criteria enterococci bacteria, indicating a threat to recreational use. Similarly, agricultural areas are also associated with exceedances of ~~numeric targets for *E. coli* and enterococci bacteria~~the same objectives/criteria.

From these multiple lines of inquiry, it is possible to conclude that the following source categories have potential to discharge pathogens to surface waters in the Russian River Watershed:

#### Sources of Human Fecal Waste Material

- Treated Municipal Wastewater to Surface Waters including discharges from holding ponds;
- Untreated Sewage from Sanitary Sewer Systems;
- Wastewater from Percolation Ponds and through Spray Irrigation;
- Runoff from Land Application of Municipal Biosolids and Biosolids Storage Areas;
- Runoff from Water Recycling Projects;
- Onsite Wastewater Treatment Systems, including individual systems and large or multi-user systems;
- Recreational Water Uses and Users;
- Homeless and Illegal Camping; and
- Storm Water to Municipal Separate Storm Sewer System (MS4s) and Areas Outside MS4 Boundaries, including CalTrans stormwater runoff.

#### Sources of Domestic Animal and Farm Animal Waste

- Pet Waste;
- Manure from Non-Dairy Livestock and Farm Animals; and
- Manure from Dairy Cows

*Chapter 9* ~~{Implementation}~~ describes the program of implementation by which these sources of fecal waste material are to be controlled, including completion of site specific studies/surveys will be completed, development and implementation of new or upgraded management plans developed and implemented, including the existing and new applicable regulatory mechanisms applicable to each source category.

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## CHAPTER 7 TMDL CALCULATIONS AND ALLOCATIONS

### 7.1 OVERVIEW

A TMDL is a calculation of the maximum amount of a pollutant that a waterbody can receive and still meet water quality objectives. The TMDL equals the loading capacity of the waterbody for the pollutant plus a margin of safety (MOS) to account for any uncertainties. The MOS can be implicit by virtue of conservative assumptions or explicit, given as a measured or estimated term. The loads are allocated among the various sources of the pollutant. Anthropogenic pollutant sources are characterized as either point sources that receive a wasteload allocation (WLA) or nonpoint sources that receive a load allocation (LA). The natural background load is included in the load allocation, unless estimated separately.

$$\text{TMDL} = \Sigma \text{WLAs} + \text{LAs} + \text{MOS}$$

TMDLs can be expressed in terms of mass per time, toxicity or other appropriate measure. The TMDL must be set at a level not to exceed the loading capacity of the waterbody and at a level resulting in attainment of the water quality objective. It must be adjusted to account for seasonal variation, if appropriate.

### 7.2 LOADING CAPACITY, TMDL AND MARGIN OF SAFETY

~~Because the current~~ The fecal coliform objective applicable contained in the ~~North Coast Region Basin Plan~~ for protection of REC-1 is ~~soon to be~~ superseded by a statewide bacteria objective, ~~the for *E. coli* in freshwater and enterococci in saline waters, adopted by the State Water Board in August 2018. As such, the loading capacity, and by extension the TMDL, are based on the draft statewide *E. coli* bacteria objective proposed by the State Water Board for standard for the protection of REC-1 in freshwaters. The draft statewide bacteria objective itself is based on U.S. EPA national criteria (2012), which assessed the applicability of two *E. coli* criteria, each derived from a different number of acceptable illnesses per 1,000 recreators. The draft.~~ The statewide bacteria objective is based on the lower of the two acceptable illness rates identified by U.S. EPA (2012) (i.e., 32 gastrointestinal illnesses versus 36). As such, the TMDL, ~~based on the draft statewide bacteria objective,~~ includes an implicit margin of safety as represented by the lower of two acceptable illness rates. ~~The TMDL and loading capacity are defined in Table 7.1.~~

~~As an added margin of safety, thresholds for two fecal indicator bacteria are proposed as numeric targets (see Chapter 5). The indicators and targets are selected because of the epidemiological evidence that links their measurement to health outcomes, as described in U.S. EPA (2012). These two indicators measure different bacteria, but under different scenarios, are linked to similar health outcomes, and are identically scaled to result in no more than 32 gastrointestinal illnesses per 1,000 recreators. Should environmental factors~~



cause measurement of either of the indicators to result in a false positive, then the results of the other will allow for better assessment and response. Such a margin of safety ensures greater certainty when assessing attainment of the water quality objective and protection of public health.

### 7.3 WASTELOAD AND LOAD ALLOCATIONS

The loading capacity of the Russian River Watershed for fecal waste pathogens is equivalent to the water quality objective, given as a concentration of the fecal indicator bacteria *E. coli* in freshwaters and enterococci in saline waters, as per the statewide objectives adopted by the State Water Board in August 2018. To attain this water quality objective, the wasteload (WLA) and load allocations (LA) are also equivalent to the water quality objective and given as the same concentration of *E. coli* in freshwater and enterococci in saline waters, as described in Table 7.1. Natural background concentrations of *E. coli* and enterococci have not been estimated. As described in Chapter 3, Regional Water Board staff are conducting a reference study to estimate fecal indicator bacteria concentrations in minimally disturbed subwatersheds representing multiple different landscapes found within the Russian River Watershed and region as a whole. For the purpose of this TMDL, natural background concentrations are not represented by a separate term, but included in the load allocation. The wasteload and load allocations are defined in Table 7.1.

Table 7.1		
Source Category	Type of Allocation	Allocation
Municipal wastewater discharge to surface water (NPDES)	WLA	GM and STV for <i>E. coli</i> or enterococci depending on salinity
Municipal wastewater discharge to land (WDR)	WLA/LA	0
Sanitary Sewer Systems	LA	0
Land Application of Biosolids	LA	0
Recycled Water Irrigation Runoff	LA	0
Municipal Stormwater (NPDES)	WLA	GM and STV for <i>E. coli</i> or enterococci depending on salinity
CalTrans Stormwater (NPDES)	WLA	GM and STV for <i>E. coli</i> or enterococci depending on salinity
Large OWTS	LA	0
Individual OWTS	LA	0
Recreational Water Use and Users	LA	0
Homeless Encampments and Illegal Camping	LA	0
Non-dairy Livestock and Farm Animal Waste	LA	GM and STV for <i>E. coli</i> or enterococci depending on salinity
Dairies and CAFOs subject to NPDES permit	WLA	GM and STV for <i>E. coli</i> or enterococci depending on salinity
Dairies and CAFOs not subject to NPDES permit	LA	GM and STV for <i>E. coli</i> or enterococci depending on salinity

The sampling frequency and period of sampling is important to proper interpretation of monitoring results. The ~~draft~~ statewide *E. coli* objective for freshwater and enterococci objective for saline water requires that the geometric mean be calculated weekly based on a rolling 6 week period using a statistically relevant number of samples, generally a minimum of 5 within 6 weeks. The Statistical Threshold Value (STV) is to be exceeded no more than 10% of the time, calculated monthly. To remain consistent with the ~~draft~~ statewide *E. coli* objectives, the same sampling frequency and calculation approach are required here.

## 7.4 SEASONAL VARIATION

When establishing wasteload and load allocations, it is important to consider the seasonality of the discharge and beneficial use. A point source waste discharge prohibition applies in the Russian River Watershed, which limits point source discharge to the wet season, only. The existing waste discharge prohibition does not apply to nonpoint sources of waste. Chapters 4 and 6 provide evidence of fecal waste discharge during all times of the year, largely from developed areas, both sewered and nonsewered, though measured concentrations of ~~FIB~~fecal indicator bacteria are highest in the wet season.

The beneficial use of concern to this TMDL is REC-1, which is designated as a year round use. REC-1 includes multiple forms of water contact recreation and is based on the potential to ingest water incidental to the recreational activity. While the use is designated as a year round use, and there is no restricted access to rivers and streams during the winter; nonetheless, full body contact is most prevalent during the dry season months when the Russian River Watershed swimming beaches are more commonly enjoyed.

Because fecal waste discharge and REC-1 occur during all times of the year, and the TMDL is based on concentrations of *E. coli* for freshwater and enterococci for saline water, regardless of river flow, there is no seasonal variation required for this TMDL. The use of concentration limits as the waste load and load allocation intrinsically accounts for seasonality. The TMDL is based on the maximum allowable concentration of *E. coli* in freshwater and enterococci in saline water to protect public health during all times of the year.

## 7.5 REQUIRED REDUCTIONS

An estimate of the reductions necessary to achieve the TMDL are useful for implementation planning and required as one of the nine elements of a watershed plan, to be eligible for 319(h) grant funding. Regional Water Board staff estimated the reductions in *E. coli* that would be necessary to achieve the TMDL, as reported in Butkus (2013d).<sup>22</sup> Staff evaluated historic *E. coli* data from 2002 to 2012 at numerous locations throughout the watershed, with a minimum of 5 samples required for the analysis. A statistical rollback method was applied to use the statistical characteristics of a bacteria concentration distribution to

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<sup>22</sup> [http://www.waterboards.ca.gov/northcoast/water\\_issues/programs/tmdls/russian\\_river/](http://www.waterboards.ca.gov/northcoast/water_issues/programs/tmdls/russian_river/)

estimate future concentrations after abatement processes are applied to sources. The percent reductions necessary to achieve both the geometric mean and statistical threshold value established by the draft-statewide *E. coli* objective were estimated at each location where sufficient historic *E. coli* data was available. The required reductions range from 49-99% and are particularly important in the tributaries.

## **7.6 TMDL SCHEDULE**

Attainment of a TMDL and its wasteload and load allocations is generally required on the quickest schedule that can reasonably be applied. Chapter 9 describes the implementation actions that are necessary to identify and control individual fecal waste sources. The Action Plan establishes the time frame for achieving each of the elements of the program of implementation. Completion of all action and attainment of the TMDL are anticipated to occur within 20 years of Action Plan adoption and approval.

## CHAPTER 8 LINKAGE ANALYSIS

The purpose of this chapter is to establish the link between 1) the sources of fecal waste on the landscape, 2) evidence of fecal waste discharge to the Russian River and its tributaries, 3) the risk of contact with human and domestic animal fecal waste when recreating in and around the Russian River and its tributaries, 4) the increased risk of illness that could potentially result from contact with pathogen-contaminated waters, and 5) the reduction in risk of pathogen contact and illness that will result from the control of fecal waste discharge in a manner described in the proposed Program of Implementation.

### 8.1 SOURCES OF FECAL WASTE ON THE LANDSCAPE

Chapter 6 presents an inventory of all of the known sources of fecal waste on the landscape within the Russian River Watershed. Though the inventory does not quantify the relative contribution from each of the sources or establish their actual potential to discharge. Instead from specific locations, it identifies each of the sources of fecal waste discharge within the Russian River Watershed.

### 8.2 EVIDENCE OF FECAL WASTE DISCHARGE

Chapter 4 provides evidence of human and bovine fecal waste discharge by describing the results of monitoring for *E. coli*, enterococci, and *Bacteroides* bacteria, among other measures of impact. *Bacteroides* bacteria that are specific to their animal host. Ambient water quality samples were collected throughout the watershed: upper, middle and lower reaches. The results indicate the widespread presence of human-specific and bovine-specific *Bacteroides* bacteria throughout the watershed. These and exceedances of 1) statewide bacteria objectives and 2) national criteria for enterococci plus public health advisories in HUC-12s through the middle and lower reaches of the watershed. *Bacteroides* bacteria can only have entered the Russian River having first originated in the gut of their animal host, and are a good measure of recent discharge. The *Bacteroides* analyses do not directly associate any of the known sources of fecal waste with evidence of discharge, except to the degree that it distinguishes between human sources and bovine sources.

Chapter 4 also provides evidence of human and grazer fecal waste discharge through the use of PhyloChip™ DNA tracing. Water samples were analyzed for the presence of gene sequences that can be matched to a library of known animal fecal waste gene sequences. These data establish that human and grazer fecal waste are entering the Russian River Watershed at locations throughout the middle and lower portions of the watershed. The PhyloChip™ study indicates that the most significant fecal waste discharge of concern in the Laguna de Santa Rosa subwatershed may be from dairies, while the most significant problem in the Guerneville subwatershed is from humans. The PhyloChip™ study does not directly associate any of the known sources of fecal waste with evidence of discharge, except to the degree that it distinguishes between human sources and grazer sources. But,

Chapter 4 provides clear evidence that investigation of the potential for discharge from the identified sources is warranted.

Chapter 6 confirms evidence of the discharge of human and bovine sources of fecal waste being associated with specific land cover types. Human-specific and bovine-specific *Bacteroides* and the other FIBs were associated with every landcover type during both dry and wet weather, but at levels nearly an order of magnitude higher during wet weather. The exception is with forestland, which has similar concentrations of both human-specific and bovine-specific *Bacteroides* and other FIBs during both dry and wet conditions. Non-sewered developed lands are identified as having the highest concentrations of fecal indicator bacteria during the dry season, while sewerred developed lands had the highest during the wet season. Agricultural lands showed the largest concentrations of both human and bovine fecal waste sources during the wet season.

### 8.3 RISK OF CONTACT WITH FECAL WASTE

One of the general findings of the TMDL study is that the most significant discharge of fecal waste to the Russian River Watershed occurs as a result of storm water discharges. Another general finding is that the most significant recreational use of the Russian River Watershed is during the summer months when swimming, boating, and other water contact recreational activities are most common. With respect to public health protection, these findings are very good news: the most significant human health risk occurs during times of the year when the fewest people are in contact with water in the Russian River Watershed. It is important to keep in mind, however, that recreational use of the Russian River Watershed is allowed and occurs during all times of the year. Further, the Regional Water Board has designated the water contact recreational beneficial use as a year round use, thereby obligating it to ensure protection during all months of the year. In other regions of the State, a seasonal recreational beneficial use is sometimes applied and requires structures (e.g., fences) that prevent the public from making use of the waterbody during dangerous time of the year. This is not the case in the Russian River Watershed.

Chapter 6 describes the results of a focused study of the effect of onsite waste treatment systems (OWTS) on water quality conditions. In the study staff collected water quality samples in locations in surface water determined to have a high density of OWTS upgradient. Samples were analyzed for human-specific *Bacteroides*, *E. coli* and ~~enterococcus~~*enterococci*. The results of this sampling was compared to the results of identical sampling at locations determined to have a low density of OWTS upgradient. Specific to assessing the risk of human contact with fecal waste, the study showed that higher OWTS density is directly associated with higher concentrations of FIBs, including human-specific *Bacteroides*.

Further, Chapter 6 describes the relationship between the number of summer time swimmers and evidence of human-specific fecal waste. Water samples were collected and analyzed for *E. coli*, enterococci, and human-source *Bacteroides* bacteria. Samples were

collected at Veterans Memorial Beach and Monte Rio Beach during the week of the Independence Day holiday in 2013. The study found that the percentage of *Bacteroides* bacteria that were human-source showed a relatively strong positive correlation with swimming recreation, with the higher percentages of human-specific *Bacteroides* observed on days with a larger number of people swimming. These data provide compelling evidence that summer recreational use of the Russian River Watershed does present a risk of contact with fecal waste, particularly at recreational beaches and during holidays when a larger number of people are present.

Finally, Chapter 6 relates various land cover categories with ambient water quality results for *E. coli*, enterococci, and *Bacteroides* bacteria. The Land Cover Study confirms the potential for developed areas (both urban and rural) and agricultural areas to be associated with elevated FIBs, including evidence of human and bovine-specific bacteria.

These studies effectively extend the area of concern to include urban areas, areas with a high density of OWTs, and areas such as shrubland, agricultural lands, and rural residential lands that include cows.

## 8.4 RISK OF PATHOGEN-RELATED ILLNESS

The primary mechanism by which the Action Plan assesses the potential for pathogen-related illness is through ambient water quality sampling for *E. coli* and enterococci using draft statewide bacteria objectives and U.S. EPA (2012) recommended criteria, respectively, as thresholds of concern. The TMDL assessment applied the specific thresholds that represent a risk to no more than 32 illnesses per 1000 recreators. Chapter 4 describes the results of the *E. coli* analyses in freshwater and enterococci analyses in saline water, with exceedances of the draft statewide bacteria objective at 16 of the 31 numerous locations sampled. These locations include: a number of reaches in the Russian River mainstem within the Geyserville and Guerneville are contained in the following HUC-12 subwatersheds, the: West-Slough-Dry Creek, Sausal Creek-Russian River, Upper Laguna de Santa Rosa, Upper Santa Rosa Creek, Lower Santa Rosa Creek, Lower Laguna de Santa Rosa, Porter Creek-Mark West Creek, Atascadero Creek, and Green Valley Creek. Chapter 4, Porter Creek-Russian River, Dutch Bill Creek-Russian River, and Willow Creek-Russian River HUC-12 subwatersheds also describes the results of the enterococci analyses, with were identified as impaired/polluted based on exceedances of the U.S. EPA (2012) recommended national criteria at 27 of the 31 locations sampled. Only four locations on the Russian River were free of enterococci exceedances, including the Russian River at: Vichy Springs Road, Talmadge Road, River Access Road, in freshwater coupled with public health advisories. Oat Valley-Russian River and Hacienda Bridge Road-Brooks Creek-Russian River HUC-12 subwatersheds are identified as impaired/polluted on this basis.

These data were augmented by an analysis using PhyloChip™ phylogenetic DNA microarray. From the PhyloChip™ analysis, the genetic sequence of seven pathogenic

bacteria species with the potential to cause human illness were identified at locations in the middle and lower Russian River Watershed. As many as 27 tributary locations and four mainstem locations showed evidence of contamination with *proteus mirabili*, *salmonella enterica*, *serratia marcescens*, *shigella flexneri*, *Staphylococcus epidermidis*, *Staphylococcus haemolyticus*, and *Yersinia sp.* Up to 41% of the samples collected showed the presence of one or more of these pathogenic bacteria, with potential to cause illnesses ranging from urinary tract infection, skin infections, gastroenteritis, pneumonia, meningitis, and the plague.

Finally, ~~As above~~, local agencies have on occasion been compelled to close public beaches within the Russian River Watershed because of exceedances of public health criteria. The City of Santa Rosa posts a permanent advisory against swimming in Santa Rosa Creek at Prince Memorial Greenway. In addition, an advisory against swimming has been posted on at least one of the public beaches in Sonoma County in all but 3 of the years between 2001 and ~~2014~~2018, with the largest number of posted days in 2008 (11 days), 2009 (80 days), 2011 (7), 2012 (36), ~~and 2013 (9).~~2015(6), and 2017(8).

To ensure a clear linkage of fecal waste discharge to fecal indicator bacteria concentrations, all the ambient water samples, which were analyzed for *E. coli* and enterococci, were also analyzed for human-source and bovine-source *Bacteroides* bacteria. The results provide evidence of human and bovine fecal waste discharge at all of the locations where *E. coli* or enterococci bacteria exceeded ~~draft statewide bacteria objectives and U.S. EPA (2012) recommended criteria, respectively~~, confirming the linkage of fecal waste discharge to fecal indicator bacteria concentrations.

## 8.5 ATTAINMENT OF WATER QUALITY OBJECTIVE

~~The current water quality objective related to protection of water contact recreation from pathogens is established in the Basin Plan as a numeric fecal coliform objective. The fecal coliform objective is no longer deemed the best metric to assess risk of pathogenic illness, soon to be superseded by a statewide bacteria objective to be adopted by the State Water Board. The draft statewide objective currently out for public review is based on U.S. EPA (2012) and is an *E. coli* bacteria objective ensuring no more than 32 gastrointestinal illnesses per 1,000 recreators. Numeric targets are based on measurement of *E. coli* and enterococci bacteria with thresholds based on U.S. EPA (2012) that represent a risk of no more than 32 illnesses per 1,000 recreators. Measurement of these metrics~~Numeric targets to measure attainment of statewide water quality objectives are based on the statewide water quality objectives, themselves. Measurement of these metrics (i.e., *E. coli* in freshwater and enterococci in saline water) will allow assessment of the progress being made toward reducing fecal waste discharge and reducing potential public exposure to illness-causing pathogens. Similarly, attainment of the statewide bacteria objective will ensure protection of the REC-1 beneficial use and public health.

## 8.6 CONCLUSION

Fecal waste from animals and humans can contain pathogens. Indicator bacteria are associated with the presence of fecal waste and are routinely used as an indicator of pathogens. Ambient water quality samples were collected throughout the watershed: upper, middle and lower reaches. Monitoring data indicate that the Russian River watershed is impacted by fecal indicator bacteria in multiple reaches during both dry and wet weather. Chapter 4 and Chapter 6 ~~of the staff report~~ provides evidence of human and bovine fecal waste discharge throughout the watershed, indicating high concentrations of pathogen indicator bacteria in the watershed, and multiple fecal waste sources within the Russian River Watershed, respectively.

The loading capacity is defined in terms of fecal indicator bacterial indicator concentrations and is equivalent to the numeric targets. The numeric targets correspond to an acceptable level of human illness in recreational waters, use indicators that correlate with controllable sources of pathogens, and are indicators that are associated with gastrointestinal illness rates. The numeric targets are associated with a human health risk that will protect the REC-1 beneficial use, and therefore effectively measure progress toward attainment of the water quality standards.

Reductions in ~~*E. coli* and enterococci bacteria concentrations~~ fecal waste discharge from the identified sources ~~should~~ are expected to result in a reduction in the discharge of pathogens and therefore a reduction of receiving water column concentrations, of *E. coli* in freshwater and enterococci in saline water. These reductions are expected to correlate with a decrease in illness rate, and support of the REC-1 use. The numeric targets are identical to the statewide bacteria objectives and protective of recreational beneficial uses; hence the TMDLs define appropriate water quality conditions. Therefore, the loading capacity, waste load and load allocations, and proposed actions to reduce the ~~pollutants~~ discharge of fecal waste and therefore pathogens will result in attainment of the numeric targets and thus achieve water quality standards.



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## CHAPTER 9 PROGRAM OF IMPLEMENTATION

The purpose of the Program of Implementation is to describe the actions necessary to reduce and eliminate fecal waste discharges and attain water quality objectives. The Regional Water Board has discretion in how it implements the Program of Implementation described in this chapter. The Program of Implementation is incorporated into ~~aan~~ Action Plan, to be proposed to the Regional Water Board for adoption as an amendment to the Basin Plan (Basin Plan Amendment). ~~The~~The Action Plan is included as Appendix A. The Program of Implementation identifies:

1. Actions that staff expect will reduce and eliminate fecal waste discharges and associated pathogens;
2. Implementing parties for these actions;
3. Regulatory mechanisms by which the Regional Water Board will ensure that these actions are taken; and
4. A timeline for completion of actions.

### 9.1 WASTE DISCHARGE PROHIBITIONS

Discharges of fecal material from humans or from domestic animals to waters of the state are controllable water quality factors that shall conform to the bacteria water quality objective and be treated and managed in such a way as to ensure ambient fecal indicator bacteria concentrations are protective of REC-1. Controllable water quality factors are those actions, conditions, or circumstances resulting from human's activities that may influence the quality of waters of the state and that may be reasonably controlled.

In accordance with Water Code section 13243 and in order to achieve the bacteria water quality objective, to protect present and future beneficial uses of water, to protect public health, and to prevent nuisance, the Action Plan sets forth the following discharge prohibition:

*Discharges of waste containing fecal waste material from humans or domestic animals<sup>23</sup> to waters of the state within the Russian River Watershed that cause or contribute to an exceedance of the bacteria water quality objectives not otherwise authorized by waste discharge requirements or other order or action of the Regional or state Water Board are prohibited. Compliance with this prohibition can be achieved in the following manner.*

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<sup>23</sup> Examples of domestic animals include, but are not limited to, cows, horses, cattle, goats, sheep, swine, poultry, dogs, cats, or any other animal(s) in the care of any person(s).

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1. Implement adequate treatment and best management practices to prevent the discharge of fecal waste material from humans or domestic animals from entering a water of the state either directly, or indirectly as a result of stormwater runoff.
2. Comply with all fecal waste/pathogen-related provisions of an applicable NPDES permit.
3. Comply with all fecal waste/pathogen-related provisions of an applicable WDR.
4. Comply with all fecal waste/pathogen-related provisions of an applicable general WDR or waiver of WDRs.
- 1-5. Implement the terms of the Memorandum of Understanding between the North Coast Regional Water Quality Control Board and relevant local agencies to address fecal waste from homeless encampments and recreational water use.
6. For non-dairy livestock, implement best management practices to achieve the assigned load allocation within 2 years of the effective date of this TMDL and, if required by the Executive Officer, develop and implement a Ranch Management Plan. Once adopted by the North Coast Regional Water Quality Control Board, non-dairy livestock operations comply with the prohibition if dischargers are in compliance with all fecal waste/pathogen-related provisions of an applicable WDR or waiver of WDRs.

Examples of domestic animals include, but are not limited to, cows, horses, cattle, goats, sheep, swine, poultry, dogs, cats, or any other animal(s) in the care of any person(s).

## **9.2 IMPLEMENTATION ACTIONS**

Water quality assessment and monitoring results indicate the following source categories have potential to discharge pathogens to surface waters in the Russian River Watershed:

### **Sources of Human Fecal Waste Material**

- Treated Municipal Wastewater to Surface Waters; including discharges from holding ponds
- Untreated Sewage from Sanitary Sewer Systems;
- Wastewater from Percolation Ponds and through Spray Irrigation;
- Runoff from Land Application of Municipal Biosolids and Biosolids Storage Areas;
- Runoff from Water Recycling Projects;
- Runoff from sites that receive discharges of waste to land
- Onsite Wastewater Treatment Systems, both large and small, commercial and domestic;
- Recreational Water Uses and Users;
- Homeless and Illegal Camping; ~~and~~
- Storm Water to Municipal Separate Storm Sewer System (MS4s) and Areas Outside MS4 Boundaries.

### **Sources of Domestic Animal and Farm Animal Waste**

- Pet Waste;
- Manure from Non-Dairy Livestock and Farm Animals; ~~and~~
- Manure from Dairy Cows

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The implementation actions included in the Action Plan address the control of fecal waste discharge and associated pathogens from specific controllable pathogen sources (as identified in Source Analysis, Chapter 6), including humans and domesticated animals. Each probable source, its implementing party(s), its applicable wasteload allocation (WLA) or load allocation (LA), and, where applicable, its implementation actions are described in the following sections. They include:

- Municipal wastewater discharges to surface waters
- Wastewater holding pond discharges to surface waters
- Percolation ponds and disposal by irrigation
- Sanitary sewer systems
- ~~Storage and use~~ Land application of treated municipal sewage sludge (biosolids)
- Recycled water irrigation runoff
- Individual onsite wastewater treatment systems
- ~~Recreation~~
- Large onsite wastewater treatment systems
- Recreational water uses and users
- Homeless encampments and illegal camping
- ~~Urban~~ Municipal storm water runoff
- Caltrans storm water runoff
- Non-dairy livestock and farm animals
- Dairies and CAFOs

### **9.2.1 MUNICIPAL WASTEWATER DISCHARGES TO SURFACE WATERS**

There are municipal wastewater treatment facilities in the Russian River Watershed that are authorized pursuant to a National Pollutant Discharge Elimination System (NPDES) permit to collect, treat, disinfect and discharge fully-treated wastewater directly to the Russian River or its tributaries during the wet season up to certain percent of the river flow. These facilities are operated by:

- City of Ukiah
- City of Healdsburg
- City of Santa Rosa
- Russian River County Sanitation District
- Occidental County Sanitation District
- City of Cloverdale

The waste discharges are regulated under existing NPDES permits that include effluent limitations and disinfection specifications to ensure treatment processes achieve effective and reliable pathogen reduction. Disinfection requirements in these permits are derived from standards for tertiary-treated recycled water contained in title 22 of the California Code of Regulations. The Basin Plan describes discharge requirements for advanced treated wastewater ~~for discharges~~. When a disinfection system operates properly and attains the effluent limitations for total coliform bacteria, it will also attain the wasteload allocation for *E. coli* in freshwater and enterococci in saline water that is described in the

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Action Plan. As a general matter, direct discharges of properly disinfected, treated wastewater to surface waters are not expected to contribute to an exceedance of fecal indicator bacteria concentration limits that are protective of REC-1.

In order to ensure ambient fecal indicator bacteria concentrations are protective of REC-1, ~~dischargers~~discharges of wastewater from municipal treatment facilities directly to the Russian River or its tributaries shall attain the following effluent limitations in their NPDES permits and/or the wasteload allocation, whichever is most stringent:

1. The median concentration of total coliform bacteria shall not exceed 2.2 MPN/ 100 mL, using the daily bacteriological results of the last 7 days for which analyses have been completed;and
2. The number of total coliform bacteria shall not exceed 23 MPN/ 100 mL in more than one daily result in any 30-day period;and.

In order to ensure ambient fecal indicator bacteria concentrations are protective of REC-1, each entity shall maintain compliance with applicable waste discharge requirements for its wastewater treatment facility. To demonstrate compliance with limitations, ~~direct dischargers~~discharges of treated wastewater directly to the Russian River and its tributaries shall comply with existing monitoring and reporting requirements, including daily effluent monitoring at a location or locations where a representative sample of the effluent can be collected. ~~Direct~~Dischargers shall provide to the Regional Water Board monthly discharge monitoring reports and other reports, as necessary, to demonstrate compliance with effluent limitations and wasteload allocations.

## **9.2.2 WASTEWATER HOLDING POND DISCHARGES TO SURFACE WATERS**

There are five municipal wastewater treatment facilities in the Russian River Watershed that collect, treat, dispose, or recycle municipal wastewater and discharge treated effluent from a wastewater holding pond to the Russian River or its tributaries. These facilities are operated by:

- Town of Windsor
- City of Santa Rosa<sup>24</sup>
- Forestville Water District
- Graton Community Services District
- Russian River County Sanitation ~~District~~District<sup>18</sup>

All municipal wastewater treatment facilities discharging directly to surface waters in the Russian River Watershed are regulated under NPDES permits that include effluent limitations and disinfection specifications to achieve pathogen reduction in the effluent, and the regulated dischargers listed in Section 9.2.1 above maintain reasonably consistent compliance with these limitations and specifications. However, wastewater discharged

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<sup>24</sup> The City of Santa Rosa and the Russian River County Sanitation District also have the capability of discharging treated wastewater effluent directly to the Russian River or its tributaries.

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from municipal wastewater holding ponds, although previously disinfected, is not routinely monitored after prolonged storage and prior to discharge to surface water to detect the presence of fecal indicator bacteria. Consequently, the discharge, upon entering the surface water, may not meet waste load allocations.

In order to ensure ambient fecal indicator bacteria concentrations are protective of REC-1, ~~each entity~~ NPDES permits adopted after the effective date of the Action Plan for entities authorized to discharge treated wastewater from holding ponds to the Russian River or its tributaries shall maintain compliance with the wasteload must include 1) requirements for the entity to collect and load allocations as follows, using the analyze bacteriological results of samples from holding pond effluent samples collected at least weekly for the calendar month for which analyses have been completed:

The geometric mean concentration and other pertinent information related to the discharge to determine whether discharges from the holding pond are attaining WLAs, and 2) effluent limitations that implement WLAs if it is determined that an entity's discharge causes or has the reasonable potential to cause an exceedance of *E. coli* bacteria shall not exceed 100 MPN/100 mL, and WLAs. An entity's effluent monitoring requirements must include samples of a sufficient number and frequency to fully characterize the discharge from the holding pond to surface water.

- ~~1. The Statistical Threshold Value (STV) for *E. coli* bacteria shall not exceed 320 MPN/100 mL.~~

Within ~~five~~ seven years from the effective date<sup>25</sup> of the Action Plan, the Regional Water Board will begin to conduct reasonable potential analyses (RPAs) for entities authorized to discharge treated wastewater from holding ponds to the Russian River or its tributaries and, where reasonable potential is determined, establish the aforementioned effluent limitations that implement WLAs in each an entity's NPDES permit. The Regional Water Board shall complete the RPAs and establish appropriate effluent limitations when each individual NPDES permit is scheduled for revision.

Based on an entity's request and demonstration that it is infeasible for the entity to achieve immediate compliance with ~~these adopted~~ effluent limitations, the Regional Water Board may authorize a schedule of compliance in the NPDES permit. A schedule of compliance shall include a series of required actions to be undertaken by the discharger for the purpose of achieving adopted effluent limitations established pursuant to the Action Plan. These actions shall demonstrate reasonable progress toward the attainment of effluent limitations. The compliance schedule shall reflect a realistic assessment of the shortest practicable time to perform each task. The compliance schedule shall contain a final compliance date based on the shortest practicable time required to achieve compliance, but

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<sup>25</sup> Federal law requires that TMDLs be incorporated into a Regional Water Boards water quality control plan (Basin Plan). The Basin Plan is a legal document that describes how a Regional Water Board would manage water quality. The TMDLs must be formally incorporated into the Basin Plan to be part of the basis for Regional Water Board actions. Basin Plan amendments are adopted through a public process that requires approval of the TMDLs by a Regional Water Board, the State Water Board, the Office of Administrative Law, and USEPA Region 9. The effective date of a TMDL Action Plan is date on which the US E.P.A. approves the Basin Plan amendment.

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in no case exceed ten years from the effective date of the ~~TMDL-adopted~~ NPDES permit. The deadlines for each action in the compliance schedule shall be specified in the NPDES permit and may be accompanied by interim requirements, such as, interim effluent limitations and pollutant minimization measures. If the final compliance date extends beyond the term of the NPDES permit, the final compliance date and supporting explanation shall be included in the permit findings.

### **9.2.3 PERCOLATION PONDS AND DISPOSAL BY IRRIGATION**

There are six municipal wastewater treatment facilities and five privately-owned wastewater treatment facilities in the Russian River Watershed that collect, treat, and dispose of or recycle treated effluent to land via percolation ponds or by irrigation. These facilities are operated by:

- Bohemian Grove (private)
- Calpella County Water District (public)
- Camp Royaneh (private)
- City of Cloverdale (public)
- City of Ukiah (public)
- Geyserville County Sanitation Zone (public)
- Hopland County Water District (public)
- Rio Lindo Academy (private)
- Russian River County Sanitation District (public)
- Rodney Strong Vineyards (private)
- (Former) Salvation Army Lytton Springs Rehabilitation Facility (private)

The discharge of wastewater to surface water from percolation ponds and as a result of irrigation runoff is prohibited.

In order to ensure ambient fecal indicator bacteria concentrations are protective of REC-1, each entity shall maintain compliance with applicable waste discharge requirements for its wastewater treatment facility.

### **9.2.4 SANITARY SEWER SYSTEMS**

There are ~~eighteen~~<sup>nineteen</sup> publicly-owned sanitary sewer systems in the Russian River Watershed that collect and convey domestic wastewater to wastewater treatment facilities for treatment, and disposal or recycling. These facilities are operated by:

- Airport/Larkfield/Wikiup Sanitation Zone
- Calpella County Water District
- City of Cloverdale
- City of Cotati
- City of Healdsburg
- City of Rohnert Park
- City of Santa Rosa

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- City of Sebastopol
- City of Ukiah
- Forestville Water District
- Geyserville County Sanitation Zone
- Graton Community Services District
- Hopland County Water District
- Occidental County Sanitation District
- Russian River County Sanitation District
- Sonoma State University
- South Park County Sanitation District
- Town of Windsor
- Ukiah Valley Sanitation District

Publicly-owned sanitary sewer systems greater than one mile in length are regulated under General Waste Discharge Requirements for Sanitary Sewer System, Water Quality Order No. 2006-0003-DWQ (Sanitary Sewer General Order) and Monitoring and Reporting Program WQ 2013-0058-EXEC. The Sanitary Sewer System General Order prohibits the discharge of untreated or partially-treated wastewater from sanitary sewer systems to waters of the United States, including the Russian River and its tributaries.

In order to ensure ambient fecal indicator bacteria concentrations are protective of REC-1, each municipality and district shall maintain compliance with the Sanitary Sewer General Order and all amendments and subsequent updates to the Sanitary Sewer General Order.

#### **9.2.5 LAND APPLICATION OF TREATED MUNICIPAL SEWAGE SLUDGE (BIOSOLIDS)**

Currently, the City of Santa Rosa is the only public entity permitted for the land application of biosolids as a soil amendment in the Russian River Watershed. The City of Santa Rosa's biosolids application discharges are regulated under General Waste Discharge Requirements for the Discharge of Biosolids to Land for Use as a Soil Amendment in Agricultural, Silvicultural, Horticultural, and Land Reclamation Activities, Water Quality Order No. 2004-12-DWQ (Biosolids General Order), which prohibits the discharge of biosolids to surface water and includes biosolids management practices to reduce the risk to public health and the environment.

In order to comply with the Action Plan, the City of Santa Rosa and any proponent of a future project involving the land application of municipal biosolids shall maintain coverage for its biosolids land application projects under the Biosolids General Order, or individual waste discharge requirements adopted to regulate the discharge of biosolids to land.

#### **9.2.6 RECYCLED WATER IRRIGATION RUNOFF**

There are ~~twelve~~thirteen municipalities and special districts, three private entities, and one university in the Russian River Watershed that use recycled water for landscape irrigation, crop irrigation and other approved non-potable uses. These facilities are:



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- Airport/Larkfield/Wikiup Sanitation Zone
- City of Cotati
- City of Healdsburg
- City of Rohnert Park
- City of Santa Rosa
- City of Sebastopol
- City of Ukiah
- Forestville Water District
- Graton Community Services District
- Occidental County Sanitation District
- Russian River County Sanitation District
- Sonoma State University
- Town of Windsor
- Mayacamas Golf Club (private)
- Vintner's Inn (private)
- Virginia Dare Winery (private)

Recycled water projects that beneficially reuse treated wastewater for landscape irrigation, agricultural irrigation, or other use allowable under California Code of Regulations, title 22, chapter 3, article 3, section 60303 through 60307 are regulated under water recycling requirements in State Water Resources Control Board Order WQ 2016-0068-DWQ, Water Reclamation Requirements for Recycled Water Use (Recycled Water General Order) or Regional Water Board-issued waste discharge requirements. To prevent and/or minimize overspray, spills, and incidental runoff of recycled water that could reach surface waters, these projects rely on best management practices (BMPs). Water recycling BMPs are set forth in Regional Water Board-issued waste discharge requirements as water recycling specifications. For recycled water projects regulated under the Recycled Water General Order, water recycling BMPs are described by a discharger in its Notice of Intent and implemented immediately upon permit issuance, in accordance with an Operations and Management Plan. Where the water recycling entity is also regulated under the Phase I Municipal Separate Storm Sewer Systems (MS4) Permit, recycled water BMPs are implemented in accordance with a non-storm water BMP Plan approved by the Regional Water Board Executive Officer.

Title 22 prohibits the escape of recycled water from recycled water use areas as surface water flow that would enter surface waters. Accordingly, recycled water permits prohibit discharges of recycled water to surface water, except for when the runoff is deemed incidental. Incidental runoff is unintended amounts of runoff that are typically infrequent, low volume, not due to a pattern of neglect or lack of oversight, and are promptly addressed.

In order to ensure ambient fecal indicator bacteria concentrations are protective of REC-1, each municipality and district or other entity that is permitted to beneficially reuse treated wastewater for landscape irrigation, agricultural irrigation, or other use shall maintain

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compliance with its applicable water recycling requirements and shall develop and implement a Recycled Water BMP Plan, or equivalent BMP plan.

The Recycled Water BMP Plan shall include, at a minimum:

- BMPs to prevent overspray, spills, and incidental runoff;
- Setbacks from recycled water points of use to waterbodies, curbs, pavement and storm water inlets; and
- A compliance program that includes public outreach and progressive enforcement.

All permit applications for recycled water projects within the Russian River Watershed proposed after the effective date of the Action Plan shall submit a Recycled Water BMP Plan, or equivalent BMP plan, with the permit application. For Recycled Water BMP Plans being implemented prior to the effective date of the Action Plan, the implementing party shall submit written certification that their existing Recycled Water BMP Plan adequately prevents and/or minimizes overspray, spills, and incidental runoff. This certification shall be submitted to the Regional Water Board Executive Officer within ~~one month of~~ three months after the effective date of the Action Plan. Any entity currently recycling water, but without a Recycled Water BMP Plan or an equivalent BMP plan, shall develop and implement a Recycled Water BMP Plan within two years after the effective date of the Action Plan. Where the entity is the producer and user of recycled water, the entity shall also submit to the Regional Water Board Executive Officer a Title 22 Engineering Report approved by the State Water Board Division of Drinking Water.

Where necessary, the Regional Water Board will require the submission of a Recycled Water BMP Plan and/or Title 22 Engineering Report under authority of section 13267 subdivision (b) of the Water Code.

## **9.2.7 INDIVIDUAL ONSITE WASTEWATER TREATMENT SYSTEMS**

### **9.2.7.1 ONSITE WASTEWATER TREATMENT SYSTEMS (OWTS) POLICY**

On June 19, 2012, the State Water Resources Control Board (State Water Board) adopted the OWTS Policy. The OWTS Policy took effect on May 13, 2013. The Regional Water Board, in accordance with the statewide OWTS Policy, amended the Basin Plan on June 18, 2015, to incorporate requirements of the OWTS Policy into the Basin Plan for the North Coast Region. The Basin Plan amendment was approved by the Office of Administrative Law on July 18, 2016.

Section 3.2 of the OWTS Policy allows the Regional Water Board to approve individual Local Agency Management ~~Plans (LAMPP~~Programs (LAMPs) for local agencies that want to provide alternative minimum standards than those specified in the OWTS Policy for OWTS that pose the lowest threat to water quality and public health. Individual OWTS within the Russian River Watershed are regulated by the Sonoma County Permit and Resource Management Department in Sonoma County (Permit Sonoma) and by the County of Mendocino Health & Human Services Agency – Department of Environmental Health in

Mendocino County- (DEH). These local agencies review development proposals that rely on individual OWTS for domestic waste treatment and disposal. Local agency staff also review permit applications and project plans for OWTS repairs and upgrades and issue repair permits as necessary in accordance with local policies. To ensure compliance with local regulations and technical standards for OWTS, local agency staff also conducts inspections at the time of OWTS construction and in response to complaints and reports of OWTS failures. For OWTS utilizing supplemental treatment components or enhanced effluent dispersal systems, both ~~Permit Sonoma County PRMD~~ and Mendocino County DEH implement permit programs that include periodic inspections of the OWTS by County staff and/or a service provider and self-monitoring requirements imposed on OWTS owners.

#### **9.2.7.2      ADVANCED PROTECTION MANAGEMENT PROGRAM**

An Advanced Protection Management Program (APMP) is a management program that establishes standards for OWTS near impaired waterbodies. The standards for an OWTS in an APMP may be established by the following:

- A TMDL implementation plan adopted by a Regional Water Board;
- An approved LAMP with special provisions for OWTS that are near impaired waterbodies listed in Attachment 2 of the OWTS Policy; and
- The default APMP requirements prescribed by section 10.0 of the OWTS Policy.

The Action Plan establishes minimum requirements for all OWTS within the designated APMP area for the Russian River Watershed. Owners of existing, new and replacement OWTS whose OTWS are located entirely outside the boundaries of the APMP are not subject to the APMP requirements, but must still comply with relevant requirements of the OWTS Policy and any approved Local Agency Management Program (LAMP), and if applicable, individual/general waste discharge requirements or waiver of waste discharge requirements.

Section 10.1 of the OWTS Policy states that an APMP must specify its geographic area and the OWTS requirements that apply within that area.

#### **9.2.7.3      THE GEOGRAPHIC AREA OF THE APMP**

Given their proximity to surface waterbodies, OWTS discharging to the subsurface near a waterbody may contribute pathogens to surface waters by direct discharge (i.e., surfacing effluent from an improperly designed or located OWTS) or through contamination of groundwater in the vicinity of the OWTS as a result of incomplete soil treatment of the OWTS effluent and the migration of the contaminated groundwater to surface water. The likelihood that surface water will be adversely impacted by OWTS is increased significantly in areas with highly permeable soils and inadequate separation to groundwater, which are conditions that can result in incomplete removal of pathogenic organisms from the waste stream, and in areas where there is a high density of OWTS, particularly those areas with small parcel sizes and where there is a high percentage of existing OWTS that predate adopted local standards for the design and siting of OWTS. A Regional Water Board study (NCRWQCB 2013) confirmed that areas where OTWS are in close proximity, fecal indicator

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bacteria concentrations in surface water downstream of the OWTS are higher than for areas where the OWTS are widely spaced.

To establish the geographic area of the APMP, Regional Water Board staff applied the conclusions from TMDL monitoring and the identification of HUC-12 sub-watersheds (as described in Chapter 4 of this Staff Report) for which there is substantial evidence of pollution attributable to fecal waste discharges to establish an area of influence within which it can be expected that an OWTS ~~will~~could contribute to the impairment of a waterbody if the OWTS is failing or malfunctioning to the extent that the OWTS requires major repair. Consistent with the Tier 3 of the OWTS Policy for areas near impaired waterbodies, ~~if an OWTS is within 600 feet of a waterbody, it is assumed to be contributing wastewater effluent to that waterbody. In addition, because Regional Water Board monitoring found that areas with OWTS situated in close proximity to each other adversely impacted downstream water quality, the geographic area of the APMP includes a density component, whereby OWTS located in areas with OWTS density greater than a threshold density of 50 parcels per square mile are also included in the APMP. The parcel density threshold of 50 parcels per square mile is a Regional Water Board staff decision to identify OWTS that posed the highest threat to contribute fecal contamination to surface waters~~The Action Plan establishes a 600-foot zone of influence for OWTS adjacent to perennial streams, which for the purposes of the Action Plan are blue line streams that are depicted on the USGS 1:100,000 scale topographic map, and a 200-foot zone of influence for lower class streams that are derived using a LIDAR dataset. The 600-foot distance is based on a microbial contamination zone that was recommended by the California Department of Public Health (CDPH, 1999) to protect water supply from viral, microbial and direct chemical contamination. In the 1999 guidance document, CDPH found that for porous media aquifers, 600 feet is the recommended minimum distance for protection of water supply wells from microbial contaminants as well as chemical contaminants such as nitrate. This distance is believed to be sufficiently protective to protect public health from microbiological contaminants. The 600-foot zone of influence is consistent with State Water Resources Control Board's recommended distance when it established its Tier 3 default zone of influence in the statewide OWTS Policy for OWTS near impaired water bodies. For intermittent and ephemeral streams, Regional Water Board staff established the smaller, 200-foot zone of influence because contributions of wastewater from OWTS to these nonperennial streams are less likely to impair REC-1 beneficial uses in downstream waterbodies and the 200-foot distance is consistent with the minimum horizontal setback from a low risk OWTS to a spring or flowing surface water body required in Tier 1 of the OWTS Policy (section 7.5.4), plus a factor of safety.

Accordingly, the Action Plan defines the Russian River Watershed APMP boundary<sup>26</sup> to include both: 1) areas/parcels that are at least partially within 600 linear feet in the horizontal (map) direction on either side of the entire mainstem centerline of each waterbody/blue line streams depicted on the 2012 303(d) list USGS 1:100,000 scale

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<sup>26</sup> A map of the Russian River APMP Boundary is provided on the Regional Water Board website at [http://www.waterboards.ca.gov/northcoast/water\\_issues/programs/tmdls/russian\\_river/](http://www.waterboards.ca.gov/northcoast/water_issues/programs/tmdls/russian_river/)

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topographic map for pathogens, which includes the Russian River, Santa Rosa Creek, Green Valley Creek, Dutch Bill Creek, and the Laguna de Santa Rosa impaired HUC-12 sub-watersheds, and 2) areas/parcels that are at least partially within 600/200 linear feet on either side of the centerline of any mapped stream/waterway derived using LIDAR datasets in sub-watersheds where parcel densities are greater than 50 parcels per square mile. Watersheds, defined as Hydrologic Units Code 12 basin names, with parcel densities greater than 50 parcels per square mile HUC-12 sub-watersheds that have evidence of pollution attributable to fecal waste discharges. Affected HUC-12 sub-watersheds include the following: Brooks Creek, (Russian River), Sausal Creek (Russian River), Dutch Bill Creek, East Fork (Russian River), Green Valley Creek, Lower Laguna De Santa Rosa, Upper Laguna de Santa Rosa, Lower Santa Rosa Creek, Upper Santa Rosa Creek, Porter Creek (Mark West Creek), Porter Creek, Salt Hollow (Russian River), West Slough (Dry Creek, Upper Laguna de Santa Rosa, Upper Santa Rosa), Willow Creek, Ward (Russian River), and Oat Valley Creek-Austin Creek, and Windsor Creek (Russian River).

Any OWTS located on a parcel within the APMP boundary is subject to the requirements of the APMP. As described below, some APMP requirements will vary for individual OWTS based on the distance of the OWTS to the mapped stream.

#### **9.2.7.4 OPERATION AND MAINTENANCE REQUIREMENTS**

Proper operation and maintenance is essential to the long-term performance of any OWTS. Routine inspections and service visits can provide early detection of problems that could result in malfunction of OWTS and allows for timely repair before an OWTS becomes a public health hazard. Section 2.5 of the OWTS Policy requires that owners of OWTS maintain their OWTS in good working condition, including inspections and pumping of solids, as necessary, or as required by local ordinances, to maintain proper function and assure adequate treatment.

The Action Plan establishes an implementation action for owners of existing, new and replacement OWTS within the boundaries of the APMP to obtain a basic operational inspection of their septic tank, effluent dispersal area(s), and related appurtenances of the OWTS by a qualified professional once every five years. The objective of this requirement is to implement the OWTS Policy and to facilitate timely identification and resolution of maintenance and operational issues. To minimize the financial burden of routine inspection on owners of OWTS, the Action Plan allows that operational inspections can be scheduled by the OWTS owner to occur in conjunction with pumping of the septic tank, a property transaction, issuance of a local building permit, an in-field performance verification performed by a Service Provider certified by an OWTS manufacturer, or an inspection otherwise required by the local agency or Regional Water Board. So the Regional Water Board and the local agency are made aware of the results of the inspection for potential follow up actions, the OWTS owner may will be required to submit a report of the inspection to the Regional Water Board and/or local agency within 30 days after completion of the inspection.

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The appropriate frequency of monitoring and maintenance is related to the complexity of the OWTS, its age, location, site constraints, approved variances, repair history, past monitoring and inspection results, peak hydraulic loading, and other factors. However, in general, OWTS consist of a treatment component, which for a conventional OWTS is typically a septic tank, and an effluent dispersal component. At a minimum, a basic operational inspection should evaluate whether both the treatment and effluent dispersal components are functioning adequately to minimize the threat to water quality and public health. To provide direction to OWTS owners, the Action Plan specifies minimum requirements that must be included in an OWTS inspection. For conventional OWTS that use a standard septic tank and leachfield effluent dispersal field, the following are the minimum requirements that must be included in an OWTS inspection:

a. Septic Tank and Pump Systems

- i. Observations to detect leaks, cracks, excessive corrosion, root intrusion, odors
- ii. Presence and proper operation of liquid high-level alarm
- iii. Assessment of liquid levels in relation to tank outlet
- iv. Evidence of lack of water tightness
- v. Evidence of problems in downstream OWTS components, where they have been installed (e.g., distribution box, effluent filter, dosing tank)
- vi. Proper settings and operation of pumping system(s), where they have been installed

b. Effluent Dispersal Area(s)

- i. Evidence of odors or surfacing effluent (e.g., excessive vegetation)
- ii. Evidence of unequal effluent distribution
- iii. Observations of inspection ports

The requirement for owners and operators of OWTS to obtain a basic inspection will be required pursuant to Water Code section 13267 by the Regional Water Board Executive Officer. For OWTS utilizing supplemental treatment components and/or enhanced effluent distribution systems, the minimum requirements of a basic inspection will depend on the type of individual OWTS and will be specified in the investigative order.

#### **9.2.7.5 CORRECTIVE ACTION REQUIREMENTS**

Section 11.0 of the OWTS Policy requires that any OWTS that is failing or fails at any time while the Policy is in effect must be replaced, repaired, or modified to return the OWTS to proper function and comply with applicable local requirements. The OWTS Policy also prohibits the use of cesspools for new and replacement OWTS and OWTS subject to major repair.

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To ensure that ambient fecal indicator bacteria concentrations are protective of REC-1, the Action Plan requires corrective action for cesspools and other OWTS within the boundaries of the APMP that do not include a septic tank and effluent dispersal system: that complies with the OWTS Policy. The Action Plan also requires corrective action for OWTS that are routinely operated under conditions of hydraulic overloading, a condition that could result in overflows and solids carry-over to and clogging of the effluent dispersal field.

The Action Plan requires property owners with OWTS within the boundaries of the APMP that do not meet minimum requirements established in the Action Plan to repair or replace the OWTS. Where alternatives to repairs or replacement of an individual OWTS are available, the owner of the OWTS will be offered an opportunity to participate in the planning and completion of a community wastewater treatment and disposal system or equivalent alternative. Property owners that are required to upgrade, repair, or replace an existing OWTS or acquire a new OWTS must obtain the appropriate county permit in accordance with county ordinances and policies, or must obtain from the Regional Water Board waste discharge requirements or a waiver of waste discharge requirements. In accordance with a Memorandum of Understanding (MOU) between the Regional Water Board, the County of Sonoma, and the Sonoma County Community Development Commission, ~~the Sonoma County Permit and Resource Management Division of the Department of Public Works~~ Permit Sonoma will be the lead organization for plan review, local permit issuance, construction inspection and monitoring of new OWTS and upgrades, and repairs or replacement of existing OWTS. Regional Water Board staff continue to work with Mendocino County to develop a similar agreement.

~~Section V.B.1.3.1 of~~ The Action Plan establishes minimum requirements for corrective action for new and replacement OWTS and for existing seepage pits within the boundaries of the APMP and conditions under which the requirements apply. To ensure that fecal indicator bacteria concentrations downstream of the OWTS are protective of REC-1, the Action Plan requires supplemental treatment components and/or enhanced effluent dispersal systems that provide sufficient pretreatment of the wastewater for the following conditions:

a. New<sup>27</sup> OWTS

- i. When ~~a new or replacement~~ the OWTS has ~~its~~ an effluent dispersal system within ~~100600~~ feet from the top of the bank of any mapped stream within the APMP boundary;

b. Replacement<sup>28</sup> OWTS and OWTS Requiring Major Repair<sup>29</sup>

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<sup>27</sup> New OWTS means an OWTS permitted or approved after the effective date of the TMDL Action Plan

<sup>28</sup> OWTS Policy (2013), section 1.0, defines replacement OWTS to mean an OWTS that has its treatment capacity expanded, or its dispersal system replaced or added to.

<sup>29</sup> OWTS Policy (2013), section 1.0, defines major repair to mean either: (1) for a dispersal system, repairs required for an OWTS dispersal system due to surfacing wastewater effluent from the dispersal field and/or wastewater backed up into plumbing fixtures because the dispersal system is not able to percolate the design flow of wastewater

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- i. ~~When a replacement the OWTS is designed to treat or dispose of a wastewater flow greater than the OWTS being replaced; or~~  
~~When a new or replacement the OWTS has a projected wastewater flow of 3,500 gallons per day or greater.~~
- ii. ~~The Action Plan provides flexibility for the local agency to authorize, where the authorization will not individually or collectively result in pollution or nuisance, replacement OWTS without supplemental treatment components or an enhanced effluent dispersal system if the replacement OWTS projected flow is required for reconstruction due to a catastrophic natural event (e.g., fire, flood, tree falls). The local agency may also authorize a replacement OWTS without supplemental treatment components or the amount of wastewater flow into the OWTS as determined in accordance with an enhanced effluent dispersal system when the replacement OWTS is proposed as a voluntary OWTS upgrade or repair initiated by the owner in response to a failing or marginally functional OWTS, provided that the replacement OWTS is not otherwise required to include pretreatment or an enhanced effluent dispersal system by the Action Plan.~~  
approved LAMP
- iii. When the OWTS is for a developed parcel permitted by the local agency for replacement of an existing OWTS that has been unutilized for five consecutive years or more prior to receipt of a building permit application by the local agency
- iv. When OWTS is less than or equal to 600 feet from the top of the bank of any mapped stream within the APMP boundary, except when the replacement OWTS meets the conditions in Table 9.1
- c. Seepage Pits
  - i. Seepage pits permitted or for which a construction permit by a local agency has been issued after May 13, 2016 are prohibited.
  - ii. Seepage pits permitted or for which a construction permit has been issued by a local agency prior to May 13, 2016 are prohibited unless the seepage pit includes supplemental treatment components to remove pathogens.
  - iii. Seepage pits may be authorized as replacement OWTS for existing cesspools only if the other options to comply with the Action Plan are infeasible.

Table 9.1 Site Conditions Requiring Supplemental Treatment and/or Enhanced Effluent Dispersal System for OWTS			
OWTS Distance from Waterbody	Minimum Separation to Groundwater	Acceptable Percolation Rate	Acceptable Wastewater Application Rate

associated with the structure served, or (2) for a septic tank, repairs required to the tank for a compartment baffle failure or tank structural integrity failure such that either wastewater is exfiltrating or groundwater is infiltrating.



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< 200 feet	36 inches	30-120 minutes per inch	Not to exceed application rate set forth in Table 3 OWTS Policy for determined percolation rate
200-600 feet	24 inches	30-120 minutes per inch	
> 600 feet	In accordance with Tier 2 requirements of on approved LAMP or, if there is no approved LAMP, Tier 1 of the OWTS Policy		

Where a local agency establishes more restrictive requirements, the more restrictive standards shall govern.

The Action Plan requires that, within the boundaries of the APMP and except for OWTS that are required to include pretreatment or an enhanced effluent dispersal system by the Action Plan or by local agency requirements, new OWTS must meet all local agency requirements for soils and setbacks for 1) an undeveloped parcel permitted by the local agency after ~~May 13, 2013~~ the effective date of the Action Plan, and 2) for replacement of an existing OWTS that has been unutilized for five consecutive years or more prior to receipt of a building permit application by the local agency.

#### **9.2.7.6 INITIAL OWTS ASSESSMENT**

Consistent with the principle that proper operation and maintenance and routine inspections are essential to the long-term performance of any OWTS, the Action Plan establishes a program to assess whether each OWTS within the boundaries of the APMP is failing and/or in need of corrective action. The program will be carried out by the Regional Water Board and/or its agents and the local agencies and consists of an ~~initial~~ assessment process to evaluate the operational status of existing OWTS and a routine inspection process that is described in section 9.2.7.4 ~~of the Program of Implementation~~.

~~As set forth in the Action Plan, for the initial~~ The assessment process, The Regional Water Board and/or its agents will notify all to identify the type of OWTS within the boundaries of the APMP of the need to submit information that will be used to determine whether the OWTS is failing and/or in need of corrective action. The assessment may include a desktop assessment or local record review, results of a sanitary survey, public survey, questionnaire, or, upon determination of the Regional Water Board, a physical site inspection or evaluation. Information that may be used to ascertain the performance of an existing OWTS includes, but is not limited to, the OWTS type, age, approved variances, repair history, monitoring and inspection results, septic tank pumping records, maintenance records, peak hydraulic loading, and record of complaints received. As set forth in the Action Plan, for the OWTS assessment process, will notify all OWTS within the boundaries of the APMP of the need to submit information that will be used to determine whether the OWTS is failing and/or in need of corrective action. Upon conclusion of the assessment for an individual OWTS or group of OWTS, at the discretion of the Regional Water Board, the Regional Water Board will notify each property owner whether the OWTS is in need of corrective action to comply with the Action Plan. When a physical site

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inspection is conducted to provide information about the OWTS type and the inspection includes the minimum requirements for a basic operational inspection described in section 9.2.7.4, the inspection will satisfy the first five-year inspection requirement in the APMP.

The Regional Water Board will begin the process of notifying owners and operators of OWTS of the need to submit information within six months of the effective date of the TMDL Action Plan, under authority of section 13267 subdivision (b) of the Water Code. The schedule for notifications and the deadlines for submission of OWTS assessments will be developed in consultation with the local agencies and citizen advisory groups and will be based on the OWTS type, age, threat to water quality, approval date by the local agency, level of function, and other factors as required.

#### **9.2.7.7 PLANNING FOR COMMUNITY-BASED SYSTEMS**

The objective of the Regional Water Board's initial OWTS assessment is to identify OWTS that are failing OWTS, OWTS prohibited by the OWTS Policy (such as, cesspools), and/or OWTS that by their design or in need of corrective action, operation are a high threat to contribute pathogens and other pollutants to the Russian River or its tributaries. In areas within the APMP where there are significant numbers of existing OWTS that do not meet the minimum standards defined in the Action Plan, and where repairs or upgrades/replacement of individual OWTS to meet minimum standards are infeasible or cost prohibitive, the development of a community-based OWTS management plan or Onsite Wastewater Management Authority, where authorized by a local agency, may be appropriate. For development of a community-based management plan to be orderly, fair, and provide a path to compliance, coordination between the Regional Water Board encourages the development of community advisory groups to assist the Regional Water Board and local agencies in the development, affected homeowners, and implementation of community-based solutions. It is the intent of the Regional Water Board to provide adequate time for owners of failing and substandard OWTS to comply with the Action Plan and to seek and obtain financial and technical assistance for the planning and construction of community-based wastewater treatment and disposal systems, as necessary. crucial.

As a pilot project to develop a framework for a public participation process, Regional Water Board staff is participating with Sonoma County and representatives from the communities of Monte Rio and Villa Grande to pursue public funding to investigate community wastewater solutions that would enable OWTS owners in the project area to comply with APMP requirements. An important component of this pilot project is a commitment by local agencies to coordinate and cooperate to identify technical and regulatory solutions to wastewater planning, to investigate funding options, and to secure public and private funding assistance for local actions to resolve wastewater disposal challenges and implement the TMDL Action Plan. To support this commitment, the Regional Water Board, the County of Sonoma, and the Sonoma County Community Development Commission have entered into a Memorandum of Understanding (MOU) that acknowledges the necessity of cooperation between the agencies to provide funding and facilitate community outreach for affected communities. Approved in December 2016, this MOU establishes the mutual

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understandings of the parties with respect to their joint efforts and responsibilities to implement the Action Plan as it relates to OWTS.

A second, vital component of the project is the formation of a community advisory group whose purpose is to provide input to the implementing agencies on the planning process and conduct meaningful outreach to homeowners and others affected by the requirements of the Action Plan. The Monte Rio/Villa Grande Community Advisory Group has met monthly since June 2018 and has made significant contributions to a Planning Scope of Work that is part of an application for funding by Clean Water State Revolving Fund Program. If successful, this pilot project will serve as a model for public outreach programs for infrastructure improvements and for establishing other community advisory groups in the Russian River Watershed where replacement of OWTS may be infeasible.

### **9.2.8 LARGE ONSITE WASTEWATER TREATMENT SYSTEMS**

For the purpose of the Action Plan, a large OWTS means any OWTS with a projected flow greater than 10,000 gpd, any facility, such as a campground or any mobile home park, with multiple OWTS whose combined projected flows are greater than 10,000 gpd, or any individual or combined OWTS with projected flow greater than that specified in an approved LAMP. In the North Coast Region, large OWTS are commonly used for domestic wastewater disposal for mobile home parks and campgrounds.

Discharges of untreated or partially-treated wastewater to surface water from large OWTS are prohibited. Accordingly, ~~the wasteload allocation for these facilities is zero~~ load allocations described in Chapter 7 apply to this source.

Owners of large OWTS in the Russian River Watershed not regulated by WDRs or a Waiver of WDRs on the adoption date of the Action Plan shall notify the Regional Water Board by submitting a report of waste discharge containing information about their OWTS. The report of waste discharge shall be submitted to the Regional Water Board no later than three months after the effective date of the Action Plan. Based on the report of waste discharge, the Regional Water Board may issue WDRs or Waivers of WDRs for the OWTS.

### **9.2.9 RECREATIONAL WATER USES AND USERS**

Discharges of human waste to surface water ~~in excess of water quality objectives~~ from individuals engaged in recreational water use are prohibited. Accordingly, the load allocations described in Chapter 7 apply to this source.

However, the Regional Water Board recognizes that the most effective strategy to reduce contamination from recreational water users will focus not on demanding compliance with a prohibition, but instead, through public outreach and education to increase the awareness of the connection between unhygienic activities and the impairment of the recreational use of the Russian River and its tributaries. To this end, the County of Sonoma and the Sonoma County Community Development Commission have entered into a Memorandum of Understanding (MOU) with the Regional Water Board that outlines a Joint

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Policy for addressing water quality impacts relative to recreational water use. The Joint Policy includes a concerted effort to engage private landowners, other public agencies, and river users through educational or regulatory activities designed to reduce pathogen load from recreational activities. The Regional Water Board will coordinate with Mendocino County to develop a MOU or equivalent agreement to address water quality impacts from recreational water use in Mendocino County.

Potential joint implementation actions in both counties could include:

- Installing temporary or permanent restroom facilities and pet waste disposal stations near the recreation use areas and signage to effectively direct recreators to restroom facilities;
- Establishing interagency agreements with local sanitation districts to provide maintenance and waste disposal for temporary restroom facilities;
- Developing and distributing educational and outreach materials (fliers, brochures) to inform river recreators about proper waste disposal and sanitation at beaches and access points along the Russian River and tributaries;
- Conducting outreach to private recreational beach operators and commercial river outfitters to improve beach housekeeping and provide adequate sanitation facilities for customers;
- Publicizing locations of public restroom facilities on the county website and at recreational outfitters' headquarters; and
- Improving restroom facilities at popular private beaches.

#### **9.2.10 HOMELESS ENCAMPMENTS AND ILLEGAL CAMPING**

Discharges of human waste to surface water in excess of water quality objectives is prohibited. Accordingly, the load allocations described in Chapter 7 apply to this source.

However, addressing homelessness and its associated impacts to water quality is complex. Both Sonoma and Mendocino counties are developing and implementing strategies to engage unsheltered homeless people living near waterways in an effort to mitigate the impacts of homelessness, with the long-term goal of ending homelessness within their jurisdictions. The County of Sonoma and the Sonoma County Community Development Commission have entered into a Memorandum of Understanding (MOU) with the Regional Water Board that outlines a Joint Protocol for addressing water quality impacts relative to homeless encampments. The Joint Protocol includes sharing of information and technical assistance as necessary to support the County's actions, and quarterly meetings between responsible public and private entities to discuss activities addressing homeless issues in the Russian River area. The Regional Water Board will coordinate with Mendocino County to develop a MOU or equivalent agreement to address water quality impacts from homeless encampments in Mendocino County.

Where suitable housing for homeless persons exists or is planned, and the housing unit is served by an individual septic system, community septic system, or other approved waste treatment and disposal system, the design, installation, and operation of the system shall comply with the Action Plan and the LAMP for the local agency with jurisdiction over

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individual OWTS or requirements set forth in WDRs or waivers of WDRs. Throughout implementation of the Action Plan, the Regional Water Board will prioritize permitting for homeless-dedicated and affordable housing projects in the Russian River area for which Regional Water Board permits are required.

### **9.2.11 URBAN MUNICIPAL STORM WATER RUNOFF**

Within the Russian River Watershed's urban boundaries, storm water runoff and non-storm water runoff is regulated under a Phase I Municipal Separate Storm Sewer Systems (MS4) Permit. The current Phase I MS4 Permit, Order No. R1-2015-0030 (NPDES Permit No. CA0025054) became effective on January 6, 2016, and continues in force until a new permit is issued. Traditional Small MS4s within the watershed are enrolled under Water Quality Order No. 2013-0001-DWQ, National Pollutant Discharge Elimination System (NPDES) General Permit No. CAS000004, Waste Discharge Requirements (WDRs) for Storm Water Discharges from Small Municipal Separate Storm Sewer Systems (Phase II MS4 General Permit). The County of Mendocino is currently enrolled under the Phase II MS4 General Permit. Sonoma State University is enrolled under the Phase II General Permit as a Non-Traditional Small MS4 permittee.

~~The County of Mendocino is the only entity within the Russian River Watershed enrolled under the Phase II MS4 General Permit.~~ Permittees currently named under the Phase I MS4 Permit are:

- City of Santa Rosa
- County of Sonoma
- City of Cloverdale
- City of Cotati
- City of Rohnert Park
- City of Healdsburg
- City of Sebastopol
- Sonoma County Water Agency
- City of Ukiah
- Town of Windsor

~~The County of Sonoma and the current Phase I MS4 Permit, only the City of Santa Rosa have and the County of Sonoma are required to prepare work plans (i.e. Pathogen Reduction Plans) to reduce pathogens in storm water runoff. As of 2019, the City of Santa Rosa has submitted a pathogen work plan that has been approved by the Executive Officer of the Water Board to reduce pathogens in storm water runoff.~~ The scope of work includes the implementation of BMPs to reduce the levels of pathogens in the discharge to surface water. Implementation of the plans will be evaluated through adaptive management, with future modification potentially necessary, as supported by monitoring. The remaining County of Sonoma has submitted a work plan that is currently undergoing revision by County staff for resubmission to the Regional Water Board.

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~~For Phase I and II MS4 Permittees in the Russian River Watershed must develop and implement a similar scope of work (i.e. without approved Pathogen Reduction Plans on the effective date of the TMDL Action Plan) for Executive Officer approval. (excluding the Sonoma County Water Agency, who does not have land use authority), the Regional Water Board will require submission of the Pathogen Reduction Plans under authority of section 13267 subdivision (b) of the Water Code. The work~~Pathogen Reduction Plan shall include, at a minimum:

1. An inventory of fecal waste sources from human and domestic animals;
2. Proposed BMPs to reduce the levels of pathogens in the discharge to receiving water;
3. A proposal to conduct field monitoring, investigation, or research to confirm the source(s) identified as significantly impacting water quality;
4. A monitoring proposal to verify BMP effectiveness; and
5. A proposed implementation schedule.

~~For Phase I MS4 Permittees without approved Pathogen Reduction Plans on the effective date of the TMDL Action Plan, the Regional Water Board will require submission of the Pathogen Reduction Plans under authority of section 13267 subdivision (b) of the Water Code. For Phase II MS4 Permittees, the requirement to develop and implement a Pathogen Reduction Plan will be incorporated in the renewal of the Phase II MS4 Permit. Compliance with the TMDL~~Compliance with the TMDL for Phase I and Phase II MS4 Permittees requires attainment of the wasteload allocations described in Chapter 7.

#### **9.2.12 CALTRANS STORM WATER RUNOFF**

The California Department of Transportation (Caltrans) is regulated under General Storm Water Permit (NPDES Permit No. CAS000003), Waste Discharge Requirements Order No. 2012-0011-DWQ as amended by Order 2014-0077-DWQ, which includes TMDL-specific permit implementation requirements. The statewide permit regulates storm water and non-storm water discharges from Caltrans's properties and facilities, and discharges associated with operation and maintenance of the state highway system. In order to comply with the Action Plan, storm water and non-storm water discharges from Caltrans' facilities and properties in the Russian River Watershed shall attain the waste load allocations described in Chapter 7.

Upon renewal of the statewide storm water permit or as soon as is practicable, Regional Water Board staff will work with the State Water Board to ~~include~~establish the requirements of the Action Plan in the means by which Caltrans can achieve compliance with TMDL requirements of the permit to ensure compliance with the given wasteload allocations. Permit renewal is anticipated in ~~2017 or 2018~~2020.

### 9.2.13 NON-DAIRY LIVESTOCK AND FARM ANIMALS

Owners and operators of animal facilities, including animal husbandry, livestock production, other similar agriculture operations, and commercial animal boarding facilities, shall implement BMPs for control of fecal wastes: within two years after the adoption of the Action Plan. The BMPs shall may be included in a ranch management plan, or equivalent, and may be required by the Executive Officer. A ranch management plan may be designed to contain, stabilize, and reuse or dispose of waste in order to prevent discharge of fecal waste. Guidance on appropriate best management practices to properly contain and dispose of waste and prevent potential water quality impacts resulting from surface runoff of animal waste can be found in the University of California Davis Ranch Water Quality Planning Short Course materials. Management practices may include:

- Regular cleanup of fecal waste and soiled bedding in animal habitation areas;
- Use of covered impermeable surfaces for storage of fecal waste;
- Siting of fecal waste storage areas away from water courses and off slopes;
- Use of onsite composting to stabilize and reuse fecal waste;
- Preventing storm water runoff from contact with fecal waste storage areas and compost;
- Minimization and reduction of storm water contacting paddocks, and kennel areas;
- Use of vegetated buffers to provide a barrier to offsite migration of fecal waste; and
- Limiting of animals' access to waterways.

Discharges of fecal waste from animal husbandry operations, livestock production, other similar agriculture operations, and commercial animal boarding facilities must comply with the fecal waste discharge prohibition. Accordingly, the load allocation as described in Chapter 7 applies to these sources.

~~Pursuant~~The Regional Water Board intends to develop general WDRs or a waiver of WDRs as the Action Plan, primary regulatory mechanism for compliance with the requirement of owners and operators of fecal waste discharge prohibition for non-dairy confined animal facilities to submit a report of waste discharge for discharges from these and grazing operations. It is waived for animal facilities anticipated that implement these or similar best management practices that achieve Regional Water Board adoption of the same purpose, which is to protect water quality and public health. future general WDRs or waiver will take a number of years to complete. Until this time, owners and operators of animal facilities found to be in violation of the prohibition may be subject to enforcement action for the unpermitted discharge, and grazing operators should implement BMPs listed above, or similar BMPs, that are feasible and may be required to submit a report of waste discharge for the possible establishment of waste discharges requirements for the discharge appropriate to their operation.

### 9.2.14 DAIRIES AND CAFOS

Each cow dairy and Confined Animal Feeding Operation (CAFO) in the Russian River Watershed is required to maintain compliance with a Conditional Waiver of WDRs, WDRs, or NPDES Permit, as applicable. ~~Under conditions set forth~~The General WDR for dairies is

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being revised in Conditional Waivers of WDRs and WDRs, 2019 Point source discharge of wastewater from dairy waste to waters of the production area of cow dairies to surface water United States that is subject to an NPDES permit is prohibited- in the revised General WDR.

~~Under an NPDES permit, discharge of process wastewater is prohibited from a CAFO except that portion of wastewater which overflows from a facility designed, constructed, operated and maintained to contain all process generated wastewater plus the runoff from a 25-year, 24-hour rainfall event. During a 25-year, 24-hour or greater rainfall event, discharges of fecal waste from CAFOs in the Russian River Watershed shall comply with the wasteload allocations described in Chapter 7. At all other times, the wasteload allocation for CAFOs shall be zero.~~

Within two years after the effective date of the Action Plan, in order to prevent discharges of fecal waste from dairies to surface water, each ~~enrolled dairy~~ within the Russian River Watershed enrolled under the ~~Conditional Waiver of WDRs (Order No. R1-2012-0003) or General WDR (Order No. R1-2012-0002)~~ for Dairies or subsequent dairy Orders shall update required management plans (i.e., Water Quality Plan (WQP) or Waste Management Plan or comparable plans) to address sources of fecal waste. The updated actions to be taken to address fecal waste shall be in addition to those currently required under the respective order.

At a minimum, the ~~permit required~~ management plans shall be updated to:

- Prevent or minimize animal access to water courses;
- Provide a vegetated buffer along water courses; and
- ~~Include a surface water monitoring plan for routine monitoring of fecal indicator bacteria sufficient in scope to demonstrate attainment of numeric targets and WLAs or LAs. Coordination between dairies and CAFOs, including but not limited to group monitoring, is encouraged; and~~
- Include an implementation schedule, with a commencement date not exceeding two years from the effective date of the Action Plan.

Monitoring of surface water will be required to provide information regarding the effectiveness of the required management plans, and other requirements of the Action Plan including: 1) compliance with the Fecal Waste Discharge Prohibition; 2) achievement of LAs; 3) attainment of the numeric targets; and 4) attainment of bacteria objectives and protection of beneficial uses.

The Regional Water Board will incorporate these requirements to address sources of fecal waste into ~~renewed Conditional Waiver of WDRs, WDRs, or NPDES permits when these orders come up for renewal, and into new dairy Waivers and WDRs as they are proposed and adopted. WLAs for CAFOs will be incorporated into the NPDES permit as effluent limitations upon renewal~~ revised General WDRs when the order is renewed.



## CHAPTER 10

### WATERSHED MONITORING

#### 10.1 OVERVIEW

As described in Chapter 2, the Russian River Watershed is a large watershed, which spans two counties and includes numerous towns and cities, the City of Santa Rosa being the largest at nearly 172,000 people. The watershed, nonetheless, maintains an essential rural character and covers an area of about 1,484 square miles. There is a large array of local, state, and federal agencies; private entities; and nonprofit organizations that are fully engaged in multiple efforts to study and restore a functioning Russian River Watershed system. The Program of Implementation described in Chapter 9 of this staff report to restore bacteriological health to the watershed, is only one of many stewardship efforts. As such, the watershed monitoring program designed to assess the success of the Action Plan, should be well coordinated with other similar efforts.

#### 10.2 MONITORING PURPOSE

Chapter 9 describes multiple implementation actions by which individual entities will assess and control discharges of fecal waste to the Russian River Watershed. The Program of Implementation relies both on existing regulatory mechanisms and the development of new or updated voluntary and regulatory mechanisms by which to promote and ensure control of fecal waste discharge and protection of public health from pathogen exposure. The Regional Water Board intends to adaptively manage implementation of this TMDL by assessing the success over time of implementation actions with respect to the goal of reducing concentrations of fecal indicator bacteria in the Russian River and its tributaries. To this end, adaptive management of this TMDL requires a robust and thoughtful monitoring plan that is keyed to answering specific management questions, such as:

- Are individual implementation actions being correctly implemented and implemented on schedule?
- Are ambient water quality conditions improving from sewer developed areas, non-sewered developed areas, agricultural areas, and ~~undeveloped areas~~other impacted areas (e.g., areas with homeless encampments)?
- Are ambient water quality conditions improving at key locations, such as recreational beaches and in popular boating reaches?
- Are ambient water quality conditions meeting water quality standards and 303(d) delisting requirements?
- Is there evidence of fecal waste sources not yet identified or addressed by the Action Plan?
- Is there evidence that individual implementation actions should be adapted to better address fecal waste pollution?

These key questions, and others as developed with stakeholders, will be answered through monitoring and reporting requirements associated with permitted waste discharges and coordinated ambient water quality monitoring, including public health monitoring.

### 10.3 RUSSIAN RIVER REGIONAL MONITORING PROGRAM

The concept of a Russian River Regional Monitoring Program (R3MP) has been established, engaging multiple interested parties. The purpose of the R3MP is ~~many fold, broadly defined~~ but is consistent with the goals and purpose of the Russian River Pathogen TMDL. ~~The Russian River Watershed Association (RRWA) has acquired grant funding to develop~~ The R3MP, ~~which will help to~~ coordinate the monitoring efforts of its member agencies, including cities, towns, Sonoma and Mendocino Counties. ~~Similarly, the Regional, and Sonoma Water Board has acquired discretionary contract money to assist in the effort by developing a governing structure. The R3MP is still. The Program is currently under development. But, it will be,~~ but has to date formed a Steering Committee of local agencies, adopted initial management questions, a Charter, and is in the process of evaluating funding models. The R3MP is modeled ~~on~~after established regional monitoring programs, including those in the Klamath Basin Monitoring Program and San Francisco's Bay Regional Water Board's Regional Monitoring Program and Delta. Coordination will likely include:

- Ambient sampling conditions monitoring;
- Compliance monitoring;
- Status and trends monitoring;
- Standardized sampling methods, protocols, and Quality Assurance/Quality Control;
- Data sharing and compilation visualization;
- Data assessment and interpretation;
- Information Special studies;
- Peer-reviewed publications and watershed health reporting and sharing with to stakeholders and the public; and;
- Regular public meetings to share and discuss implementation activities, ~~data analytical~~ results, research, and other information critical to water quality and the health of the Russian River Watershed.

The R3MP is being developed to accommodate growth to include multiple members with multiple purposes related to the restoration of the water quality and ecological health of the Russian River Watershed. Entities responsible for implementation under the Action Plan ~~should are encouraged to~~ participate in the R3MP once it is fully established, to ensure the best possible coordination ~~amongst among~~ monitoring partners. The Regional Water Board will be an active member of the R3MP and represent its own monitoring resources available through the State's Surface Water Ambient Monitoring Program (SWAMP).

## 10.4 INDIVIDUAL MONITORING & REPORTING REQUIREMENTS

As described in Chapter 9, dischargers and parties responsible for potential sources of fecal waste discharge will be required to assess and control sources of fecal waste and pathogens as measured by fecal indicator bacteria. Dischargers operating under existing, new or revised NPDES permits or WDRs will be required to monitor, assess, and report on the implementation of their assigned actions, including compliance with the implementation requirements and their effectiveness. For some identified pathogen sources, implementation actions are conducted in accordance with a memorandum of agreement or some other agreement between the Regional Water Board and a local agency, or in accordance with requirements in a Local Agency Management Plan (LAMP).

Generally speaking, a point source discharge must be sampled at its point of entry to any surface water of the State to confirm source control effectiveness and compliance with wasteload allocations. Similarly, ambient water quality conditions must be sampled in receiving waters at reasonably close locations above and below the point of discharge to confirm water quality improvements and compliance with the fecal waste discharge prohibition.

A nonpoint source discharge is generally assessed by 1) inspection of best management practices (BMP) to confirm that they are properly installed and functioning, 2) photographic evidence of BMP performance and ambient conditions, and 3) ambient water quality monitoring at multiple locations above, associated with, and below a nonpoint source. Nonpoint source monitoring is necessary to confirm source control effectiveness, and compliance with the load allocations. Ambient water quality conditions are also sampled to confirm water quality improvements and compliance with the fecal waste discharge prohibition.

Discharges of waste to land must meet the discharge requirements specified in the applicable permit or order, to ensure proper treatment, disinfection, and disposal. Discharges of waste to land with the potential to result in impacts to groundwater or surface water via subsurface migration may be required to conduct site specific monitoring, including the installation of groundwater monitoring wells to characterize such potential impact or migration.

Leaks and spills with the potential to discharge directly to surface water, discharge indirectly to surface water via subsurface migration, or impact groundwater may also be required to conduct site specific monitoring, including the installation of groundwater monitoring wells to characterize such potential discharge, migration, or impact.

## 10.5 MONITORING RECREATIONAL USE

The Sonoma County Department of Health Services, Environmental Health and Safety Section currently conducts monitoring at several of the beaches with the authority to issue

public warnings or close beaches, as conditions ~~warrant it indicate~~. The Regional Water Board works in coordination with the County on this and other such issues of public health protection. Such coordination is critical to the successful implementation of the Action Plan, including the collection of data necessary to assess that success. Regional Water Board staff anticipate continued coordination with the County on beach monitoring and assessment.

## 10.6 ~~AMBEIN~~TAMBIENT WATER QUALITY MONITORING

There are multiple approaches to successful ambient water quality monitoring, which the R3MP should be central to designing and implementing. With respect to the Regional Water Board's specific interest in correcting the problem of fecal waste pollution and public health protection, there are a few key parameters that should be part of any ambient water quality monitoring, whether performed for effectiveness, water quality ~~trend~~trends, compliance, or public health protection purposes.

The statewide bacteria objectives for the protection of REC-1 establish *E. coli* limitations for freshwater and enterococci limitation for saline water. Compliance with water quality standards for REC-1 protection will be determined based on attainment of these objectives. 303(d) delisting of impaired reaches will be based on the guidance contained in the 303(d) Listing Policy. As described in this staff report, fecal indicator bacteria each have their own particular sensitivities with respect to environmental influences, however. As such, a weight of evidence approach is ~~necessary~~appropriate to ensure full and complete protection of water quality, beneficial uses, and public health. In the case of the Russian River Watershed, the fecal indicator bacteria that are most relevant and valuable are: *E. coli* ~~and~~, enterococci, and *Bacteroides* in freshwater and enterococci and *Bacteroides* in saline water as described in Chapter 5 ~~regarding numeric targets~~.3, Bacteria Standards and Other Indicators of Pathogen Pollution. At a minimum, ambient water quality monitoring should include these metrics. *E. coli* ~~and~~, enterococci, and *Bacteroides* results indicate whether or not there is evidence that there is a risk to REC-1 of unacceptable human exposure to illness causing pathogens.

There are multiple other lines of evidence that could provide important assessment information, however. ~~For example, human and bovine *Bacteroides* data were used in the Russian River Pathogen TMDL to confirm that exceedances of the statewide *E. coli* objective or national enterococci criteria were related to fecal waste discharge, rather than a result of environmental influences.~~ Many other potential lines of evidence are described below for use in an ambient water quality monitoring program, including: individual or general monitoring and reporting requirements, the R3MP, SWAMP, and public health monitoring.

The ambient water quality monitoring conducted to support development of this TMDL did not include monitoring in every HUC-12 within the Russian River Watershed; nor did it include collection of every parameter within each HUC-12 subwatershed. The following are HUC-12 subwatersheds in which the limited data collected suggests the need for

additional data collection to assessment impairment/pollution status: Orrs Creek-Russian River, Cumiskey Creek-Russian River, and Gill Creek-Russian River. In addition, it is a high priority to collect ambient water quality data in Windsor Creek for which there currently is none.

#### **10.6.1 BACTEROIDES BACTERIA**

Because of the short life span, *Bacteroides* bacteria concentrations are often used to indicate recent fecal contamination of surface waters. *Bacteroides* bacteria are a suitable indicator of a waterbody's bacteriological quality since the bacteria come from the gastrointestinal systems of animals, they degrade rapidly outside of the body, and technology is available to trace the bacteria back to specific types of animals, including humans and domestic animals. Host-specific *Bacteroides* bacteria can be used to help assess the natural background of pathogenic indicator bacteria in minimally disturbed waterbodies. Current recommended genetic markers and protocols for *Bacteroides* bacteria analysis are described by Griffith et al. (2013). Additional markers may also be appropriate in the future as technology advances to improve assay sensitivity and performance. As above, *Bacteroides* is recommended as part of a triad of metrics to assess the presence of fecal waste and the potential for exposure to illness-causing pathogens above water quality standards.

#### **10.6.2 BACTERIOPHAGES**

Measurement of *Bacteroides* bacteriophages may provide additional information on animal hosts. *Bacteroides* bacteria are rapidly inactivated by environmental oxygen levels, but *Bacteroides* bacteriophages are resistant to degradation. One group of phages that specifically uses *B. fragilis* strain HSP40 as host is found only in human feces and not in feces of other animals.

#### **10.6.3 VIRUSES**

Several analytic methods detect viruses excreted in feces and/or urine with high specificity to human waste and almost no cross-reactivity with other sources. Among the virus methods, markers for DNA viruses, such as human adenovirus and human polyomavirus, are among the more sensitive and robust. These viruses are fairly widespread among humans, and a sizable portion of the population sheds polyomaviruses passively. In addition, the DNA genomes of these viruses are less labile than those of common human enteric viruses with RNA genomes, which may make them more resistant to environmental degradation and therefore easier to detect.

#### **10.6.4 CHEMICAL SOURCE TRACKING**

Chemicals found in wastewater might be useful for independently confirming human waste in ambient surface waters. Measurement of chemicals that could include optical brighteners used in laundry detergents, caffeine, fecal sterols (metabolic byproducts of

human digestion processes), and metabolite of nicotine (cotinine) excreted by tobacco users.

The collection of any water quality data must be in accordance with an approved QA/QC Plan. *E. coli* and enterococci data should be collected on a weekly basis to ensure an adequate number of samples to assess compliance with the targets. These data will be important for determining public health risk related to REC-1 impairment. Similarly, storm water monitoring also will be important to assessing the effectiveness of the Action Plan. A storm water monitoring plan should consider monitoring locations that allow assessment of: 1) the impact of known fecal waste discharges, 2) the location of unknown fecal waste discharges, 3) the water quality trends associated with specific areas (e.g., sewer and unsewered developed areas, agricultural areas) and 4) the water quality trends in waters contained within the Advanced Protection Management Program (APMP) area.

## 10.7 SPECIAL STUDIES

The Sonoma County Water Agency mechanically breaches the sand bar that forms at the mouth of the Russian River in the spring/summer months if there is threat of flooding of low lying housing in the estuary. However, the National Marine Fisheries Service (NMFS) has concluded that the freshwater lagoon conditions that form behind the sand bar are beneficial to the growth of young steelhead and should be preserved, as possible. The TMDL analyses did not specifically include assessment of the degree to which the presence of the sand bar and freshwater lagoon at the mouth of the river affect upstream ambient water quality conditions. But, the Environmental Impact Report for NMFS's Biological Opinion concluded that there might be water quality impacts that are not mitigatable. Further assessment of the effects of these phenomena on water quality conditions and implementation of the pathogen TMDL is warranted.

## 10.8 REPORTING AND ASSESSMENT

Regional Water Board staff will review and assess the monitoring results provided under individual or general monitoring and reporting requirements, the R3MP, SWAMP, and public health monitoring. Staff anticipates periodically compiling data and data assessments into a stewardship report, which is produced in collaboration with partners and public feedback, as a basis for adaptive management. For example, monitoring approaches may be revised, if data are inadequate to assess program effectiveness. Similarly, implementation requirements may be revised if data indicate that the assigned actions show no effect.

Continued and ~~coordinate~~coordinated monitoring of the Russian River Watershed may lead to the inclusion of new reaches of the Russian River Watershed on the 303(d) List of Impaired Waters. Similarly, such monitoring may lead to delisting other reaches, as water quality conditions improve, overtime.

## CHAPTER 11

### CEQA SUBSTITUTE ENVIRONMENTAL ANALYSIS

The Regional Water Board is the lead agency for evaluating the environmental impacts of a Basin Plan amendment pursuant to the California Environmental Quality Act (CEQA). The Regional Water Board basin planning process is certified by the Secretary for Natural Resources as “functionally equivalent” to CEQA, and therefore exempt from the requirement for preparation of an environmental impact report or negative declaration and initial study<sup>30</sup>. Basin Plan amendments proposed for board approval must include or be accompanied by a Substitute Environmental Documentation (SED)<sup>31</sup> which shall include, at a minimum, all of the following:

1. A brief description of the proposed project (Section 11.1; Details described in Chapters 1-10).
2. An identification of any significant or potentially significant adverse environmental impacts of the proposed project. (Section 11.4)
3. An analysis of the reasonably foreseeable alternatives to the proposed project. (Section 11.2)
4. An analysis of mitigation measures to avoid or reduce any significant or potentially significant adverse environmental impacts of the proposed project. (Section 11.4)
5. An environmental analysis of the ~~reasonable~~reasonably foreseeable methods of compliance. (Chapters 9 and Section 11.4)

The SED shall contain an environmental analysis of reasonably foreseeable methods of compliance (compliance measures) for the project that include the following components:<sup>32</sup>

1. An identification of the reasonably foreseeable methods of compliance with the project. The reasonably foreseeable methods of compliance (hereinafter compliance measures) are the potential actions that responsible parties may employ to comply with the TMDL load allocations, numeric targets and the implementation measures in the Action Plan. (Chapter 11.4)
2. An analysis of any reasonably foreseeable significant adverse environmental impacts associated with the reasonably foreseeable methods of compliance.

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<sup>30</sup> Cal. Code Regs., tit. 14, § 15251(g); Cal. Code Regs., tit. 23, § 3775.

<sup>31</sup> Cal. Code Regs., tit. 23, § 3777.

<sup>32</sup> Cal. Code Regs., tit. 23 § 3777(b)(4); Cal. Code Regs., tit. 14 § 15187(c); Cal. Pub. Resources Code, § 21159 (c).

3. An analysis of any reasonably foreseeable alternative methods of compliance that would have less significant adverse environmental impacts. (Chapter 11.2)
4. An analysis of the reasonably foreseeable mitigation measures that would minimize any unavoidable significant adverse environmental impacts (Chapter 11.4)

The SED must take into account a reasonable range of:<sup>33</sup>

1. Environmental, economic, and technical factors. (Chapters 1-12)
2. Population and geographic areas. (Chapters 1 & 2 & 11)
3. Specific sites (Chapters 9 & 11)

While the regulations require consideration of a “reasonable range” of the factors listed above, an examination of every site is not required.<sup>34</sup> The statute specifically states that the agency shall not be required to conduct a “project-level analysis.”<sup>35</sup> Rather, in most circumstances, the site-specific analysis will be performed by the responsible party or the agency with jurisdiction when an activity is conducted in conformance with the Basin Plan amendments.

Notably, the Regional Water Board is prohibited from specifying the manner of compliance with requirements in waste discharge requirements or other Order,<sup>36</sup> and accordingly, the actual environmental impacts will necessarily depend upon the compliance strategy selected by the responsible party.

This Staff Report ~~for the Action Plan for the Russian River Watershed Pathogen TMDL (2017 Staff Report)~~, includes the CEQA checklist, along with the Action Plan. Following public review and comment, a response to comments document will be produced and modifications to the Action Plan, as necessary. The proposed Action Plan, resolution adopting the Action Plan, and public comments and response to public comments will be available prior to the public hearing. These materials fulfill the requirements of California Code of Regulations, title 23, section 3777, and the Regional Water Board’s substantive CEQA obligations.

Any potential environmental impacts associated with implementation of the Action Plan depend upon the specific compliance projects selected by the responsible parties, many of whom are public agencies subject to their own CEQA obligations<sup>37</sup>. Consistent with CEQA, the SED does not engage in speculation or conjecture but rather considers the reasonably

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<sup>33</sup> Cal. Code Regs., tit. 23 § 3777(c); Cal. Code Regs., tit. 14 § 15187(d); Cal. Pub. Resources Code, § 21159 (c).

<sup>34</sup> Cal. Code Regs., tit. 23 § 3777(c);

<sup>35</sup> Cal. Code Regs., tit. 23 § 3777(c); Public Resources Code § 21159(d)

<sup>36</sup> ~~Cal. Water Wat.~~ Code § 13360

<sup>37</sup> Public Resources Code § 21159.2



foreseeable feasible mitigation measures, and the reasonably foreseeable methods of compliance, which would avoid, or minimize the identified impacts.

The Regional Water Board recognizes that there may be project-level impacts that the local public agencies determine cannot be avoided or minimized to have less than significant adverse impacts. To the extent there are unavoidable adverse environmental effects, the necessity of implementing the federally required TMDL via the Action Plan, improving public health by reducing pathogens and associated waterborne illnesses, and removing the water quality impairment from the Russian River Watershed (an action required to achieve the national policy of the Clean Water Act) outweigh the unavoidable adverse environmental effects. The potential significant impacts associated with the Basin Plan amendment are outweighed by the benefit of restoration and enhancement of beneficial uses, and reduction of pathogens in the Russian River watershed.<sup>38</sup>

In making this statement of overriding considerations, the Regional Water Board has balanced the economic, legal, social, technological, and other benefits of this proposed TMDL against the unavoidable environmental effects in determining whether to recommend approval of this project. Upon review of the environmental information generated for this project and in view of the entire record supporting the TMDL, the Regional Water Board has determined that the specific economic, legal, social, technological, and other benefits of this proposed bacteria TMDL outweigh the unavoidable adverse environmental effects, and that such adverse environmental effects are acceptable under the circumstances.

## 11.1 SUMMARY OF PROPOSED ACTION PLAN

Regional Water Board staff developed a proposed *Action Plan for the Russian River Watershed Pathogen TMDL* (proposed Action Plan) for amendment into the Basin Plan. The Action Plan consists of a description of the TMDL fecal indicator bacteria-related load allocations, numeric targets, and implementation actions necessary to comply with the TMDL. The Action Plan also includes the following prohibition:

*~~Discharges of waste containing fecal waste material from humans or domestic animals<sup>39</sup> to waters of the state within the Russian River Watershed that cause or contribute to an exceedance of the bacteria water quality objectives not otherwise authorized by waste discharge requirements or other order or action of the Regional or state Water Board~~*

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<sup>38</sup> California Code of Regulations title 23, section 3777 (d) requires the Regional Water Board to make findings consistent with California Code of Regulations title 14 section 15093 when the SED identifies potentially unavoidable adverse environmental effects.

<sup>39</sup> Examples of domestic animals include, but are not limited to, cows, horses, cattle, goats, sheep, swine, poultry, dogs, cats, or any other animal(s) in the care of any person(s).

are prohibited. Compliance with this prohibition can be achieved in the following manner.

7. Implement adequate treatment and best management practices to prevent the discharge of fecal waste material from humans or domestic animals from entering a water of the state either directly, or indirectly as a result of stormwater runoff.
8. Comply with all fecal waste/pathogen-related provisions of an applicable NPDES permit.
9. Comply with all fecal waste/pathogen-related provisions of an applicable WDR.
10. Comply with all fecal waste/pathogen-related provisions of an applicable general WDR or waiver of WDRs.
- 2.11. Implement the terms of the Memorandum of Understanding between the North Coast Regional Water Quality Control Board and relevant local agencies to address fecal waste from homeless encampments and recreational water use.
12. For non-dairy livestock, implement best management practices to achieve the assigned load allocation within 2 years of the effective date of this TMDL and, if required by the Executive Officer, develop and implement a Ranch Management Plan. Once adopted by the North Coast Regional Water Quality Control Board, non-dairy livestock operations comply with the prohibition if dischargers are in compliance with all fecal waste/pathogen-related provisions of an applicable WDR or waiver of WDRs.

The Action Plan is necessary to comply with existing federal and State laws, regulations, plans and policies. Technical information supporting the Action Plan is described in detail in Chapters 1-10 of this staff report. In summary, the Action Plan is proposed to include the following elements:

1. An analysis of the sources of ~~fecal bacteria~~fecal bacteria pathogens within the Russian River Watershed
2. The Total Maximum Daily Load (TMDL) of fecal ~~waste indicator~~indicator bacteria that can be discharged to the Russian River Watershed and still attain water quality objectives
3. Waste load and load allocations for *E. coli* bacteria for freshwaters and enterococci bacteria for saline waters applicable to all controllable sources identified within the Russian River Watershed
4. A new Waste Discharge Prohibition specific to unauthorized fecal waste discharges within the Russian River Watershed
5. Existing and prospective interagency agreements to cooperatively implement actions for OWTS, homeless encampments, and recreational water users
6. A discussion of permitting, implementation of the prohibition, and enforcement.
7. A discussion of monitoring and adaptive management
8. Requirements, for responsible parties to develop, update, and implement the following for the reduction of fecal bacteria loads:
  - a. A *Recycled Water BMP Plan*, or equivalent BMP Plan, for recycled water projects;
  - b. A *Water Quality Management Plan*, *Waste Management Plan*, or *Nutrient Management Plan* for dairies;
  - c. *Report of Waste Discharge* for unpermitted large private OWTS, OWTS not meeting

conditions of the OWTS Policy's Conditional Waiver of Waste Discharge Requirements.

d. A Pathogen Reduction Plan for MS4 general permit enrollees.

## **11.2 ALTERNATIVES ANALYSIS**

Regional Water Board staff has identified two approaches (or alternatives) to address the ~~fecal indicator bacteria~~pathogen impairment in the Russian River Watershed. The following sections discuss the two alternatives: 1) Adoption of the Action Plan (adoption of the proposed Basin Plan amendment), and 2) No Action.

### **11.2.1 ALTERNATIVE 1 - ADOPTION OF THE ACTION PLAN (PREFERRED ALTERNATIVE)**

The Preferred Alternative is adoption of the Action Plan, including establishment of the human and domestic animal fecal waste discharge prohibition for the Russian River Watershed. The Action Plan includes the source assessment, waste load allocations and load allocations for each of the identified sources, and an implementation program describing the actions likely necessary to achieve the TMDL allocations and numeric targets. Regional Water Board staff will conduct reviews to evaluate the success of implementation actions aimed at reducing loading to achieve the allocations. Individual monitoring and reporting requirements will provide data and information about whether the implementation actions are working and if the TMDL is being achieved. A coordinated monitoring program will help improve the consistency and cost-effectiveness of monitoring actions. The Action Plan requirements will be implemented through updates to existing permits, local agency MOUs, and through existing Regional Water Board authorities. Staff have determined that this alternative is the most likely to result in attainment of water quality standards in a reasonable period of time and that most of the impacts resulting from this action are generally less than significant or can be mitigated. Therefore, this is the preferred alternative.

### **11.2.2 ALTERNATIVE 2 - NO ACTION**

Under the No Action alternative, no amendment to the Basin Plan would occur (no Action Plan adopted) and staff would continue to implement existing Regional and State Water Board programs and permits. The Regional Water Board would not adopt a TMDL for the Russian River Watershed and would not require specific load reductions from each source and the proposed prohibition would not be enacted.

Under this scenario, all existing onsite wastewater treatment systems (OWTS) in the Russian River Watershed would continue to be required to comply with the Basin Plan requirements for OWTS. If the Regional Water Board does not adopt a TMDL within two years of the TMDL completion date specified in Attachment 2 of the statewide OWTS Policy

(i.e., by the end of ~~2018~~, 2020)<sup>40</sup>, coverage under the OWTS Policy's conditional waiver of WDRs will expire for any OWTS that has any part of its dispersal system within 600 feet of the waterbodies listed in Attachment 2 for pathogens. ~~These~~In conformance with the findings of the 2012 303(d) list of impaired waters, there reaches include:

- Lower Russian HA, Guerneville ~~HASHSA~~, mainstem Russian River from Fife Creek to Dutch Bill Creek
- Lower Russian HA, Guerneville ~~HASHSA~~, Green Valley Creek Watershed
- Middle Russian River HA, Geyserville HAS, mainstem Russian River at Healdsburg memorial beach and unnamed tributary at Fitch mountain
- Middle Russian River HA, Mainstem Laguna de Santa Rosa
- Middle Russian River HA, Mainstem Santa Rosa Creek

Beginning in ~~2019~~2021, for all existing OWTS within these geographic areas, the Regional Water Board would have to issue WDRs, waivers of WDRs, or require corrective action to comply with siting, design, or operational standards that would be protective of bacteria water quality objectives. New and replacement OWTS within 600 feet of the waterbodies listed in Attachment 2 would have to meet applicable specific Tier 3 requirements of Basin Plan OWTS Policy adopted by the Regional Water Board on June 19, 2014, or other special provisions established for these waterbodies.

Additionally, opportunities for owners of OWTS to obtain public funding assistance for required upgrades to their OWTS may be reduced because ~~standards~~standard federal and state implementation grants and other funding sources are typically only available for projects located in watersheds that have an approved Action Plan or some other effective watershed-scale management plan in place.

The Regional Water Board is required under the *Policy for the Implementation and Enforcement of the Nonpoint Source Pollution Control Program*<sup>41</sup> (NPS Policy) to implement a WDR, waiver of WDR, or waste discharge prohibition to address sources of nonpoint source pollution. In the absence of the fecal waste discharge prohibition included in Alternative 1, the Regional Water Board would have to develop a WDR or waiver of WDRs for any sources of fecal waste to the Russian River Watershed, which are not addressed through an existing WDR or waiver to conform to the requirements of the policy.

This no action alternative will likely result in some improvement in water quality, but it does not provide a framework for watershed-wide implementation and monitoring efforts, a timeline by which implementation must occur, and reasonable assurance that water

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<sup>40</sup> The statewide OWTS Policy was revised by Resolution No. 2018-0019 on April 17, 2018. Attachment 1 of the resolution was revised to update the proposed adoption date for the Russian River Pathogen TMDL from 2017 to 2018.

<sup>41</sup> [https://www.waterboards.ca.gov/water\\_issues/programs/nps/docs/plans\\_policies/nps\\_iepolicy.pdf](https://www.waterboards.ca.gov/water_issues/programs/nps/docs/plans_policies/nps_iepolicy.pdf)

quality objectives will be attained within the shortest, reasonable period of time. Further, the no action alternative does not conform to the NPS Policy.

### **11.3 REASONABLY FORESEEABLE MEANS OF COMPLIANCE**

This section presents an analysis of the potential environmental impacts associated with reasonably foreseeable methods of compliance with the proposed Action Plan (preferred alternative). Regional Water Board staff solicited public input to help identify reasonably foreseeable compliance measures. Many of the measures listed below were identified by members of the public and agency staff during the CEQA scoping process. Current elevated fecal indicator bacteria densities exceed water quality objectives and are detrimental to the beneficial uses within the Russian River Watershed. The Action Plan provides a program addressing the adverse impacts of non-compliance with water quality objectives through progressive reduction in loading of fecal waste and pathogens (as measured by fecal indicator bacteria) to the Russian River Watershed using a schedule that is reasonable and as short as practicable.

The compliance measures and pollution controls necessary to comply with the Action Plan will depend on a number of site-specific conditions and factors. The following examples are not meant to be exhaustive of the suitable suite of compliance measures, but rather provide a reasonable range of measures that may be implemented. Many of the compliance measures listed below are often interchangeable as mitigation measures for potentially adverse environmental impacts associated with specific project activities. Additionally, though not listed below, public commenters encouraged the use of Low Impact Development (LID), including the construction of smaller homes, as possible mitigation measures.

#### **11.3.1 NON-STRUCTURAL CONTROLS**

Non-structural controls are typically aimed at controlling sources of a pollutant and do not involve construction or other earth moving/landscape manipulations. Non-structural controls are those activities that are primarily planning or outreach in nature. Most of the non-structural controls identified are unlikely to have an environmental impact because they are not physical in nature; however, where they were found to have less than significant impacts or where they could be mitigated to less than significant, they are discussed in Section 11.4. No potentially significant impacts on the environment were identified for these controls. Some of the possible non-structural controls that could be implemented as a method of compliance include:

- Education and Outreach: Conduct education and outreach about proper maintenance and upkeep for OWTS, water conservation, recycled water and graywater use, preventing illegal camping along waterbodies, proper human and domestic animal waste disposal and sanitation, and the effects of improper pet waste disposal. Publicize the locations of restrooms found at recreational beaches along the mainstem Russian River.

- **Inspection and Maintenance:** Require preventative maintenance and upkeep of OWTS. Inspect and perform routine maintenance of sewer laterals. Perform inspections and routine maintenance of sanitary sewer infrastructure and existing public restroom facilities at beaches along the Russian River. Perform regular beach clean-up to dispose of waste left on beaches. Manage irrigation to minimize leaks and ensure that overwatering and runoff do not occur.
- **Municipal Wastewater Program Establishment, Evaluation, and Enforcement:** Revise design standards for new and replacement sewer systems to add enhanced protection against overflows and exfiltration. Establish procedures and standards for the use of off-site easements, which include conditions, covenants, and deed restrictions, to facilitate properly designed and constructed OWTS serving multiple dwellings. Establish a local ordinance to require property owners to inspect their private sewer lateral upon property transfer, in response to chronic sanitary sewer overflows, or prior to change in property use. Establish a program and funding assistance for homeowners to promote voluntary inspections and repairs of private laterals. Develop an OWTS management program. Provide and/or improve options for shelters and transitional housing or other homeless services. Establish a hotline for reporting homeless/illegal encampments and facilitate their removal along stream corridors. Evaluate and if necessary improve management practices to prevent recycled water overspray, spills, and runoff. Implement programs to discourage or prevent illegal dumping. Explore expanding recycled water use to prevent discharge into surface waters. Enforce permit conditions, including water recycling requirements.
- **Water Quality Plans:** Require Best Management Practices (BMPs) for manure handling through the development or update of Water Quality Plans. BMPs for manure handling could include regular cleanup of manure and soiled bedding in animal habitation areas, locating manure storage areas away from water courses and off slopes (i.e., prevent storm water discharge), practicing onsite composting and reuse of manure, and storing manure on impermeable surfaces (i.e., prevent groundwater discharge).

### 11.3.2 STRUCTURAL CONTROLS

Structural controls for non-point sources divert, store, treat, and/or infiltrate storm water to prevent the discharge of waste material to the river as a result of runoff. Structural controls for point sources can also be implemented to treat waste before discharge and/or prevent the direct discharge of waste into a waterbody. Structural controls can involve activities that create potentially significant environmental impacts. Structural controls that were found to have impacts, both potentially significant and less than significant, are discussed in Section 11.4.

The following is a list of potential structural controls:

- **Straw Waddles:** Use straw waddles inoculated with mushrooms (i.e. mycofiltration), as appropriate, to filter bacteria from runoff.
- **Buffer Strips, Vegetated Swales, and Bioretention:** Construct and maintain vegetative

buffers along roadsides and next to waterbodies to slow runoff velocity, increase filtration of pollutants, and increase storm water infiltration. Construct and maintain bioretention BMPs to provide onsite removal of pollutants, including fecal waste, from storm water runoff through landscaping features.

- Green Roofs and Rain Gardens: Replace existing roofs and gardens with “green” infrastructure such as green roofs and rain gardens to prevent or reduce clean storm water from coming into contact with fecal wastes.
- Exclusion: Construct fencing, hedgerows, livestock trails, and walkways to exclude animals from streams and riparian areas to prevent direct deposition of feces into surface waters. Construct fencing, shrubs, or other barriers to prevent camping & habitation under bridges and overpasses and in other rights-of-way.
- Waste Storage and Disposal: Install pet waste collection systems, which provide plastic bags to be used in the collection of domestic pet waste, throughout the watershed. Provide garbage cans, recycling bins, and diaper changing stations at public beaches.
- Municipal Composting of Biosolids: Ensure the elimination of pathogens from biosolids by upgrading treatment through the use of composting.
- Waterless Waste Treatment: Utilize waterless technology such as composting and incinerating toilets.
- Restroom Facilities: Provide and/or upgrade permanent or temporary restroom facilities at recreation beaches and at locations frequented by homeless and transient people.
- Sewer Lateral Replacement: Fix or replace private sewer laterals that have inflow and infiltration issues.
- Increase Wastewater Storage Capacity: Enlarge wastewater holding ponds to prevent discharge to the Russian River and its tributaries.
- Wastewater Treatment Plant Expansion and/or New Treatment Plant Construction: Expand or construct wastewater treatment plants to allow for new connections.
- Connect OWTS to a Centralized Wastewater Treatment Plant or Decentralized Community System: Connect individual wastewater treatment and disposal systems to a centralized treatment plant or decentralized community wastewater treatment system and discontinue use of individual OWTS.
- Treatment Plant Wastewater Disinfection: Upgrade treatment plant wastewater disinfection systems and disinfect holding pond effluent through the use of ozone, heat sterilization or ultrafiltration.
- OWTS Supplemental Treatment: Utilize supplemental treatment such as ultraviolet (UV) light disinfection or chlorine to ensure adequate treatment of effluent from OWTS.
- MS4 Sand Filters: Install and maintain sand filters, which are effective for pollutant removal from storm water. Sand filters may be a good option in densely developed urban areas with little pervious surface since the filters occupy minimal space.
- Replacement and/or Improvement of OWTS: Replace/upgrade leaking and poorly sited

OWTS with OWTS that are correctly designed, sited, constructed, installed, operated and maintained. System status to be determined through site inspection.

## **11.4 ENVIRONMENTAL CHECKLIST**

As stated previously, the environmental analysis must include an evaluation of the reasonably foreseeable environmental impacts of the methods of compliance and the reasonably foreseeable mitigation measures relating to those impacts. This section, consisting of the CEQA checklist and answers to the questions in the checklist, discusses the reasonably foreseeable compliance measures and alternatives and mitigation measures of those compliance methods.

In formulating the checklist answers, the impacts of implementing the non-structural and structural controls were evaluated. At this time, the exact compliance measures that might be implemented to comply with the Action Plan are unknown, and therefore this analysis considers a range of non-structural and structural measures that might be used. When specific measures are selected for implementation, a project-level/site-specific CEQA analysis will be performed by the responsible party, as necessary.

This evaluation considers whether the construction or implementation of the reasonably foreseeable compliance measures has the potential to cause a substantial, adverse change in any of the physical conditions within the area affected by the project. In addition, the evaluation considers environmental effects in proportion to their severity and probability of occurrence. In this analysis, the level of significance is based on the existing conditions of both the physical environment and regulatory baseline requirements. A significant effect on the environment is defined in regulation as “a substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project, including land, air, water, minerals, flora, fauna, ambient noise, and objects of historic or aesthetic significance. An economic or social change by itself shall not be considered a significant effect on the environment. An economic or social change related to a physical change may be considered in determining whether the physical change is significant.” (14 Cal. Code regs, tit.14, § 15382.).

Potential reasonably foreseeable impacts of the reasonably foreseeable compliance measures were evaluated with respect to each of the factors on the checklist. Additionally, mandatory findings of significance regarding short-term, long-term, cumulative and substantial impacts were evaluated. In this analysis, the level of significance was based on baseline conditions (i.e., current conditions). Based on this review, it has been concluded that there may be some potentially significant impacts associated with certain reasonably foreseeable methods of compliance with the Action Plan. Reasonably foreseeable structural and non-structural controls that were found to have impacts, both potentially significant and less than significant, or that require mitigation are discussed in detail below.



<b>Table 11.1 Environmental Checklist</b>				
	<b>Potentially Significant Impact</b>	<b>Less Than Significant With Mitigation</b>	<b>Less Than Significant Impact</b>	<b>No Impact</b>
<b>I. AESTHETICS -- Would the project:</b>				
a) Have a substantial adverse effect on a scenic vista?			✓	
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?		✓		
c) Substantially degrade the existing visual character or quality of the site and its surroundings?		✓		
d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?		✓		
<b>II. AGRICULTURE AND FOREST RESOURCES: In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Dept. of Conservation as an optional model to use in assessing impacts on agriculture and farmland. In determining whether impacts to forest resources, including timberland, are significant environmental effects, lead agencies may refer to information compiled by the California Department of Forestry and Fire Protection regarding the state's inventory of forest land, including the Forest and Range Assessment Project and the Forest Legacy Assessment Project; and forest carbon measurement methodology</b>				
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	✓			
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?	✓			
c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))?				✓
d) Result in the loss of forest land or conversion of forest land to non-forest use?				✓

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<b>Table 11.1 Environmental Checklist</b>				
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e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use?	✓			
<b>III. AIR QUALITY: Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations. -- Would the project:</b>				
a) Conflict with or obstruct implementation of the applicable air quality plan?				✓
b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?			✓	
c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?				✓
d) Expose sensitive receptors to substantial pollutant concentrations?				✓
e) Create objectionable odors affecting a substantial number of people?		✓		
<b>IV. BIOLOGICAL RESOURCES -- Would the project:</b>				
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?		✓		
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the California Department of Fish and Wildlife or US Fish and Wildlife Service?		✓		
c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?		✓		

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d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?		✓		
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?		✓		
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?		✓		
<b>V. CULTURAL RESOURCES -- Would the project:</b>				
a) Cause a substantial adverse change in the significance of a historical resource as defined in §15064.5?		✓		
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?		✓		
c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?		✓		
d) Disturb any human remains, including those interred outside of formal cemeteries?		✓		
e) Would the project cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:				
i) Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code section 5020.1(k), or		✓		

<b>Table 11.1 Environmental Checklist</b>				
	<b>Potentially Significant Impact</b>	<b>Less Than Significant With Mitigation</b>	<b>Less Than Significant Impact</b>	<b>No Impact</b>
ii) A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resource Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.		✓		
<b>VI. GEOLOGY AND SOILS -- Would the project:</b>				
a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:				
i) Rupture of a known earthquake fault, as delineated on the most recent Alquist- Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.		✓		
ii) Strong seismic ground shaking?		✓		
iii) Seismic-related ground failure, including liquefaction?		✓		
iv) Landslides?		✓		
b) Result in substantial soil erosion or the loss of topsoil?		✓		
c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?		✓		
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?		✓		
e) Have soils incapable of adequately supporting the use of septic tanks or alternative waste- water disposal systems where sewers are not available for the disposal of waste water?		✓		

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<b>VII. GREENHOUSE GAS EMISSIONS -- Would the project:</b>				
a) Generate Greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?		✓		
b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?				✓
<b>VIII. HAZARDS AND HAZARDOUS MATERIALS -- Would the project:</b>				
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?		✓		
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?		✓		
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?		✓		
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?		✓		
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?		✓		
f) For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?		✓		
g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?				✓
h) Expose people or structures to a significant risk of loss injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?				✓

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	<b>Potentially Significant Impact</b>	<b>Less Than Significant With Mitigation</b>	<b>Less Than Significant Impact</b>	<b>No Impact</b>
<b>IX. HYDROLOGY AND WATER QUALITY -- Would the project:</b>				
a) Violate any water quality standards or waste discharge requirements?		✓		
b) Substantially deplete ground water supplies or interfere substantially with ground water recharge such that there would be a net deficit in aquifer volume or a lowering of the local ground water table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?				✓
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site?		✓		
d) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site?		✓		
e) Create or contribute runoff water which would exceed the capacity of existing or planned storm water drainage systems or provide substantial additional sources of polluted runoff?		✓		
f) Otherwise substantially degrade water quality?		✓		
g) Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?				✓
h) Place within a 100-year flood hazard area structures which would impede or redirect flood flows?		✓		
i) Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?				✓
j) Inundation by seiche, tsunami, or mudflow?				✓

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<b>X. LAND USE AND PLANNING -- Would the project:</b>				
a) Physically divide an established community?				✓
b) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?				✓
c) Conflict with any applicable habitat conservation plan or natural community conservation plan?				✓
<b>XI. MINERAL RESOURCES -- Would the project:</b>				
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?				✓
b) Result in the loss of availability of a locally – important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?				✓
<b>XII. NOISE -- Would the project result in:</b>				
a) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?		✓		
b) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?				✓
c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?	✓			
d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?		✓		
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?				✓
f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?				✓

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<b>Table 11.1 Environmental Checklist</b>				
	<b>Potentially Significant Impact</b>	<b>Less Than Significant With Mitigation</b>	<b>Less Than Significant Impact</b>	<b>No Impact</b>
<b>XIII. POPULATION AND HOUSING -- Would the project:</b>				
a) Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?	✓			
b) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?		✓		
c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?		✓		
<b>XIV. PUBLIC SERVICES</b>				
a) Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:				
Fire protection?				✓
Police protection?				✓
Schools?				✓
Parks?				✓
Other public facilities?				✓
<b>XV. RECREATION</b>				
a) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be			✓	
b) Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?				✓



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	<b>Potentially Significant Impact</b>	<b>Less Than Significant With Mitigation</b>	<b>Less Than Significant Impact</b>	<b>No Impact</b>
<b>XVI. TRANSPORTATION/TRAFFIC -- Would the project:</b>				
a) Cause an increase in traffic which is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in either the number of vehicle trips, the volume to capacity ratio on roads, or congestion at intersections)?			✓	
b) Exceed, either individually or cumulatively, a level of service standard established by the county congestion management agency for designated roads or highways?				✓
c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?				✓
d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?				✓
e) Result in inadequate emergency access?				✓
f) Result in inadequate parking capacity?			✓	
g) Conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks)?			✓	
<b>XVII. UTILITIES AND SERVICE SYSTEMS -- Would the project:</b>				
a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?				✓
b) Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	✓			
c) Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?			✓	
d) Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?				✓

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	<b>Potentially Significant Impact</b>	<b>Less Than Significant With Mitigation</b>	<b>Less Than Significant Impact</b>	<b>No Impact</b>
e) Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	✓			
f) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?				✓
g) Comply with federal, state, and local statute and regulations related to solid waste?				✓
<b>XVIII. MANDATORY FINDINGS OF SIGNIFICANCE</b>				
a) Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?		✓		
b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?	✓			
c) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?	✓			

**i. AESTHETICS**

**Would the project:**

(a) – Have a substantial adverse effect on a scenic vista?

Answer: Less than significant.<sup>42</sup>

The creation of buffer strips and vegetated swales may include planting of trees and shrubs. The addition of these types of vegetation to the landscape is generally regarded as having positive aesthetic effects. In some cases the planting or retention of large woody vegetation could reduce visibility of an adjacent waterbody or of the surrounding landscape and therefore could alter the scenic vista. Although the creation of buffer strips and vegetated swales will modify the appearance of an area, the aesthetic effects are expected to be positive and will not likely result in a substantial adverse effect on the scenic vista and are considered less than significant.

(b) – Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?

(c) – Substantially degrade the existing visual character or quality of the site and its surroundings?

(d) – Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?

Answer: Less than significant with mitigation.

The changes to the visual character of a site due to the construction of wastewater treatment ponds and buildings associated with significantly expanded or new centralized or decentralized wastewater treatment facilities can be mitigated by building facility structures to house equipment and fences to provide a visual screen for equipment and materials used in the everyday operations of the facility. Planting vegetation such as native trees, grasses, and wildflowers can provide a vegetative screen and result in an aesthetic that more closely reflects the surrounding landscape. Strategic siting of the facility structures on the landscape can also allow for the structures to be placed in locations that will have the least possible effect on the existing visual character of the surrounding area and allow them to avoid damaging scenic resources. Additionally, where scenic resources are identified at a site along a scenic highway, the use of standard construction techniques and sediment and erosion control practices would require revegetation and would not result in permanent alteration to the vegetation of scenic resources. The potential glare that could result from the construction of new wastewater treatment and effluent storage ponds could be mitigated by proper siting and the planting of vegetation screens around the ponds.

The construction of new restroom facilities at public beaches or other locations throughout the watershed could result in adverse aesthetic affects to the visual quality of the surroundings; however this effect can be mitigated through strategic siting of the restroom facility in a location that minimizes the effect on the visual character of the surrounding

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site. Additionally, the planting of trees, shrubs, and native plants can be used to screen the restroom from view and result in an aesthetic that more closely reflects the surrounding landscape. For restrooms constructed in urban locations, the selection of materials used to construct the exterior of the restroom should reflect the aesthetic and character of the surrounding location, which will allow it to blend it better with neighboring structures.

Increasing wastewater storage capacity, adding supplemental treatment to OWTS, composting biosolids, and installing pet waste collection systems, and garbage and recycling cans would result in less than significant impacts to the visual character and quality of the site and its surroundings. The enlarging of wastewater holding ponds would result in minimal changes from the existing baseline and therefore will have a less than significant impact on the visual character surrounding site. The composting of biosolids and addition of supplemental treatment to OWTS would result in minimal changes to the visual landscape as they can be housed in existing structures and the mechanisms to house supplemental treatment could even be placed underground with a cover for access. Pet waste collection systems are small and can be painted to blend with the surrounding environment. The presence of garbage and recycling cans will not substantially degrade the surrounding area and is expected to improve the aesthetics of the surroundings by preventing trash from being deposited on the ground.

## **ii. AGRICULTURE AND FOREST RESOURCES**

### **Would the project:**

- (a) – Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?
- (b) – Conflict with existing zoning for agricultural use, or a Williamson Act contract?
- (e) – Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to nonforest use?

Answer: Potentially significant.

The creation of riparian buffers and exclusion of animals from riparian zones could cause incidental loss of agricultural use. These losses would affect only a very narrow band of land on either side of a watercourse. Additionally, some agricultural areas that are mapped as prime, unique or important may already have riparian buffers or exclusion fencing in place. Although there are many factors that affect this determination, it can be assumed that agricultural lands with a potential to discharge waste that contains pathogenic microorganisms to waters of the state and that implement riparian protection actions or compliance measures to comply with the Action Plan could be taking land out of production. While avoidance and minimization measures can be used to lessen impacts, and experience suggests that some modified management of riparian zones is often appropriate, there is no mitigation for loss of land where that occurs. Therefore, this is a potentially significant and unavoidable impact that cannot be reduced to a less than

significant level with mitigation. The impact is overridden by project benefits as set forth in the SED.

(c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))?

(d) Result in the loss of forest land or conversion of forest land to non-forest use?

Answer: No Impact.

None of the reasonably foreseeable structural or non-structural compliance measures will rezone or force the rezoning of Timberlands Production or result in the conversion of forested land to non-forested land. Therefore, there will be no impact on the classification or conversion of timberlands.

### **iii. AIR QUALITY**

Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations.

#### **Would the project:**

(a) – Conflict with or obstruct implementation of the applicable air quality plan?

(c) – Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is not attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?

(d) – Expose sensitive receptors to substantial pollutant concentrations?

Answer: No impact.

None of the structural or non-structural compliance measures would result in a violation of air quality plans, result in a cumulatively considerable increase in criteria pollutants, or expose sensitive receptors to substantial pollutant concentrations.

(b) – Violate any air quality standard or contribute substantially to an existing or projected air quality violation?

Answer: Less than significant impact.

Construction activities can generate dust and combustion exhaust emissions that will be emitted into the atmosphere from construction equipment associated with wastewater treatment plant expansion and/or construction, treatment plant wastewater disinfection system upgrades, connecting OWTS to a centralized or decentralized wastewater treatment plant, adding supplemental treatment to OWTS, replacing or upgrading existing OWTS, increasing wastewater storage capacity, construction of new restroom facilities, creation of sand filters for storm water, sewer lateral replacement, and creation of green roofs and

rain gardens. Air pollutants will be emitted from construction worker commutes. However, because of the temporary nature of construction activities, the proposed project is not likely to result in construction-related emissions that will result in significant impacts or require mitigation for any of the regionally significant pollutants.

(e) – Create objectionable odors affecting a substantial number of people?

Answer: Less than significant with mitigation.

The repair and replacement of sewer laterals and upgrade, maintenance, and/or replacement of OWTs will decrease the potential for illicit discharges which would result in objectionable odors. Therefore, there would be no impact from those activities. The composting of biosolids can result in objectionable odors, however through the use of indoor composting or the thoughtful siting and design of composting locations odors can be minimized. Other mechanisms that could be considered to mitigate composting odors include use of aeration and biofiltration, mixing with coarse dry bulking agents, and placing an aerobic biofilter layer over the biosolids. Therefore, the application of mitigation measures will result in less than significant impacts to air quality.

#### **iv. BIOLOGICAL RESOURCES**

##### **Would the project:**

(a) – Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?

(b) – Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the California Department of Fish and Game or US Fish and Wildlife Service?

(c) – Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?

(d) – Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?

(e) – Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?

(f) – Conflict with the provision of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?

Answer: Less than significant impact with mitigation.

There are numerous aquatic and terrestrial Federal and State listed endangered and threatened animals which are known to be present in the Russian River Watershed. Such species could potentially be adversely impacted by measures implemented to comply with the proposed Action Plan, if only temporarily. The location of sensitive species and habitat must be assessed on a project by project basis. When installing structural compliance

measures that involve substantial earth moving or riparian restoration activities that have the potential to affect candidate, sensitive, or special status species, project proponents are required to consult with federal, state and local agencies, including but not limited to, the county, CDFW, Regional Water Board, and USFWS. Project proponents must ensure project actions avoid, minimize and/or mitigate for impacts to rare, threatened or endangered species.

Actions to limit the input of fecal indicator bacteria into water ways, such as riparian buffers, the use of straw waddles, and exclusion from riparian areas may conflict with the habitat requirements of certain flora or fauna and some could impede migration. Specific examples include non-native species out competing natives in constructed riparian buffers. Mitigation measures to reduce this potential impact include use of certified weed-free grass and project specific seed mixes to prevent the introduction of non-native or invasive species. Fencing can be selected that won't ensnare animals and migration corridors can be left to allow movement of fauna. Alternatively, rotational grazing practices and hotwire fences could be used where exclusionary fencing has the potential to affect wildlife and impede migration. The netting used in some straw waddles may ensnare small terrestrial fauna, and can be mitigated by the use of biodegradable, natural fiber netting. In most cases, impacts could be avoided by adjusting the timing and/or location of the actions to take into account candidate, sensitive, or special status species or their habitats. The process for designing, permitting, and implementing mitigation measures includes collaboration between Regional Water Board staff and CDFW and USFWS staff to reach agreement on the most appropriate approach to protecting sensitive beneficial uses.

Construction activities may have a potential impact upon species identified as a candidate, sensitive, or special status, may conflict with a local policies or ordinances protecting biological resources, may fill federally protected wetlands as defined by Section 404 of the Clean Water Act, and may conflict with the provisions of an adopted Habitat Conservation Plan (HCP), Natural Community Conservation Plan (NCCP) or other approved local, regional, or state habitat conservation plan. Construction has the potential to cause adverse effects in several ways: filling of federally protected wetlands, short-term habitat destruction during construction, permanent displacement of sensitive species due to new structures, and, "take" of endangered species. It is likely that when an entity is choosing possible locations for the construction of a new centralized or decentralized wastewater treatment plant, new restroom, new sewer lines, or significant expansion of a wastewater treatment plant they would give preference to sites that did not fill federally protected wetlands or adversely affect biological resources. If a site containing endangered or threatened species was selected for new construction, the entity would be required to consult with federal, state, and local agencies to mitigate potential impacts. If a site were selected that would result in the fill of federally protected wetlands, the responsible party would be required to obtain a Clean Water Act (CWA) Section 404 permit from the Army Corps of Engineers and a CWA Section 401 Water Quality Certification from the Regional Water Board. If a direct fill of a stream or wetland is absolutely necessary, then adequate compensatory mitigation in accordance with federal and state regulatory programs will be

required to replace the loss of functions and values in compliance with the State's No Net Loss Policy<sup>43</sup>.

During project level construction activities to implement compliance measures, both structural and non-structural mitigation measures can be implemented to avoid, minimize or mitigate potentially significant impacts to sensitive species. Once a project plan is prepared and construction areas are delineated, measures must be implemented prior to and during construction to avoid, minimize, and mitigate impacts to sensitive animals and their habitat, and vegetation communities such as wetlands. For example, wetlands within 100 feet of any ground disturbance and construction-related activities (including staging and access roads) would be clearly marked and/or fenced to avoid impacts from construction equipment and vehicles. If new or temporary access roads are required, grading would be conducted such that existing hydrology would be maintained. In addition, water pollution control measures such as erosion control, sediment control, and waste management would be implemented to avoid and minimize potential water quality impacts from polluted storm water runoff to streams, wetlands and riparian areas. Other potential mitigation measures could include only constructing during the time of year where the species are not present or are at less vulnerable life stages, or fencing off areas that contain sensitive species or their habitat so that they are not disturbed during construction.

Based on the information provided above and the variety of avoidance, minimization and mitigation measures available, the impacts to Biological Resources from compliance measures to address fecal indicator bacteria impairment are less than significant with mitigation incorporated.

#### **v. CULTURAL RESOURCES**

##### **Would the project:**

- (a) – Cause a substantial adverse change in the significance of a historical resource as defined in §15064.5?
- (b) – Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?
- (c) – Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?
- (d) – Disturb any human remains, including those interred outside of formal cemeteries?
- (e) - Would the project cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:
  - (i) Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code section 5020.1(k), or

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<sup>12</sup> Executive Order W-59-93



ii) A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resource Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.

Answer: Less than significant with mitigation.

For the majority of potential compliance measures, it is unlikely that their implementation will cause a substantial adverse change to cultural resources. Most of the reasonably foreseeable compliance measures will take place in areas that are already disturbed and are in highly urbanized areas, contain sewer laterals, septic systems, and/or other pipes. Implementation strategies that involve digging of a hole, such as for a fence post to contain livestock, may disturb previously unexcavated soil; however, the volume of soil excavated for post-holes is not significant and, therefore, does not pose a significant threat to cultural resources. Additionally, it is more probable that livestock owners will choose methods of compliance that are less costly than fencing a great length of ground, e.g. moving food and water sources away from riparian areas, which of course results in minimal excavation, if any. In the event cultural resources are discovered, implementation is not expected to have substantial adverse change in significance of the resources, destruction of unique cultural resources or sites with cultural value, or the disturbance of human remains. The digging of new fence post holes is a small-scale operation and the fence post could be relocated if cultural resources are found.

The Project is not expected to have a substantial adverse change in significance of tribal cultural resources. Strategic siting of facility structures or facility improvements on the landscape can allow for the structures to be placed in locations that will have the least possible effect on tribal cultural resources. Avoidance and preservation of the resource in place would minimize significant adverse impacts.

In cases where the installation of compliance measures may involve large scale excavations or earth disturbing activities, such as centralized or decentralized wastewater treatment plant construction, restroom construction, placing new sewer lines, or expanding a wastewater treatment plant or pond, a cultural resources investigation should be conducted before any substantial disturbance. The cultural resources investigation will include, at a minimum, a records search for previously identified cultural resources, including sites, features, places, cultural landscapes, sacred places, and objects with cultural value pursuant to the California Register of Historical Resources or included in a local register of historical resources. Additionally, the lead agency will consider the impact of the project on tribal cultural resources and follow consultation requirements pursuant to Public Resources Code sections 21080.3.1, 21080.3.2, and 21082.3. Previously conducted cultural resources investigations of the project parcel and vicinity will also be identified and utilized.

All future actions must comply with the CEQA process and investigate, evaluate, and treat impacted significant cultural resources. A record search should be conducted that also includes contacting the appropriate information center of the California Historical Resources Information System, operated under the auspices of the California Office of Historic Preservation, and the relevant Regional Archaeological Information Center. In coordination with the information center or a qualified archaeologist, a determination regarding whether identified cultural resources will be affected by the proposed project must be made and if investigations were performed to satisfy the requirements of CEQA. If not, a cultural resources survey may need to be conducted. The purpose of this investigation would be to identify resources before they are affected by a proposed project and avoid the impact. If resources are identified, site-specific implementation will minimize impacts. This can include actions such as avoidance through relocation, changes in design, site capping and protection through barriers, fencing, and covering of the cultural resources. Taking into account tribal cultural values and meaning of the resource, other mitigation measures could include protecting the confidentiality of the resource, protecting the cultural character and integrity of the resource, and its traditional use.

In addition, in the event that the ground disturbances uncover previously undiscovered or documented resources, California law protects Native American burials, skeletal remains, and associated grave goods regardless of the antiquity and provides for the sensitive treatment and disposition of those remains. (Health & Safety Code, Section 7050.5; Public Resource Code, Section 5097.9 et seq).

#### **vi. GEOLOGY AND SOILS**

##### **Would the project:**

- (a) – Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:
  - i. Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.
  - ii. Strong seismic ground shaking
  - iii. Seismic-related ground failure, including liquefaction?
  - iv. Landslides?
- (b) – Result in substantial soil erosion or the loss of topsoil?
- (c) – Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?
- (d) – Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?
- (e) – Have soils incapable of adequately supporting the use of septic tanks or alternative waste-water disposal systems where sewers are not available for the disposal of waste water?

Answer: Less than significant with mitigation.

It is possible that some soils in areas of the Russian River Watershed considered for the construction of new structures, including centralized or decentralized wastewater treatment facilities, community OWTS, and restrooms, could be unstable, be located on expansive soil, or result in ruptured faults, seismic ground shaking, liquefaction, or landslides if construction were to occur on certain sites. The first step in preventing this possibility is to properly site such construction so as to avoid these potential outcomes.

If it were determined that construction would take place on a site with areas of unstable or expansive soils or in areas with fault zones, seismic shaking, or where liquefaction could occur it would be up to the project proponents to offer mitigation measures to reduce the impact to less than significant. Mitigation measures could include abstaining from constructing in areas with unsuitable or unstable geology, minimizing the disturbance of the areas of concern, anchoring the soils, adding structural piles, building a thicker foundation, deepening the footings of the foundation, and ensuring proper drainage so that rain-induced landslides do not occur. A site-specific CEQA evaluation would need to be completed for the project to outline any potential environmental effects. Additionally, a site-specific work plan and health and safety plan would be developed by a licensed geologist or engineer prior to implementation of the project. Such plans ensure conditions are assessed and impacts appropriately avoided prior to initiation of the project. The site manager must also be made aware of potential risks and management measures associated with any structures, soil instability, expansive soils, or other features associated with the unique nature of the project setting, with specific attention to potential risks to life or property and appropriate protections.

Construction activities may result in soil erosion of disturbed topsoil. Implementation of compliance measures such as expansion of restroom facilities, construction of centralized or decentralized wastewater treatment systems, green roofing, or wastewater storage ponds will result in temporary ground disturbances. These activities could result in erosion and sedimentation. However, construction related erosion impacts will be temporary and should cease with the cessation of construction activities. Standard best management practices (BMPs) to address erosion, sediment, and pollution prevention should be used during small and large scale construction activities to mitigate potential erosion issues. Facility pollution prevention plans should be developed to ensure that the correct BMPs are selected for the construction of wastewater treatment facilities, wastewater storage ponds, and of other treatment measures. For example, excavated soil should be covered or seeded prior to precipitation and replanted as soon as practicable to avoid contaminating storm water runoff and to prevent soil erosion. For construction activities that are greater than one acre, enrollment under the National Pollutant Discharge Elimination System (NPDES) construction storm water general permit will be necessary and the development of a storm water pollution prevention plan (SWPPP) required.

The proper implementation of mitigation measures, including those discussed above, will result in a less than significant impact to soil stability and erosion.

## **vii. GREENHOUSE GAS EMISSIONS**

### **Would the project:**

(a) Generate Greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?

Answer: Less than significant with mitigation.

Implementation of compliance measures at the project level could result in a temporary increase in greenhouse gases related to exhaust from equipment and vehicles used during construction activities. However, these emissions will be limited to a finite period of time and would result in less than significant impacts overall.

Greenhouse gases may be generated from wastewater treatment plant alterations or new construction, installation of new sewer lines, replacement of OWTS, and improvements, repair, and maintenance of OWTS, sewer laterals, and wastewater treatment facilities, as compared to the current baseline.

The daily operations of a new centralized or decentralized wastewater treatment plant, or significantly expanded plant, could result in increased greenhouse gas emissions as a result of greater power needs at the plant itself, as well as at lift stations to move a larger volume of waste. Possible mitigation measures include the use of ecofriendly power, including wind and solar power, and implementation of water and power conservation measures. Impacts associated with individual projects implemented to comply with the Action Plan will be evaluated for their potential to increase greenhouse gases by the parties responsible for implementing the compliance measures and appropriate mitigation implemented to reduce that potential.

(b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?

Answer: No Impact

All structural or non-structural implementation measures would need to be implemented in a manner consistent with plans, policies or regulations to reduce greenhouse gas emissions including those mentioned here. Any water quality control effort must be consistent with the State Water Board Resolution No. 2008-0030 which directs Water Board staffs to “require...climate change considerations, in all future policies, guidelines, and regulatory actions.” Also, the proposed project is intended to be implemented in a manner which conforms with the goals of Assembly Bill (AB) 32 (States, 2005, ch 488). AB 32 requires that greenhouse gas emissions be reduced to 1990 levels by 2020. This requirement relates to anthropogenic sources of greenhouse gases.

**viii. HAZARDS AND HAZARDOUS MATERIALS**

**Would the project:**

- (a) – Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?
  - (b) – Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?
  - (c) – Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?
  - (d) – Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?
  - (e) – For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?
  - (f) – For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?
- Answer: Less than significant with mitigation.

The existing regulatory baseline includes numerous federal, state and local laws regarding the designation, handling, transportation and disposal of hazardous substance. Nothing in the proposed TMDL Basin Plan amendment alters this existing regulatory baseline. However, the manner in which hazardous materials are handled and controlled can have environmental impacts as highlighted here.

Specifically, in any action involving chemicals or toxic pollutants, there is a potential for release of pollutants due to an accident or upset condition. The potential for such releases can be greatly reduced by proper planning. Measures to prevent releases of pollutants include such things as pollution prevention technology (e.g., automatic sensors and shut-off valves, pressure and vacuum relief valves, secondary containment, air pollution control devices, double walled tanks and piping), access restrictions, fire controls, emergency power supplies, contingency planning for potential spills and releases, pollution prevention training and other types of mitigation measures. Before implementing structural compliance measures, it is important to consider site geology, hydrology, surrounding land uses and potential receptors, costs, and air quality control plans (including monitoring and contingency plans) if necessary.

Fuels, lubricating oils, and other petroleum products will be used during construction activities. Well established techniques for controlling spills, leaks, and drips should be incorporated in work plans, remedial action plans, treatment plans and site health and safety plans to assure the control of petroleum products and any other chemicals used during the cleanup activity. In order to mitigate the potential adverse effects, pollution

prevention plans and waste management BMPs should be used in conjunction with the implementation of compliance measures.

Existing regulations require the proper storage, handling and use of these types of materials. In the event of an accident, responsible parties must comply with the requirements of the California Emergency Management Agency (CalEMA) Hazardous Materials Spill reporting process. Any significant release or threatened release of a hazardous material requires immediate reporting by the responsible person to the Cal EMA State Warning Center (800) 852-7550 and the Certified Unified Program Agency (CUPA) or 911.

The mitigation measures discussed above will likely reduce impacts to a less than significant level.

(g) – Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?

(h)– Expose people or structures to a significant risk of loss injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?

Answer: No Impact

Much of the Russian River valley includes rural residential dwellings and a loosely-defined urban/wildland boundary. The California Department of Forestry and Fire Protection (CalFire) has identified at least 3 communities in the Russian River valley as existing in a Very High Fire Hazard Severity Zone, including: Cloverdale, Santa Rosa, Ukiah. The proposed structural and non-structural compliance measures will not hinder emergency response plans or expose people or structures to wildfires above and beyond that which already exists as the baseline.

## **IX. HYDROLOGY AND WATER QUALITY**

### **Would the project:**

(a) – Violate any water quality standards or waste discharge requirements?

(c) – Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site?

(d) – Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site?

(e) – Create or contribute runoff water which would exceed the capacity of existing or planned storm water drainage systems or provide substantial additional sources of polluted runoff?

(f) – Otherwise substantially degrade water quality?

(h) – Place within a 100-year flood hazard area structures which would impede or redirect flood flows?

Answer: Less than significant impact with mitigation.

When replacing or repairing private sewer laterals and OWTS, and operating a centralized or decentralized wastewater treatment plant, it is possible that sewage could be released to surface waters and violate water quality standards and degrade water quality. Mitigation measures such as containment structures and absorption materials are available to reduce transfer of these substances to surface waters. Fuels, lubricating oils, and other petroleum products will be used during construction activities and could be accidentally discharged to surface waters. Well established techniques for controlling spills, leaks, and drips should be incorporated in work plans, remedial action plans, treatment plans and site health and safety plans to assure the control of petroleum products and any other chemicals used during the activity. In order to mitigate the potential adverse effects, pollution prevention plans and waste management BMPs should be used in conjunction with the implementation of permit compliance measures. Mitigation measures such as containment structures, absorption materials, and drip pans are available to reduce the transfer of these substances to surface waters. The possibility that composted biosolids could reach surface waters can be mitigated by siting compost piles away from water courses, covering the piles during storm events, using straw waddles around the piles to filter runoff, build storm water containment, and placing the piles indoors. Pet waste collection systems which provide plastic bags for pet waste cleanup, may cause violations of water quality standards if they are improperly discarded and enter waterbodies. This can be mitigated by providing waste receptacles near the pet waste collection systems to provide a location for people to place the used and unused bags.

Compliance measures related to construction activities could potentially cause an alteration of the existing drainage pattern of a site. In most cases however, these compliance measures would be installed with appropriately designed mitigation measures so as to limit any alteration of the existing drainage pattern, unless beneficial to the environment. In general, compliance measures could be constructed or installed without resulting in substantial erosion or siltation on- or offsite. For example, implementing BMPs such as using straw mulch and hydroseed on exposed areas, placing silt fencing and straw waddle to filter runoff, drip protection and vehicle cleaning for construction equipment, maintenance and site inspections are all methods that can be employed. Entities are commonly required to install and maintain erosion control measures (e.g. mulch, straw waddles, silt fencing) to prevent discharge of excess sediment from soil disturbing activities.

Construction of a new centralized or decentralized wastewater treatment plant, restroom facility, or significant expansion of a wastewater treatment plant, may increase the amount of impervious surface and therefore could result in flooding or polluted runoff. Additionally, these structures may be placed within the 100-year flood hazard area. The possibility of flooding and polluted runoff can be mitigated through the use of Low Impact Development (LID). LID is utilized to infiltrate storm water and reduce changes in drainage patterns due to impervious surfaces and to filter storm water runoff. LID strategies

integrate green space, native landscaping, natural hydrologic functions, and various other techniques to generate less runoff from developed land. Examples of LID that could be used are bio swales, green roofs, rain gardens, and sand filters.

(b) – Substantially deplete ground water supplies or interfere substantially with ground water recharge such that there would be a net deficit in aquifer volume or a lowering of the local ground water table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?

(g) – Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?

(i) – Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?

(j) – Inundation by seiche, tsunami, or mudflow?

Answer: No impact.

The structural and non-structural reasonably foreseeable compliance measure identified would not deplete groundwater supplies and should not substantially increase the chances of risk of loss, injury, or death involving flooding, or increase the chance of tsunami or mudflow. No housing development is proposed as a result of this proposed Basin Plan amendment and therefore none will be placed within a 100-year flood hazard area or place housing in the 100-year flood plain.

## **X. LAND USE PLANNING**

### **Would the project:**

(a) – Physically divide an established community?

(b) – Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?

(c) – Conflict with any applicable habitat conservation plan or natural community conservation plan?

Answer: No impact.

The reasonable foreseeable structural and non-structural compliance measures should not divide a community, conflict with land use, policy, or regulation of an agency with jurisdiction over the project, adopted for mitigation purposes, or conflict with any applicable habitat conservation plan or natural community conservation plan. All compliance measures would have to work within the existing regulatory baseline and comply with existing plans, policies, and regulations.

## **XI. MINERAL RESOURCES**

### **Would the project:**



(a) – Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?

(b) – Result in the loss of availability of a locally –important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?

Answer: No impact.

None of the reasonably foreseeable structural or non-structural compliance measures would result in the loss of availability of a known mineral resource. Based upon a search of the internet in July 2015, including the California Geologic Survey website, water board staff did not find any evidence of current mineral mining practices taking place in the Russian River Watershed. Furthermore, reasonable foreseeable structural and non-structural compliance measures should not preclude the mining of mineral resources.

## **XII. NOISE**

### **Would the project result in:**

(a) – Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?

Answer: Less than significant with mitigation.

Temporary increases in noise levels would likely be associated with construction activities, including construction of structural compliance measures. Activities might include the use of heavy machinery and the movement of earth and debris, both of which can create noise and ground vibrations. Mitigation measures include the use of standard construction BMPs and operation of equipment according to a time schedule to prevent cumulative noise impacts resulting in further increased noise levels. The majority of the activities that would produce noise are not typically expected to exceed existing standards. Therefore, the temporary noise impacts from construction activities are considered less than significant with mitigation.

(b) – Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?

(e) – For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?

(f) – For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?

Answer: No impact.

None of the reasonably foreseeable structural or non-structural compliance measures would result in excessive noise levels. Groundborne vibration from construction would be at an extremely low level would be temporary and would not be notable above the existing baseline.

(c) – A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?

Answer: Potentially significant.

The every-day running of a new centralized or decentralized wastewater treatment plant may result in increased ambient noise levels above baseline levels for those within the project vicinity. To a large extent, these increases in noise may be mitigated by housing motors, pumps, generators, and other mechanisms that may make noise indoors.

Additionally, sound walls and other sound barriers can be constructed if necessary to lessen the noise impacts of the running of the facility. A similar impact may result from ~~implementation~~operation of supplemental treatment units for individual OWTS, where those prove necessary. Given that it may be impossible to minimize to less than significant all ambient noise impacts associated with the running of a wastewater treatment plant or supplemental treatment units for OWTS, the substantial permanent increase in ambient noise levels in the project vicinity may be a potentially significant impact- that cannot be reduced to a less than significant level with mitigation. The impact is overridden by project benefits as set forth in the SED.

(d) – A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?

Answer: Less than significant with mitigation.

During construction activities there may be a brief period when the noise level is increased due to earth moving or construction machinery. Noise may also increase as a result of an increase in traffic due to installation of, or work on collection system lines under roadways. Temporary impacts can be mitigated to a less than significant level by implementing noise abatement procedures, for example, standard construction techniques such as sound barriers, mufflers, and restricted hours of operation. Appropriate mitigation measures should be evaluated on a case-by-case basis when specific projects are determined.

### **XIII. POPULATION AND HOUSING**

#### **Would the project:**

(a) – Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?

Answer: Potentially significant.

The construction of a new centralized or decentralized wastewater treatment plant, or significant expansion of an existing plant, may have a potentially significant impact on population growth in the project area, as people who were considering constructing new homes but were not able to install OWTS due to space, soil, other limitations would potentially be able to connect their homes to the wastewater treatment plant. It is acknowledged that other services and infrastructure would need to be established before new development could occur, such as electric lines and roads, and therefore construction

or expansion of a wastewater treatment plant would be one of several factors that may indirectly influence population growth. It is also possible that a new wastewater treatment plant or plant expansion could be done so it only served the existing population. All things considered, there may be potentially significant impacts from population growth associated with the construction or significant expansion of a wastewater treatment plant. These potentially significant impacts cannot be reduced to a less than significant level with mitigation. The impact is overridden by project benefits as set forth in the SED.

(b) – Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?

Answer: Less than significant with mitigation.

Displacement of people from existing housing due to failing OWTS could be mitigated by connecting to a centralized or decentralized wastewater treatment plant, upgrading the OWTS to meet standards, or other efforts that would remedy the effects of the failing OWTS. A very limited number of systems may not be able to remedy their failing OWTS but the number is expected to be very low, will not necessitate the construction of replacement housing, and therefore does not rise to the level of significance.

(c) – Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?

Answer: Less than significant with mitigation

There is the potential that some properties will not have the site characteristics necessary to replace or repair failing OWTS with the risk of displacing people from those homes. There are a number of alternatives, however, to mitigate the risk including seeking a permit from the county for an alternative system, connection to a new or existing wastewater treatment system, connection to a new or existing community OWTS, or installation of other alternatives such as composting toilets and greywater systems. A very limited number of people may not be able to remedy their failing OWTS but the number is expected to be very low, will not necessitate the construction of replacement housing, and therefore does not rise to the level of significance.

#### **XIV. PUBLIC SERVICES**

(a) – Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:

- Fire protection?
- Police protection?
- Schools?
- Parks?
- Other public facilities?

Answer: No impact.

There are no reasonably foreseeable compliance measures that would cause environmental impacts, impeding acceptable service ratios and response times. Limiting parking near areas of the river without adequate restroom facilities would cause a negligible need for increased parking enforcement as compared to the existing baseline as the existing parking capacity at many areas along the river is already highly limited or is located on private property. Reasonably foreseeable compliance measures should not impede services. If roadway access is restricted due to construction equipment associated with the building of a restroom facility or if a roadway must be excavated for collection system maintenance, for example, access to and through that roadway for emergency vehicles should be maintained. Fences, if installed, will likely be constructed in areas that are not currently used as access for fire or police protection or that are not part of a park or school. If a fence is constructed at a park, it would likely surround the park and not impede its use as a park. Therefore, there would be no impact in terms of Public Services.

#### **XV. RECREATION**

(a) – Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?

Answer: Less than significant.

Publicizing the location of public beaches with restroom facilities and limiting parking near areas of the river without adequate restrooms would have a minimal impact on the existing public beaches and facilities compared to the existing baseline. The Russian River Watershed is currently a highly recreated area and the small increase in users at particular public beaches is not expected to cause substantial physical deterioration of the restroom facilities at those locations. Therefore, there would be a less than significant impact.

(b) – Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?

Answer: No impact.

Reasonably foreseeable compliance measures do not include the construction of recreational facilities. Thus, there will be no impact in terms of recreation.

#### **XVI. TRANSPORTATION/TRAFFIC**

**Would the project:**

(a) – Cause an increase in traffic which is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in either the number of vehicle trips, the volume to capacity ratio on roads, or congestion at intersections)?

(f) – Result in inadequate parking capacity?

(g) – Conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks)?

Answer: Less than significant impact.

During construction-related activities, there may be a brief period when traffic congestion will increase due to the presence of earth moving equipment and other construction equipment. Potential impacts would be temporary and less than significant because potential impacts could be reduced by limiting or restricting hours of construction so as to avoid peak traffic times and by providing temporary traffic signals and flagging to facilitate traffic movement. Additionally, a parking lot, street parking, or the alternate transportation infrastructure could potentially be temporarily blocked due to compliance measures that involve construction, particularly construction occurring in roadways and in urban areas. However, the blockage would be temporary and is likely negligible as compared to the existing traffic baseline. Therefore, these impacts would be less than significant.

(b) – Exceed, either individually or cumulatively, a level of service standard established by the county congestion management agency for designated roads or highways?

(c) – Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?

(d) – Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?

(e) – Result in inadequate emergency access?

Answer: No impact.

None of the reasonably foreseeable structural or non-structural compliance measures will affect a level of service standard, air traffic patterns, increase hazards, or result in inadequate emergency access. Changes in traffic due to construction-related activities to install compliance measures should not exceed the service standard level established by the county as these types of activities currently occur, are part of the baseline, and the County's level of service standard should allow for the activities. There should be no change in air traffic patterns due to the reasonably foreseeable compliance measures. This is because the compliance measures in no way increase or decrease air traffic; and, structures should not be tall enough to have an effect on the flight of an airplane. Traffic hazards will not substantially increase, as the reasonably foreseeable compliance measures do not require redesign of roads or incompatible uses. Reasonably foreseeable compliance measures should not impede emergency access and if roadways must be excavated for new sewer line installation or collection system maintenance, access to and through that roadway for emergency vehicles should be maintained. Fences will likely be constructed in areas that are not currently used as access for fire or police protection or that are not part of a park or school.

## **XVII. UTILITIES AND SERVICE SYSTEMS**

### **Would the project:**

(a) – Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?

Answer: No impact.

Any reasonably foreseeable compliance measure requiring compliance with wastewater treatment requirements of the North Coast Regional Water Board, will be controlled via a permit adopted through a public process by the North Coast Regional Water Board, and will include appropriate controls, limitations, and compliance schedules.

(b) – Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?

(e) – Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?

Answer: Potentially significant.

The proposed Basin Plan Amendment could result in an existing wastewater treatment plant determining it doesn't have the capacity to serve the projects projected demand and thus result in the construction of a new centralized or community wastewater treatment plant or expansion of an existing plant or new, upgraded or replaced individual or community OWTs, as reasonably foreseeable compliance measures. The environmental effects associated with this type of construction, and of construction in general, have been discussed throughout this checklist, as appropriate. Potentially significant effects were identified and discussed in sections XI. Noise (c) and XII. Population and Housing (a). Any potentially significant adverse impacts that may result cannot be reduced to a less than significant level with mitigation. The impact is overridden by project benefits as set forth in the SED.

(c) – Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?

Answer: Less than significant.

Storm water infrastructure is already in place and it is not anticipated that large-scale construction will occur (such as a new subdivision). The expansion or construction of a new centralized or decentralized wastewater treatment facility will not result in significant environmental effects related to storm water drainage as storm water discharges from a wastewater treatment facility may be subject to NPDES industrial storm water general permit requirements that require protection of water quality and prevention of nuisance. Therefore, the effect will be less than significant.

- (d) – Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?
- (f) – Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?
- (g) – Comply with federal, state, and local statutes and regulations related to solid waste?
- Answer: No impact.

Reasonably foreseeable compliance measures should not require an increase in water supply. The solid waste from a new wastewater treatment plant, construction activities, or pet waste from collection receptacles is not expected to have any impact on landfills over current baseline conditions. Any actions related to solid waste must be in compliance with all existing federal, state, and local statutes and regulations related to solid waste. None of the reasonably foreseeable compliance measures would violate existing statutes and regulations.

#### **XVIII. MANDATORY FINDINGS OF SIGNIFICANCE**

- (a) – Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?

Answer: Less than significant with mitigation.

Reasonably foreseeable non-structural compliance measures will not result in the substantial degradation of the environment for fish, wildlife, and threatened/rare plant and animal species because none of the measures would introduce any new physical effects above the baseline that could impact these characteristics.

Some of the reasonably foreseeable structural compliance measures, however, do have the potential to cause significant degradation of the environment for fish, wildlife, and threatened/rare plant and animal species if not mitigated. As discussed in section IV above, plant and animal species could potentially be adversely affected by construction related activities, creation of riparian buffers, installation of straw waddles, and by exclusion fencing. The mitigation measures discussed in that section, as well as others, could be implemented to ensure that unique, rare or endangered plant and/or animal species and their habitats are not taken or destroyed. When specific projects are developed and sites identified, a focused protocol plant and/or animal survey and/or a search of the California Natural Diversity Database should be performed to confirm that any potentially sensitive or special status plant and/or animal species in the site area are properly identified and protected as necessary. If sensitive plant and/or animal species occur on the project site, mitigation is required in accordance with the Endangered Species Act. Mitigation measures should be developed in consultation with CDFW and USFWS.

The adoption of the proposed Basin Plan amendment should result in improved surface water quality in the Russian River Watershed and will have a significant beneficial effect on the environment over the long-term. However, it should be noted that some of the structural compliance measures do have the potential to adversely impact the environment. In many cases, the impacts of the installation of the structural compliance measures will be temporary, and many of the effects caused by permanent structures can be avoided by adjusting the timing and/or location so as to take into account any candidate, sensitive, or special status species or their habitats. Therefore, with correctly implemented mitigation measures these impacts are considered less than significant.

(b) – Does the project have impacts that are individually limited, but cumulatively considerable? (“Cumulatively considerable” means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?

Answer: Potentially significant.

Cumulative impacts, defined in section 15355 of the California Code of Regulations, refer to two or more individual effects, that when considered together, are considerable or increase other environmental impacts. Cumulative impact assessment must consider not only the impacts of the proposed Basin Plan amendment, but also the impacts from other Basin Plan amendments, municipal and private projects which have occurred in the past, are presently occurring, and may occur in the future in the watershed during the period of implementation.

Impacts associated with implementation of the non-structural measures and most of the structural measures will be short-term, temporary, amenable to mitigation, and spatially distributed across the watershed, and will not contribute to significant adverse effects or cumulative impacts on the environment. However, structural compliance measures that involve substantial earth movement could have potentially significant cumulative impacts to traffic, greenhouse gas emissions, and noise when considered in conjunction with other past, present, and future construction; including but not limited to construction and repair of infrastructure (such as roads), housing construction, commercial construction activities, and restoration projects involving earth moving and construction equipment. Regional Water Board staff’s oversight of construction activities through permits, regulatory programs, and other authorities will provide an opportunity to limit the potential for cumulative impacts by ensuring that multiple projects proposing various compliance measures and implementation of BMPs with the potential to cause short-term impacts are phased appropriately to limit potential cumulative impacts.

Based on a review of the available information, and as a result of implementing various compliance measures including creating riparian buffers, exclusion fencing, construction and daily operations of a new wastewater treatment plant and expansion of an existing wastewater treatment plant, it has been determined that significant and unavoidable impacts to the environment have the potential to occur. Cumulative impacts are especially



significant in areas that are already listed as impaired or otherwise degraded since the system or species has already lost resilience to external stressors. Due to the fact that many streams in the region are impaired and several rare, threatened and endangered are present throughout the region any adverse impact that has the potential to occur in multiple instances could be considered significant and unavoidable. Many of the potential impacts discussed throughout this CEQA analysis can be reduced through proper implementation of mitigation measures; however, cumulatively these impacts do have the potential for significant adverse effects on the environment- that cannot be reduced to a less than significant level with mitigation. The impact is overridden by project benefits as set forth in the SED.

(c) – Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?

Answer: Potentially significant.

The purpose of the proposed Action Plan is to improve water quality conditions to protect human health as well as aquatic ecosystem health. Most of the potentially significant impacts to human beings, such as air quality, aesthetics, biological resources, greenhouse gas emissions, etc., are either short-term in nature, or can be mitigated to less than significant levels as previously discussed. However, some impacts were identified as being potentially significant including impacts to agricultural resources, noise levels, population growth, and utilities as detailed in those sections above. It is possible that when implemented at the project level, some of the reasonably foreseeable compliance measures identified as having potentially significant impacts could be mitigated so as to reduce the impacts to less than significant or that proposed projects could identify additional compliance measures that have less than significant impacts or impacts that can be mitigated. The overall effects of implementing the proposed Action Plan will be to improve water quality conditions and therefore are seen as a benefit for human beings and the environment. Any potentially significant environmental impacts that cannot be reduced to a less than significant level with mitigation are overridden by project benefits as set forth in the SED.

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## CHAPTER 12

### ECONOMIC CONSIDERATIONS

#### 12.1 OVERVIEW

This chapter describes the economic considerations associated with implementation of the Russian River Watershed Pathogen TMDL Action Plan (Action Plan). The triggers for Regional Water Board consideration of economics or costs in basin planning include:

- Establishing water quality objectives that ensure the reasonable protection of beneficial uses.
- Compliance with the California Environmental Quality Act (CEQA)<sup>44</sup> when Regional Water Boards amend their basin plans. CEQA, and the regulations implementing CEQA, require that the Boards identify the reasonably foreseeable methods of compliance with draft performance standards and treatment requirements.<sup>45</sup> This process must include discussion of economic factors.

Chapter 11 of this staff report (CEQA Substitute Environmental Analysis) discusses the potential environmental impacts, as required under CEQA, associated with adopting an amendment to the Water Quality Control Plan for the North Coast Region (Basin Plan) to include a Program of Implementation for the Russian River Watershed Pathogen TMDL, known as an Action Plan. Chapter 11 identifies the reasonably foreseeable compliance measures necessary to achieve compliance with the Action Plan. Compliance measures include treatment technologies and management practices most likely to be implemented to achieve compliance with load allocations, waste load allocations, numeric targets, and the water quality objectives for bacteria. There are no new water quality objectives proposed for adoption as part of the proposed Action Plan.

This chapter considers the potential costs of implementing the reasonably foreseeable compliance measures without considering whether compliance measures are currently part of the existing regulatory baseline. The costs are generally given as a range, and are dependent on the specific characteristics of the land or operation to which given management practices are applied. A list of potential funding sources is also presented below.

For CEQA purposes, the economic and social impacts of the draft proposed project are considered to determine if they will cause or contribute to an adverse environmental impact, not whether the costs of the measures themselves are significant or will cause an economic hardship. Although the Regional Water Board is required to consider economics during the Basin Plan amendment (Action Plan) process, it is not obligated to consider the balance of costs and benefits associated with implementation of the amendment.

<sup>44</sup> Pub. Resources Code § 21000 *et seq.* 21159

<sup>45</sup> Cal.Code Regs., tit., 23 § 3777 subdivision (b).

Anticipating costs with precision is challenging for several reasons. Many of the actions, such as review, revision, and development of policies and ordinances by a governmental agency, could incur no significant costs beyond the program budgets of those agencies. However, other actions, such as establishing an ordinance to require property owners to inspect and repair their private sewer laterals carries discrete costs. Cost estimates are further complicated by the fact that some implementation actions are currently part of the baseline condition as they are already required by other regulatory requirements (e.g., NPDES Storm Water) or are actions anticipated regardless of Action Plan adoption. Therefore, assigning all of these costs to implementation of the proposed Action Plan would be inaccurate.

While the below text discusses the cost of various control measures aimed at improving water quality, it does not discuss the effects (costs) of *not* improving water quality such as impacts to public health.

## 12.2 ESTIMATED COST OF COMPLIANCE

The majority of costs identified in this chapter were derived from the following sources of information:

- U.S. Environmental Protection Agency (USEPA) Technology Fact Sheets  
<http://water.epa.gov/scitech/wastetech/mtbfact.cfm>
- Water Environment Research Foundation (WERF). Performance & Cost of Decentralized Unit Processes. Final Report, 2010.  
<http://ndwrcdp.werf.org/documents/DEC2R08/DEC2R08web.pdf>
- San Francisco Bay Regional Water Quality Control Board, Staff Report for Pathogens in the Napa River Watershed Total Maximum Daily Load (TMDL).  
[http://www.waterboards.ca.gov/sanfranciscobay/water\\_issues/programs/TMDLs/napathogens/item8napapathsappb.pdf](http://www.waterboards.ca.gov/sanfranciscobay/water_issues/programs/TMDLs/napathogens/item8napapathsappb.pdf)
- Federal Remediation Technologies Roundtable Screening Matrix and Reference Guide (FRTR) <http://www.frtr.gov/default.htm>;
- Natural Resource Conservation Service (NRCS) Field Office Technical Guide (FOTG) <http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/technical/fotg/>;
- CDFW Coho Salmon Recovery Strategy <http://www.dfg.ca.gov/fish/Resources/Coho/CohoRecovery.asp>; and
- California Department of Transportation (Caltrans) 2013 contract proposal award information [http://www.dot.ca.gov/hq/esc/oe/project\\_ads\\_addenda/](http://www.dot.ca.gov/hq/esc/oe/project_ads_addenda/).

The cost information provided in the U.S. EPA guidance are available to assist the public and publicly owned treatment works, referred to here as wastewater treatment facilities (WWTFs), in understanding the necessary components and costs involved with implementing particular technologies. Many of the cost breakdowns are based on a variety of example sites throughout the county over the last two decades. Therefore, it can be generally assumed that these costs have increased with inflation, although some

compliance measures have become more affordable as improvements in technologies are made. Generally, it can be assumed that labor rates will increase at a long-term average of three percent and capital cost inflation. The assumed potential cost ranges for compliance measures listed in the following tables will be at the long-term annual inflation rate of three percent assumed by the Engineering News Record (ENR) Construction Cost Index (CCI).

Cost ranges for construction and Operation and Maintenance (O&M) unit costs provided in the following tables are national averages and may not reflect actual construction costs for Sonoma County. Factors affecting the cost of construction in different areas of the county include: cost of transporting material and equipment to the project site, state and local taxes, construction wage requirements, labor supply, compliance with local codes, and managing local conditions such as weather and unusual soils. Cost indices to update old data and area modification factors to account for nationwide composite cost data are published by R.S. Means, Craftsman Book Company, and ENR, and others. Based on the 2015 National Building Cost Manual (Craftsman Book Company), the area modification factor for estimating total project costs for residential, commercial, industrial public, agricultural, and military buildings for the Santa Rosa area is six percent. Thus, a factor of 1.06 can be applied to each of the capital and O&M cost ranges in the tables below where a non-local figure is used. A detailed cost estimate for compliance measures is beyond the scope of this staff report.

The cost information provided in the NRCS FOTG is a national dataset to assist local NRCS Districts in setting cost shares for implementing conservation practices. Cost estimates are provided at the county level and the data used for this analysis are specific to Northern California as described in their Fiscal Year 2014 Payment Schedule. The FOTG represents the NRCS estimate of costs to implement such practices.

The costs included in the CDFG Manual are described as upslope erosion inventory and sediment control guidance. The numbers are based on estimates provided by Pacific Watershed Associates, a consulting firm specializing in erosion control work. Actual costs can vary considerably depending on operator skill and experience, equipment types, local site conditions, and regional location.

## **12.2.1 POTENTIAL COSTS FOR TREATMENT PLANT UPGRADES AT EXISTING WWTFs**

### **2.2.1.1 DISINFECTION IMPROVEMENTS**

All municipal wastewater treatment facilities within the Russian River Watershed are required to comply with effluent disinfection requirements contained in waste discharge requirements. No new capital costs are anticipated as a result of implementing the proposed Action Plan for WWTFs that are in compliance with effluent limitations for bacteria and disinfection requirements in their waste discharge permits. Permitted wastewater treatment facilities will incur increased costs associated with additional

effluent and receiving water bacteria monitoring, so as to demonstrate compliance with the proposed Action Plan. In particular, those facilities that discharge treated and disinfected effluent to a holding pond prior to discharge to a surface water, will be required to conduct a reasonable potential analysis during the process of renewing their NPDES permit to demonstrate that any regrowth of *e. coli* or discharges of treated wastewater from holding ponds are not causing or contributing to an exceedance of the bacteria water quality objectives of the Russian River and its tributaries. The reasonable potential analysis may include an investigation to determine the concentrations of *E. coli*, total coliform bacteria in the, or other fecal indicator discharged from the holding pond (including bacteria contributions from bird life) does not otherwise indicate the presence of human pathogens. But, the sources of these costs are not included here as an economic consideration associated contaminants (i.e., whether the sources are humans, domestic animals, or other), and whether the microbial contaminants discharged from the holding ponds pose a public health threat or impair the REC-1 beneficial use. The cost to conduct a reasonable potential analysis to assess compliance with implementation the bacterial water quality objectives will vary depending on the scope of the investigation but may be expected to be in the hundreds of thousands of dollars for a detailed investigation involving microbial source tracking techniques.

In cases where a municipal wastewater treatment facility does not consistently meet bacteria effluent limitations in its waste discharge permit or cannot demonstrate that discharges from wastewater holding ponds are in compliance with wasteload allocations (WLAs), the municipality or special district may have to improve the reliability or upgrade its existing treatment facilities. It is anticipated that treatment systems consistent with disinfected tertiary treated water, as defined in title 22 of the California Code of Regulations, are the minimum acceptable processes that are capable of ensuring compliance with effluent limitations for bacteria, excluding consideration of the potential for bacterial regrowth in holding ponds. The costs for complying with effluent limitations for bacteria through improvements in wastewater disinfection systems include capital costs and cost for routine operations and maintenance and are presented in Table 12.1.

<b>Table 12.1 Estimated Cost Range for Centralized Wastewater Treatment Compliance Measures Advanced Treatment and Disinfection</b>			
<b>Compliance Measures</b>	<b>Capital Costs</b>	<b>Annual O&amp;M Costs</b>	<b>Cost Source</b>
Membrane Bioreactors	\$7.00-\$20.00 / gpd capacity	\$1.00-\$2.00 /gallons treated	USEPA <sup>1</sup> , GWRMN
Chlorine Disinfection	1-2.5 mgd = \$1.1 to \$1.3 million 10-20 mgd = \$3.1 to \$4 million 100-175 mgd = \$14.3 to \$1.3 million	1-2.5 mgd = \$49K to \$76K 10-20 mgd = \$158K to \$380K 100-175 mgd = \$660K to \$1.3 million	USEPA <sup>1</sup>
Dechlorination	\$6,500 to \$383,000	\$9,900 to \$17,500 \$0.10 to \$10.00/1,000 gallons treated	USEPA <sup>1</sup>
Ultraviolet Light	Lamps 1-5 mgd = \$400-\$1,375	\$19,200	USEPA <sup>1</sup> WRF

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<b>Table 12.1 Estimated Cost Range for Centralized Wastewater Treatment Compliance Measures Advanced Treatment and Disinfection</b>			
<b>Compliance Measures</b>	<b>Capital Costs</b>	<b>Annual O&amp;M Costs</b>	<b>Cost Source</b>
Disinfection	5-10 mgd = \$345-\$595 19-100 mgd = \$275-\$590 Systems 0.1 MGD (Design Flow) = \$300,000 1.0 MGD = \$250,000 10 MGD = \$1,000,000 100 MGD = \$7,000,000	0.1 MGD (Design Flow) = \$50,000 1.0 MGD = \$36,500 10 MGD = \$182,000 100 MGD = \$365,000	
Ozone Disinfection	Oxygen gas /compressor= \$245K Contact vessel (500 gpm)= \$4,000 - \$5,000 <u>Destruct unit:</u> Small (around 30 cfm)= \$800 Large (around 120)= \$1,000-1,200 Non-component costs= \$35,000 Engineering=\$12,000-15,000 Contingencies= 30%	Labor= \$12,000 Power= 90 kW Other (filter replacements, compressor oil, spare dielectric, etc.)= \$6,500	USEPA <sup>1</sup>
Reverse Osmosis	\$776k to \$81 million / 1.0 to 200 mgd		USEPA <sup>1</sup>
Wetland Treatment Systems	\$155,000 to \$260,00 /100,000 gpd \$359,000 to \$1,015,009 /acre of wetland treatment system Operations and maintenance costs	\$5,00 to \$8,323 /acre per year \$0.45 to \$1.36 /1,000 gallons over 10 to 30 year timeframe	FRTR, USEPA <sup>3</sup>
Advanced Ecologically Engineered Systems	40K gpd = \$985K to \$1.2 million 80K gpd = \$1.5 to \$1.9 million 1 million gpd = \$8.5 to \$10.5 million		USEPA <sup>1</sup>

gpm – gallons per minute / mgd – million gallons per day / gpd – gallons per day/ cy – cubic yard / ft<sup>2</sup> – square foot / lb – pound / ft- feet

OWTS – Onsite Wastewater Treatment System

SWRCB 1 – State Water Resources Control Board Onsite Wastewater Treatment System Policy Final SED June 19, 2012

FRTR – Federal Remediation Technologies Roundtable

GWRTAC – Groundwater Remediation Technologies Analysis Center, Technology Overview Report TO-97-03

U.S. EPA 1 – US Environmental Protection Agency Technology Fact Sheets <http://water.epa.gov/scitech/wastetech/mtbfact.cfm>

U.S. EPA 2 – US Environmental Protection Agency Technologies and Cost for Removal of Arsenic from Drinking Water

U.S. EPA 3 – US Environmental Protection Agency Technology Fact Sheet Free Surface Water Wetland & Constructed Wetland Treatment of Municipal Wastewaters

GWRMN- Groundwater Remediation and Management for Nitrate Report – Addressing Nitrate in California's Drinking Water AFCEE –

EN- Eco-Nomic Septic System design Page <http://www.eco-nomic.com/indexsdd.htm#Industrial or Non-Residential Wastewater>

Water Research Foundation (WRF) – Fact Sheet: Advanced Treatment-Ultraviolet Disinfection.

[http://www.waterrf.org/knowledge/advanced-treatment/FactSheets/advanced-treatment\\_UV\\_factSheet.pdf](http://www.waterrf.org/knowledge/advanced-treatment/FactSheets/advanced-treatment_UV_factSheet.pdf)

### 12.2.1.2 EXPANSION OF COLLECTION, TREATMENT, AND DISPOSAL OR RECYCLED WATER SYSTEMS

To accommodate new connections, WWTFs may need to evaluate whether flow from new customers will require expansion of its wastewater collection, treatment and disposal systems. Wastewater collection costs are generally the largest component of costs for expansion of the complete system, but the cost of land purchase is often significant when land suitable for waste management functions is scarce and expensive. Cost estimates for

expanding the wastewater collection system for new connections are highly variable depending on terrain and other site constraints, method of collection, and design flow. As part of a 2007 assessment by the City of Los Altos Hills in Santa Clara County, for example, it was estimated that a proposed extension of an existing municipal sewer line to 40 nearby residences would cost approximately \$1.5 million or \$37,500 per residence (Moody Sewer Extension), and another proposed extension to 57 residences would cost approximately \$1.01 million (~~Robleda Sewer Extension~~). ~~Both proposed extensions were rejected by City staff as too expensive to residents in the targeted subdivisions or~~ \$17,720 per residence (Robleda Sewer Extension). In Sonoma County, the Sonoma County Water Agency (Sonoma Water) is developing a project for Larkfield Estates that would extend and make sewer service available to property owners that were impacted by a destructive wildfire in 2017. The affected parcels are located within an existing municipal sewer boundary but are currently served by individual OWTS. Sonoma Water estimated that construction costs for the sewer connections, including service laterals to the property line, will cost approximately \$45,000 per parcel. Connection fees for individual property owners, which would be due upon connection, would cost \$12,023 and the annual service charge is expected to be approximately \$900. These cost estimates for Larkfield Estates are based on extension of sewer to an area within an existing sewer district and reflect costs for a construction project that poses few technical challenges. Sewer extension to residential areas where there are technical challenges to traditional construction practices and options will likely cost considerably more.

Unit costs for expansion of baseline capacity for treatment unit processes to accommodate additional flow from new customers outside an established service area are highly variable and dependent on many factors and estimating the cost for such an expansion would require a project level evaluation beyond the scope of this staff report. Consequently, estimating the cost for possible construction costs for WWTF expansion scenarios would be speculative and inaccurate. The average operation and maintenance costs for wastewater treatment are generally lower for a facility that increases design volume. This is a result of an economy of scale for secondary and tertiary wastewater treatment systems.

In cases where a municipality or special district chooses to comply with Action Plan by expanding effluent storage so that the need to discharge to surface water is eliminated, the capital cost may include costs for land acquisition, permitting, pond excavation and earthwork, pond liner, pumping and pumping appurtenances, and electrical systems. The total cost of construction or expansion of effluent storage will vary greatly depending on site constraints, land availability, and level of public support. Two recent examples illustrate the range of costs: In 1999, the Russian River County Sanitation District (Guerneville, CA) evaluated a project to construct a 5.7 million gallon equalization basin to increase wastewater treatment capacity at its Guerneville Treatment Plant. Although the project was never completed, the estimated cost of the expansion was \$1.5 million. More recently, the Sonoma Valley County Sanitation District (Sonoma, CA) is proposing to construct a 37-million gallon recycled water storage reservoir to reduce its discharge to Shell Slough and San Pablo Bay and provide recycled water for irrigation purposes.



Construction of the reservoir is expected to cost approximately \$2.3 million. Where discharge to a pond is designed to use percolation to groundwater as the method of disposal, costs associated with ongoing operation and maintenance, as well as groundwater monitoring will also apply.

~~In order~~ To avoid Action Plan implementation requirements for storage pond discharges to surface waters, municipalities and special districts that treat municipal wastewater may also expand existing or implement new water recycling programs. Total capital costs will vary depending on site conditions, land acquisition requirements, and public support. As part of the 1999 WWTF evaluations, the Russian River County Sanitation District considered expansion of its treated wastewater disposal capacity. Among the alternatives evaluated was expansion of spray irrigation on the Burch Property, which is located adjacent to the Guerneville Treatment Plant and a portion of which is already leased for spray irrigation of treated wastewater. This alternative was estimated to cost approximately \$4.0 million (including purchase of the Burch Property). Other alternatives for this project included extension of the pipelines and spray irrigation to Green Valley and to the Guerneville and Westside Road areas. These projects were estimated from \$6.5 to \$12 million and \$3 to \$12.5 million, respectively. Annual operation and maintenance costs for the Green Valley alternative was estimated from \$50,000 to \$350,000. Proper operation and maintenance ~~includes~~include the cost of monitoring to ensure proper application. These projects were designed to use vegetative uptake as the primary mechanism for wastewater removal, depending on agronomic rates of wastewater application and may be considered typical for similar projects, for the purpose of this analysis.

## **12.2.2 POTENTIAL COST FOR SANITARY SEWER SYSTEMS**

Sanitary sewer systems greater than one mile in length within the Russian River Watershed are required under the existing General Permit for Sanitary Sewer Systems to be designed, operated, and maintained in such a way as to prevent or minimize sanitary sewer overflows. No new costs to prevent sanitary sewer overflows are anticipated as a result of the Action Plan. In the event that public entities which own sanitary sewer systems enact new ordinances or programs to require or promote private property owners to inspect their private sewer laterals, costs to develop the ordinances or programs will be incurred. The cost of developing and implementing a program will depend on the nature and complexity of the local program and are not estimated here.

## **12.2.3 POTENTIAL COSTS FOR INDIVIDUAL AND DECENTRALIZED ONSITE WASTEWATER TREATMENT SYSTEMS**

### **12.2.3.1 INDIVIDUAL OWTS COST CONSIDERATIONS**

As outlined in the Action Plan, certain existing, new, and replacement OWTS in the Russian River Watershed may be required to utilize supplemental treatment to achieve load

allocations for fecal indicator bacteria. The necessary supplemental treatment components necessary to comply with performance requirements will vary depending on type and age of the existing OWTS, site conditions and constraints, the availability of and proximity to the individual OWTS to community sewer systems, and the availability of financial assistance to private property owners to fund OWTS upgrades. Cost estimates for new OWTS and for supplemental treatment components for new and replacement OWTS are presented in Table 12.2. Permit and design fees are an additional cost to construct an individual new or replacement OWTS and may add \$5,000 to \$15,000 to the capital and O&M costs, or more for complicated designs. Other site preparation costs, such as tree removal, are site specific, but can increase costs significantly.

In the absence of a TMDL, existing OWTS that do not meet requirements in the statewide Conditional Waiver of Waste Discharge Requirements or the conditions and requirements set forth in an approved LAMP may be required to submit a report of waste discharge, obtain waste discharge requirements, and pay an annual fee for their OWTS. The cost of preparing a complete report of waste discharge will vary depending on whether the report will be prepared by the property owner or a qualified professional, how much information is available to characterize the discharge and site conditions, site conditions and constraints, and the proposed supplemental treatment ~~system to be used to meet performance requirements.~~ The cost for a general site evaluation to obtain local agency approvals for a new or replacement OWTS is approximately \$1,000. The cost for preparation of a report of waste discharge by a qualified professional could range from \$2,000 to \$6,000 (Ted Walker, personal communication). The application fee and first annual fee submitted to the Regional Water Board for waste discharge requirements is currently ~~\$2,088~~\$286 (Fiscal Year ~~2016-17~~2018-19).

<b>Table 12.2 Estimated Cost Range for Wastewater Treatment Compliance Measures Individual OWTS</b>			
<b>Compliance Measures</b>	<b>Capital Costs</b>	<b>O&amp;M Costs</b>	<b>Cost Source</b>
Septic System for single home	Tank replacement: \$2,500 - \$4,500 Leachfield replacement: \$3,300 - \$7,400	\$44-\$400/yr	USEPA <sup>1</sup> , EN <sup>2</sup> , SWRCB <sup>3</sup>
	Whole new standard gravity OWTS: \$5,600-\$10,000		
	With supplemental treatment: \$17,600 - \$45,000 <sup>4</sup>		
Septic System for a Restaurant (approximately 200 meals per day)	Tank replacement: \$4,500 - \$13,800 Leachfield replacement: \$29,500 - \$66,000	\$44-\$400/yr	USEPA, EN, SWRCB
	Whole new OWTS: \$34,000-\$80,000		
	With supplemental treatment: \$104,000 - \$151,000		
Septic System for a School (Approximately	Tank replacement: \$4,500 - \$13,000 Leachfield replacement: \$50,000 - \$200,000	\$44-\$400/yr	USEPA, EN, SWRCB

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<b>Table 12.2 Estimated Cost Range for Wastewater Treatment Compliance Measures Individual OWTS</b>			
<b>Compliance Measures</b>	<b>Capital Costs</b>	<b>O&amp;M Costs</b>	<b>Cost Source</b>
700 students)	Whole new OWTS \$55,600-\$212,000		
	With supplemental treatment: \$104,000 - \$151,000		
Aerobic Pretreatment	500-1,500 gallon per day = \$2,500 to \$9,000	\$350/yr	USEPA
Chlorine Disinfection	\$325 - \$4,200 /unit	Tablets \$69-\$280 (45lb. pail)	USEPA
UV Disinfection	\$2,500 - 4,700/unit	Lamp Replacement: \$40-\$80 Power: 200-300 kWh/yr	USEPA Levernze <sup>5</sup>
Control Panels	\$1,500 - \$3,000 /unit	-0-	USEPA
Septic Tank Effluent Screen	\$70 - \$300 per unit, not including installation	Minimal	USEPA
Sand/Gravel Filters	Range: \$4,000 - \$15,000  1,500-gallon single compartment septic/pump tank @ \$0.57/gallon: \$850  ISF complete equipment package (includes dual simplex panel, pump pkg., tank risers, lids, liner, lateral kit, orifice shields, etc.): \$3,200  Non-component costs: \$750  Engineering (soil evaluation, siting, design, and construction): \$2,000	Labor @ \$65/hr. (2 hrs./yr.)= \$130/yr  Power @10 cents/kWh  Sludge disposal=\$25/yr	USEPA, EN
Low Pressure Pipe System	\$1,500 - \$5,000	Distribution line and filter flushing: \$0 Power: Variable depending on pumping rate, volume per dose pumped, and pump wattage.	USEPA, EN
Pressure Systems	\$4,000 - \$6,500	Distribution line and filter flushing: \$0 Power: Variable depending on pumping rate, volume per dose pumped, and pump wattage.	USEPA, EN
Mound Systems	\$12,000 to \$20,000	\$100/yr	USEPA, EN
Granular Activated Carbon Absorption	\$0.80 - \$6.30 /1,000 gallons treated	Carbon \$0.50 to \$1.20 /lb	USEPA

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**Table 12.2 Estimated Cost Range for Wastewater Treatment Compliance Measures Individual OWTS**

Compliance Measures	Capital Costs	O&M Costs	Cost Source
Replace/Upgrade Sewer laterals	Burst Pipe: \$40-\$80 per linear foot Sliplining: \$80-\$170 per linear foot Cured In Place Pipe: \$25-\$65 per linear foot Modified Cross Section: \$18-\$50 per linear foot		USEPA
Composting Toilets	Household of four: \$1,200 - \$6,000 Seasonal Usage: \$700 - \$1,500 Large Capacity/ Public Facility: \$20,000	Electric (fan): 120 Wh/day Leachate disposal: variable Bulking agents: variable Compost Disposal: variable	USEPA
Incinerating Toilet	Electric: \$2,300 - \$2,700 Propane: \$2,550	Electric: \$2,748/yr Propane: \$383.60/yr	

gpm – gallons per minute / mgd – million gallons per day / gpd – gallons per day / cy – cubic yard / ft<sup>2</sup> – square foot / lb – pound / ft – feet  
SWRCB 1 – State Water Resources Control Board Onsite Wastewater Treatment System Policy Final Substitute Environmental Document June 19, 2012

<sup>1</sup> U.S. EPA 1 – US Environmental Protection Agency Technology Fact Sheets <http://water.epa.gov/scitech/wastetech/mtbfact.cfm>  
<https://www.epa.gov/septic/decentralized-wastewater-systems-technology-fact-sheets>, <https://www.epa.gov/septic/water-efficiency-technology-fact-sheets>

<sup>2</sup> EN- Eco-Nomic Septic System design Page <http://www.eco-nomic.com/indexsdd.htm#Industrial or Non-Residential Wastewater>

<sup>3</sup> SWRCB 1 – State Water Resources Control Board Onsite Wastewater Treatment System Policy Final Substitute Environmental Document June 19, 2012

<sup>4</sup> Total costs for OWTS with supplemental treatment components and pressure-distributed effluent dispersal systems to mitigate for difficult sites can be considerably higher than this cost range.

<sup>5</sup> Leverenz, Harold, J. Darby, and G. Tchobanoglous, 2006. Evaluation of Disinfection Units for Onsite Wastewater Treatment Systems. [http://www.waterboards.ca.gov/water\\_issues/programs/owts/docs/disinfection.pdf](http://www.waterboards.ca.gov/water_issues/programs/owts/docs/disinfection.pdf)

### 12.2.3.2 DECENTRALIZED OWTS COST CONSIDERATIONS

An alternative for some small communities, where neither individual OWTS nor connection to an existing centralized municipal sewer system work well, is the establishment of a decentralized onsite waste treatment and disposal system. There is a range of available collection, treatment, and effluent dispersal technologies for a community-owned decentralized OWTS that may be used individually or in combination. Cost estimates for individual property owners to connect to a community-owned decentralized OWTS via a local sewer system (not including connection fees or other related costs) are presented in Table 12.3. Table 12.4 presents estimates for the cost of operating a decentralized OWTS, based on common technologies for waste flows ranging from 5,000 to 50,000 gpd.

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<b>Table 12.3 Estimated Cost Range for Wastewater Treatment Compliance Measures Decentralized OWTs- Cost to Property Owner</b>			
<b>Compliance Measures</b>	<b>Capital Costs for building sewer and connection to sewer main</b>	<b>Annual O&amp;M Costs</b>	<b>Cost Source</b>
Private Laterals	\$20-\$30/ft (excluding surface restoration) \$50-\$100/ft (for paved streets)	Electricity: \$0 O&M: \$0	CCCSD <sup>1</sup>
Gravity Sewer Systems	Materials and Installation: \$1,800 - \$2,700	Electricity: \$0 O&M: \$16 - \$24	WERF <sup>2</sup>
Pressure Sewer Systems	Materials and Installation: \$4,800 - \$7,200	Electricity: \$44 - \$66 O&M: \$120 - \$240	WERF
Effluent (STEP) Sewer Systems	Materials and Installation: \$3,000 - \$5,000	Electricity: \$24 - \$36 O&M: \$56 - \$84	WERF

<sup>1</sup> Central Contra Costa County Sanitary District (CCCSD) website: <http://www.centralsan.org/index.cfm?navid=27>

<sup>2</sup> Water Environment Research Foundation (WERF). Performance & Cost of Decentralized Unit Processes. Final Report, 2010.

<b>Table 12.4 Estimated Cost Range for Wastewater Treatment Compliance Measures Decentralized OWTs – Cost to Wastewater Utility</b>				
<b>Compliance Measures</b>	<b>Cost Factors</b>	<b>Wastewater Volume (gpd)</b>		
		<b>5,000 gpd (or 20 homes)</b>	<b>10,000 gpd (or 40 homes)</b>	<b>50,000 gpd (or 200 homes)</b>
Gravity Sewers	Materials and Installation Annual O&M	\$210,000-\$315,000 \$6,400-\$9,600	\$419,000-\$629,000 \$12,800-\$19,200	\$2,182,000-\$3,273,000 \$65,000-\$97,000
Pressure Sewers	Materials and Installation Annual O&M	\$33,000-\$49,000 \$6,400-\$9,600	\$65,000-\$98,000 \$13,000-\$19,000	\$344,000-\$516,000 \$56,000-\$84,000
Effluent Sewers	Materials and Installation Annual O&M	\$32,000-\$48,000 \$6,000-\$9,000	\$65,000-\$97,000 \$12,000-\$18,000	\$340,000-\$510,000 \$61,000-\$91,000
Extended Aeration	Materials and Installation Annual Electrical Annual O&M	\$100,000-\$150,000 \$900-\$1,400 \$5,300-\$8,000	\$148,000-\$223,000 \$1,800-\$2,700 \$9,000-\$13,000	\$410,000-\$616,000 \$9,000-\$14,000 \$34,000-\$51,000
Fixed-growth Media Filter	Materials and Installation Annual Electrical Annual O&M	\$30,000-\$46,000 \$350-\$500 \$4,100-\$6,000	\$98,000-\$147,000 \$900-\$1,400 \$7,300-\$11,000	\$287,000-\$431,000 \$4,600-\$6,900 \$30,000-\$44,000
Wastewater Lagoons	Materials and Installation Annual Electrical Annual O&M	\$314,000-\$471,000 -0- \$2,400-\$3,500	\$628,000-\$942,000 -0- \$4,700-\$7,100	\$3,141,000-\$4,711,000 -0- \$24,000-\$35,000
Chlorine Disinfection	Materials and Installation Annual Electrical Annual O&M	\$3,100-\$5,400 \$40-\$50 \$900-\$1,400	\$3,100-\$5,400 \$50-\$80 \$1,700-\$2,500	\$3,100-\$5,400 \$3,100-\$4,700 \$7,900-\$12,000

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<b>Table 12.4 Estimated Cost Range for Wastewater Treatment Compliance Measures Decentralized OWTS – Cost to Wastewater Utility</b>				
<b>Compliance Measures</b>	<b>Cost Factors</b>	<b>Wastewater Volume (gpd)</b>		
		<b>5,000 gpd (or 20 homes)</b>	<b>10,000 gpd (or 40 homes)</b>	<b>50,000 gpd (or 200 homes)</b>
UV Disinfection	Materials and Installation	\$1,700-\$2,500	\$2,300-\$3,400	\$5,200-\$7,800
	Annual Electrical	\$14-\$20	\$28-\$40	\$130-\$190
	Annual O&M	\$480-\$720	\$700-\$1,100	\$2,600-\$3,900
Gravity Distribution	Materials and Installation	\$54,000-\$81,000	\$105,000-\$158,000	\$517,000-\$776,000
	Annual Electrical	\$80-\$120	\$160-\$230	\$750-\$1,100
	Annual O&M	\$2,300-\$3,400	\$4,400-\$6,600	\$21,000-\$31,500
Drip Distribution	Materials and Installation	\$37,000-\$56,000	\$85,000-\$127,000	\$329,000-\$494,000
	Annual Electrical	\$240-\$360	\$480-\$720	\$2,400-\$3,600
	Annual O&M	\$3,300-\$5,000	\$6,900-\$10,000	\$31,000-\$47,000
Spray Distribution	Materials and Installation	\$138,000-\$206,000	\$265,000-\$397,000	\$1,260,000-1,890,000
	Annual Electrical	\$240-\$360	\$460-\$690	\$2,300-\$3,500
	Annual O&M	\$2,200-\$3,400	\$4,300-\$6,500	\$21,000-\$31,000

<sup>1</sup>Water Environment Research Foundation (WERF). Performance & Cost of Decentralized Unit Processes. Final Report, 2010.

### 12.3.2.3 LOCAL OVERSIGHT AGENCY COSTS

As described in Chapter 6 (Source Analysis), Section 6.5.1 (Onsite Waste Treatment Systems), effective pathogen removal in OWTS is dependent on proper siting and installation of the OWTS components, proper maintenance, and operation of the system within design specifications. Local agencies have been performing OWTS design review and approval for decades. According to the well and septic fees adopted by Sonoma County for the 2015/2016 fiscal year, inspections and field clearance reports range from \$400-\$1,100 per inspection/plan check. For existing OWTS requiring certification, the cost of a qualified contractor to perform the inspection and generate a report could range from \$350 to \$1,500.

As a general rule, the local agencies that issue a building permit are often the same entities that oversee the installation and construction of most of the OWTS, as well. In many cases, local agencies have worked with their respective regional water boards to integrate the necessary OWTS-related requirements into the building permit process, allowing one permitting and inspection agency to oversee both programs. Estimating the cost associated complying with the OWTS-related requirements of a building permit, is difficult and speculative, given the combined requirements.

Tier 2 of the Basin Plan's OWTS Policy is written to allow variability in local programs while retaining comparable standards to maintain the function of OWTS for the purpose of

protecting the environment and human health through institutional controls and management. This is achieved by requiring Regional Water Board approval of a Local Agency Management Plan (LAMP) developed under Tier 2 of the Basin Plan's OWTS Policy. Conceptually, Tier 2 Programs (approved LAMPs) will include varying degrees of change to the local programs and practices currently in place. An OWTS managed under an approved LAMP may be allowed a variety of technological designs for both the wastewater treatment and effluent dispersal system. The selection of the technology would be made to accommodate site constraints, in order to ensure that the design provides adequate protection given the site's slope, groundwater level, soil conditions, topographic location, and other natural barriers to effective treatment.

There may be additional cost to the local agencies for developing and administering a local agency management program (LAMP). ~~But, that~~ Additional costs will depend on the extent to which the existing programs and practices require upgrading to meet the goals and requirements of the Basin Plan's OWTS policy. It is expected that some or all of any such additional costs will be passed on to the owners of OWTS in the form of permit fees.

Tier 3 of the Basin Plan's OWTS Policy applies to existing, new, and replacement OWTS that are near waterbodies listed as impaired for pathogens or nitrogen on the CWA 303(d) list and where it is likely that operating OWTS will be determined to be a contributing source of the impairment. Tier 3 OWTS are regulated in accordance with an Advanced Protection Management Program (APMP) when a TMDL Implementation Plan (Action Plan) addressing the impairment(s) has been adopted by the Regional Water Board. The cost to a local agency for implementing requirements in an adopted Action Plan will depend on the extent to which the local agency assumes responsibility for implementation actions for existing OWTS.

Tier 4 of the Basin Plan's OWTS Policy requires that OWTS owners replace their failing OWTS (e.g. collapsed septic tank, overflowing leachfield) with a new component that will operate correctly and in compliance with conditions and requirements of the OWTS Policy. Replacement components (e.g. septic tank or drainfield) may have to be upgraded consistent with the Action Plan and the repair policy of the local agency. (See Tables 12.2 and 12.3 for costs associated with individual OWTS)

#### **12.2.4 POTENTIAL COSTS OF ADDRESSING HOMELESS AND FARMWORKER ENCAMPMENTS, AND RECREATIONAL WATER USE**

##### **12.2.4.1 HOMELESS ENCAMPMENTS AND ILLEGAL CAMPING**

In accordance with a Memorandum of Understanding (MOU), Sonoma County, the Sonoma County Community Development Commission and the Regional Water Board will implement a Joint Protocol to address water quality impacts associated to homeless encampments. It is anticipated that for the control of waste discharges from homeless and farmworker encampments the signatories to the MOU will employ a combination of non-structural and structural BMPs. Non-structural BMPs include community outreach and

public information to reduce the homeless population within the Russian River Watershed, thereby reducing the need for the formation of encampments. Many of these efforts are voluntary and are already in development or underway in both Mendocino County and Sonoma County. Cost estimates for these initiatives are not considered as part of this staff report. Structural BMPs could include construction of permanent restroom facilities or installation of temporary mobile restroom facilities that are accessible to homeless individuals.

Cost estimates for the construction of public restroom facilities is presented in Table 12.5, and are based on nationwide case studies in conjunction with a local project in the community Guerneville in Sonoma County. These costs also apply to the construction of public restroom facilities at recreational beaches and trailheads in close proximity to the Russian River and its tributaries. Maintenance costs for public restroom facilities will vary by location, restroom type, level of use, and other factors. Other costs associated with the operation of public toilets include costs for cleaning, maintenance, security, insurance, and other operating costs such as repair costs for graffiti and vandalism. Annual cleaning and maintenance costs for one popular, low-maintenance restroom model, the Portland Loo, which must connect to public sewer, run approximately \$21,000 per station. Cost may be considerably higher for other models depending on restroom type, location, level of use, and desired level of cleanliness. For models where a daily attendant is required, annual costs per station may be as high as \$100,000.

#### 12.2.4.2 RECREATIONAL WATER USE

In accordance with a Memorandum of Understanding, Sonoma County, the Sonoma County CDC, and the Regional Water Board will work with local entities and private parties along the Russian River to address water quality impacts relative to recreational water uses, and to promote the installation and location of sanitary facilities along the Russian River for use by recreational water users. It is anticipated that increasing the availability and access to restroom facilities at places of significant recreational use will result in a significant reduction in pathogen waste entering surface waters from recreational water use.

Table 12.5 provides estimates of the cost for construction of restroom facilities. In addition, cities, counties, and special districts may limit the availability of public parking near places of recreational water use, so as to accommodate only as many recreational water users as the facilities can safely support. Estimating costs for these site-specific measures are difficult to determine with the existing baseline of parking and trespassing enforcement during the peak tourism season. Additionally, minor cost may be incurred for posting additional signage informing recreators of such facility limits.

Table 12.5 Estimated Cost for Construction of Public Restroom Facilities					
Location/Manufacturer	(1) Room	(2) Room	(4) Room	(6) Room	Source
Salt Lake City 1700 South River Park	N/A	N/A	158,264	N/A	1



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<b>Table 12.5 Estimated Cost for Construction of Public Restroom Facilities</b>					
<b>Location/Manufacturer</b>	<b>(1) Room</b>	<b>(2) Room</b>	<b>(4) Room</b>	<b>(6) Room</b>	<b>Source</b>
Roseburg, OR ROMTEC, Inc.	82,571	N/A	149,293	204,523	1
Spokane, WA CXT Concrete Buildings	78,614	N/A	199,370	127,030	1
LeGrange, KY Hunter Kneppshield Co.	93,702	N/A	181,266	222,047	1
Reno, NV Restroom Facilities Ltd	148,460	N/A	351,483	491,646	1
Reno, NV Public Restroom Co.	117,281	N/A	205,111	247,378	1
Portland, OR Portland Loo	156,000	N/A	N/A	N/A	1
Salt Lake City American Ready Kontainer	N/A	N/A	217,750	N/A	1
Guerneville, CA	N/A	250,000	N/A	N/A	
Durham, NC	N/A	165-200,000	N/A	N/A	2
Range	\$78-156,000	\$165-250,000	\$150-351,000	\$127-492,000	

N/A – Not Available

<sup>1</sup> Staff report to City Council, Salt Lake City, “Cost of Building Public Restrooms.” (Jan 15, 2013)

<sup>2</sup> “Going Public: An Assessment of Restroom Facilities in City of Durham Parks” (Jan 15, 2014)

## 12.2.5 POTENTIAL COSTS TO CONTROL URBAN STORM WATER RUNOFF

### 12.2.5.1 LOCAL AGENCY PROGRAM COSTS

As described in Chapter 56 (Source Analysis) Section 56.3.2 (Storm Water), urban storm water runoff and non-storm water runoff from MS4s<sup>46</sup> located in urban areas within the Russian River Watershed are regulated under conditions in the Phase I MS4 Permit for the County of Sonoma, City of Cloverdale, City of Cotati, City of Healdsburg, City of Rohnert Park, City of Santa Rosa, City of Sebastopol, Sonoma County Water Agency, City of Ukiah, and the Town of Windsor. Under terms of the Phase I MS4 Permit, permittees are required to develop and implement a Storm Water Management Plan and Monitoring Program that identifies tasks and programs to reduce the discharge of pollutants in storm water to the maximum extent practicable in a manner designed to achieve compliance with water quality standards and objectives. The Storm Water Management Plan and Monitoring Program includes ongoing costs for operations and maintenance, inspections, enforcement, staff training, public education and outreach, illicit connections and discharges response and abatement, and effectiveness monitoring. The costs for implementing the Storm Water Management Plan and Monitoring Program are baseline program costs, and will be

<sup>46</sup> Municipal Separate Storm Sewer System (MS4) is a conveyance or system of conveyances owned by a public entity and designed for collecting and conveying storm water, including roads, drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels, or storm drains.

incurred by MS4 Permittees with or without additional, incremental costs associated with a specific program to control fecal indicator bacteria.

The Program of Implementation for the control of urban storm water and non-storm water runoff requires the MS4 Permittees to develop and implement BMPs to reduce the levels of pathogens in storm water discharged to surface waters. It is anticipated that MS4 Permittees will develop specific structural and/or nonstructural BMPs to control the sources of bacteria within the MS4 boundary. Potential control measures are unknown at this time. However, in the California Regional Water Quality Control Board, San Francisco Bay Region's *Pathogens in the Napa River Watershed Total Maximum Daily Load*, it was estimated that additional pathogen-specific measures for Napa County would result in a two to 15 percent increase to the annual MS4 program budget based on information for a similar MS4 program in Marin County. Using this estimate, staff estimates a range of incremental costs of implementing MS4 bacteria-control measures between a two percent annual increase (minimum) and a 15 percent annual increase (maximum). As an example of potential added costs for two MS4 Permittees in the Russian River Watershed, the cost calculations for the City of Santa Rosa and the County of Sonoma are shown in Table 12.6. Staff expects that MS4 Permittees that are already addressing fecal indicator bacteria issues would fall at the low end of incremental cost increases.

Other structural controls, including exclusionary structures to discourage uncontrolled public access and the formation of homeless encampments are also potential costs for MS4s or other entities where limiting public access is a feasible implementation action. The cost for exclusionary fencing for bridge abutments for MS4 Permittees is expected to be similar to costs estimates for Caltrans discussed in section 12.2.5.2. Potential costs for purchasing and installing exclusionary or safety fencing for operators of transportation corridors are likely much higher, depending on the type and length of fence needed.

<b>Table 12.6 Estimated Cost Range for Incremental Costs for Bacteria Control Measures Municipal Separate Storm Sewer Systems (MS4s)</b>			
	<b>Annual Program Cost</b>	<b>2% Incremental Cost Increase associated with Bacteria Control Program</b>	<b>15% Incremental Cost Increase associated with Bacteria Control Program</b>
Santa Rosa (FY 13/14) <sup>1</sup>	\$1,983,913	\$39,678	\$297,587
Santa Rosa (FY 14/15,est.) <sup>1</sup>	\$2,251,609	\$45,032	\$337,741
Sonoma County (FY 13/14) <sup>2</sup>	\$775,949	\$15,519	\$116,392

<sup>1</sup> City of Santa Rosa, December 2014. City of Santa Rosa's 2013-2014 Annual Report of Compliance with Order No. R1-2009-0050

<sup>2</sup> County of Sonoma, December 2014. NPDES Phase I Annual Report: July 1, 2013 – June 30, 2014, Term 3, Year Five

### 12.2.5.2 COSTS FOR STORM WATER CONTROLS FOR CALTRANS

In the North Coast Region (Caltrans District 4), BMPs installed to comply with Caltrans' statewide NPDES Permit conditions currently are focused on activities to prevent and minimize erosion and sediment discharges from Caltrans right-of-way. Effective erosion control will reduce the migration of pollutants, including human pathogens and fecal indicator bacteria, to surface waters.

Proactive bridge design is a cost-effective method to prevent the creation of tempting encampment sites for homeless persons. For retrofitting existing bridge underpasses, security fencing and other exclusionary structures are effective BMP to discourage the formation of homeless encampments under bridges within the Caltrans right-of-way. As an example of potential costs, in 2014, the City of Santa Rosa installed exclusion structures designed to exclude access to flat areas at the base of old bridge abutments that have been used for camping at three road crossings within the Russian River Watershed. The cost estimate for the project was \$38,960, plus \$1,170 for inspection of the three sites. In Pennsylvania, the Pennsylvania Department of Transportation spent an average of \$24,000 per location to fences bridges and highway ramps to deter homeless. Based on available information, the cost estimate per location for exclusionary fencing is from \$13,000 to \$24,000, depending on site conditions.

### 12.2.5.3 GENERAL STORM WATER COMPLIANCE MEASURES COSTS

Structural controls for nonpoint sources divert, store, treat, and/or infiltrate storm water to prevent the discharge of waste material to the river with storm water runoff. Structural controls for point sources can be implemented to treat waste before discharge and/or prevent the direct discharge of waste into a waterbody, as highlighted in Table 12.7.

<b>Table 12.7 Estimated Costs of Reasonably Foreseeable Compliance Measures Associated with Storm Water Control</b>			
<b>Reasonably Foreseeable Compliance Measure</b>	<b>Practice Name</b>	<b>Range of Practice Costs</b>	<b>NRCS Practice Code or Source</b>
Sediment/Bacteria Controls	Fiber roll / Straw Wattle	\$1.20- 20.00/Lft	Home Depot/ Caltrans 2013
Sediment/Bacteria Controls	Sand Filters	\$6,000 -\$18,500 /acre	U.S. EPA
Bioretention	Green Roofs, Rain Gardens, vegetated strips, and bioswales	\$500-\$7,000/per unit	U.S. EPA

### 12.2.6 POTENTIAL COSTS FOR OWNERS OF NON-DAIRY LIVESTOCK AND FARM ANIMALS

Activities associated with raising, feeding, and maintaining non-dairy livestock and farm animals occur throughout the North Coast Region both on private and public lands. Best

management practices are recommended to prevent the migration of animal waste to surface waters. Estimates of potential cost to the grazing community are derived from NRCS Fiscal Year 2013 Payment Schedule, as depicted in Table 12.8.

<b>Table 12.8 Estimated Cost Range for Incremental Costs for Bacteria Control Measures Owners of Non-dairy Livestock and Farm Animals</b>			
<b>Reasonably Foreseeable Compliance Measure</b>	<b>Practice Name</b>	<b>Range of Practice Costs</b>	<b>NRCS Practice Code or Source</b>
Use Exclusion	Forage exclusion	\$0.64-\$1.32/ft	#472
Vegetated filter strips	Filter strip	\$210-\$448/acre	#393
Stream buffer areas/Field borders	Field Borders: Riparian tree & shrub establishment; Non-native or native seedbed preparation	\$211-\$1,617/acre	#386
Fencing	NA	\$3-\$12/ft	CDFW Coho Recovery Plan

Owners of non-dairy livestock and farm animals who fail to implement these or substantially similar best management practices within two years after the effective date of the Action Plan will be required to submit a report in violation of the fecal waste discharge for possible establishment of waste discharge requirements for the discharge prohibition. The Executive Officer may require of waste individual non-dairy livestock operations the development and implementation of a ranch management plan. The cost for preparing a report of waste discharge, or Notice of Intent, ranch management plan will vary depending whether the report plan will be prepared by the property owner or a qualified professional, the size of the operation, how much information is available to characterize the discharge and site conditions, and site conditions and constraints. ~~The application fee and first annual fee for waste discharge requirements for small-scale animal operations is prescribed in California Code of Regulations, title 23, division 3, chapter 9, article 1, section 2200 (Annual Fee Schedules).~~

### 12.2.7 POTENTIAL COSTS FOR PET WASTE MANAGEMENT PROGRAMS

A successful pet waste management program is dependent of the participation and cooperation of individual pet owners. The cost of a public education program depends on the type of materials produced and the method of distribution. Implementation of a pet waste management program is an existing program under the MS4 permit for the County of Sonoma, City of Cloverdale, City of Cotati, City of Healdsburg, City of Rohnert Park, City of Santa Rosa, City of Sebastopol, Sonoma County Water Agency, City of Ukiah, and the Town of Windsor. No new costs are anticipated to continue implementing this program beyond the installation of new trash receptacles and pet waste bag dispensers. The cost of a bag dispenser is approximately \$60 (Washington State Department of Ecology).

### 12.2.8 POTENTIAL COSTS FOR DAIRIES

The structural BMPs to reduce and prevent discharges of animal waste associated with the operation of cow dairies are similar to practices identified in section 12.4.2.6 for non-dairy livestock and farm animals. Cost estimates for bacteria control measures for these BMPs are presented in Table 12.8. Where the structural BMP involves the construction of a new manure storage pond or enlargement of an existing manure storage pond, costs depend on the required design storm and the resulting required pond volume. Average national installation costs for livestock ponds is 2.2 cents per gallon for ponds with a capacity less than 1 million gallons, 1.8 cents per gallon for capacities from 1 million to 3 million gallons, and 1.5 cents per gallon for capacities greater than 3 million gallons (USDA)<sup>47</sup>. Increasing capacity in existing ponds by raising the levels of pond berms would cost considerably less.

### 12.2.9 POTENTIAL COSTS FOR BIOSOLIDS APPLICATION

Current options for managing wastewater biosolids include both beneficial reuse technologies (such as land application, landfilling with biogas recovery, and energy recovery through incineration) and non-reuse options, including landfilling. While implementing some type of beneficial reuse is the preferred method for managing wastewater biosolids, this is not always practical. For example, land acquisition constraints or poor material quality may limit beneficial reuse options. Composting is one of several methods for treating biosolids to create a marketable end product that is easy to handle, store, and use.

Recycling biosolids through land application serves several purposes. It improves soil properties, such as texture and water holding capacity, which make conditions more favorable for root growth and increases the drought tolerance of vegetation. Biosolids application also supplies nutrients essential for plant growth, including nitrogen and phosphorous, as well as some essential micronutrients such as nickel, zinc, and copper. Biosolids can also serve as an alternative or substitute for expensive chemical fertilizers.

Implementation of BMPs to prevent the migration of biosolids, and associated fecal pathogens, from land application areas is an existing requirement of the State Water Board's Water Quality Order No. 2004-0012-DWQ, General Waste Discharge Requirements for the Discharge of Biosolids for use as a Soil Amendment in Agricultural, Silvicultural, Horticultural, and Land Reclamation Activities (Biosolids General Order) and a common requirement in individual WDRs or Waivers of WDRs that authorize land application of biosolids. The Action Plan requires that each discharger that land applies biosolids comply

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<sup>47</sup> USDA Natural Resources Conservation Service (Rhode Island). **Comprehensive Nutrient Management Plans (CNMP): Costs Associated with Development and Implementation of Comprehensive Nutrient Management Plans** - Part I—Nutrient Management, Land Treatment, Manure and Wastewater Handling and Storage, and Recordkeeping. [http://www.nrcs.usda.gov/wps/portal/nrcs/detail/ri/technical/dma/?cid=nrcs143\\_014041](http://www.nrcs.usda.gov/wps/portal/nrcs/detail/ri/technical/dma/?cid=nrcs143_014041)

with its applicable permit. No new costs are anticipated as a result of this Program of Implementation.

#### **12.2.10 POTENTIAL COSTS FOR PUBLIC OUTREACH AND EDUCATION PROGRAMS**

Public education and community outreach are integral parts of any public program. Public education provides information to the public about where, when, why, and how a program will be implemented. If provided early and continued through the life a program, public education can also help create and maintain public support for a program and to ultimately meet the goals of the program.

Creating and implementing a successful education and outreach program requires a significant long-term financial commitment. The cost for implementing a public education and community outreach program depends on the scope of the public information effort. As an example, the Texas Water Development Board estimates in its *Best Management Practices for Municipal Water Users*<sup>48</sup> guide, that the costs for a public utility for administration and materials to implement a comprehensive water conservation program would range in cost from \$0.25 per customer per year to several dollars per year, depending on the budget and size of the public utility. The Sonoma County Water Agency estimates that the costs to implement the public outreach and education components of its water programs range from \$100,000 to \$500,000 per year.

### **12.3 SOURCES OF FUNDING**

Potential sources of funding include monies from private and public sources. Public financing includes, but is not limited to: grant funds, as described below; single-purpose appropriations from federal, state, and/or local legislative bodies; and bond indebtedness and loans from government institutions.

#### **12.3.1 SUMMARY OF PERTINENT STATE FUNDING PROGRAMS**

There are several potential sources of public financing through grant and loan funding programs administered, at least in part, by the Regional Water Board and the State Water Board. The Division of Financial Assistance (DFA) administers the implementation of the State Water Board financial assistance programs that include loan and grant funding for project planning, construction of municipal sewage and water recycling facilities, remediation for underground storage tank releases, watershed protection projects, and nonpoint source pollution control projects.

The resources available through these programs vary over time depending upon federal and state budgets and ballot propositions approved by voters. State funding programs pertinent to the proposed Action Plan are summarized and described below. Additional

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<sup>48</sup> Texas Water Development Board. *Best Management Practices for Municipal Water Users*. November 2013. <http://www.twdb.texas.gov/conservation/BMPs/Mun/doc/MunMiniGuide.pdf?d=1530657069210>

information can be found on the State Water Resources Control Board webpage.  
([http://www.waterboards.ca.gov/water\\_issues/programs/grants\\_loans/](http://www.waterboards.ca.gov/water_issues/programs/grants_loans/)).

### **12.3.1.1 CLEAN WATER STATE REVOLVING FUND**

The Federal Water Pollution Control Act (Clean Water Act or CWA), as amended in 1987, provides for establishment of a Clean Water State Revolving Fund (CWSRF) program. The program is funded by federal grants, State funds, and Revenue Bonds. The purpose of the CWSRF program is to implement the CWA and various State laws by providing financial assistance for the construction of facilities or implementation of measures necessary to address water quality problems and to prevent pollution of the waters of the State, including federal waters.

In 2014, California voters passed the Water Quality, Supply, and Infrastructure Improvement Act of 2014 (Proposition 1; Prop 1), which authorized \$7.545 billion in general obligation bonds for water projects including surface and groundwater storage, ecosystem and watershed protection and restoration, and drinking water protection. The State Water Board administers Proposition 1 for five programs: Small Community Wastewater, Water Recycling, Drinking Water, Storm Water, and Groundwater Sustainability. For small community wastewater projects, Proposition 1 allocates \$260 million to the CWSRF Small Community Grant (SCG) Fund. The State Water Board has an annual SCG appropriation of \$8 million dollars, which is administered consistent with the CWSRF Intended Use Plan (IUP), and the CWSRF Policy. Administering these funds as a part of the CWSRF Program allows grant funds to be easily leveraged with low-interest financing available through the CWSRF Program. CWSRF applications are accepted on a continuous basis, and eligible projects are funded as applications are completed and approved.

In addition to capital projects, up to 15 percent of the funds available from Prop 1 is allocated to a multi-disciplinary technical assistance (TA) program. The Prop 1 TA Funding Plan (Plan) was adopted by the State Water Board on November 4, 2015. The Plan outlines the general process to administer Prop 1 TA funds. The TA efforts are focused on helping small disadvantaged communities develop, fund, and implement capital improvement projects. This is a multi-disciplinary approach, intended to address small disadvantaged communities' drinking water, wastewater, groundwater quality, and storm water needs under one program.

Including the currently authorized and forecasted future revenue bond sales, the CWSRF's estimated cumulative uncommitted cash through June 30, 2023, available for financing new projects is approximately \$711 million.

Additional information can be found on the State Water Resources Control Board webpage  
[http://www.waterboards.ca.gov/water\\_issues/programs/grants\\_loans/srf/](http://www.waterboards.ca.gov/water_issues/programs/grants_loans/srf/)

### 12.3.1.2 INTEGRATED REGIONAL WATER MANAGEMENT GRANTS

Proposition 1 also authorized \$510 million to Integrated Regional Water Management (IRWM) funding, with funding allocated to hydrologic region-based Funding Areas. The Proposition 1 IRWM Grant Program, administered by the California Department of Water Resources (DWR), is designed to provide funding for projects that help meet the long-term water needs of the state, with particular attention to communities that are economically disadvantaged. The IRWM program is a collaborative effort to manage all aspects of water resources in a region. IRWM crosses jurisdictional, watershed, and political boundaries; involves multiple agencies, stakeholders, individuals, and groups; and attempts to address the issues and differing perspectives of all the entities involved through mutually beneficial solutions. In the North Coast Region, the North Coast Regional Partnership, a coalition of local and Tribal governments, water and wastewater service providers, non-governmental organizations, watershed groups, resource conservation districts, and interested stakeholders from Tribes and the North Coast counties, has been instrumental in obtaining IRWM project implementation funding for communities, with \$53 million of that funding over the last 10 years substantially contributing towards drinking water and water quality improvement projects in disadvantaged communities.

DWR has a number of IRWM grant program funding opportunities. Current IRWM grant programs include: planning, implementation, and storm water flood management. The IRWM Grant Programs are managed within DWR's Division of IRWM by the Financial Assistance Branch with assistance from the Regional Planning Branch and regional offices.

On October 5, 2018 DWR released the 2018 Proposition 1 - Round 1 IRWM Implementation Grant Draft Proposal Solicitation Package and Draft 2018 Guidelines for public review. DWR is proposing that approximately \$194 million be made available for implementation projects with approximately \$18 million designated for projects that provide benefits to Disadvantaged Communities.

Additional information can be found on the State Department of Water Resources webpage, <https://water.ca.gov/Work-With-Us/Grants-And-Loans/IRWM-Grant-Programs>

#### **The North Coast Partnership**

The North Coast Resource Partnership (NCRP) is a long term, innovative and successful collaboration among local governments, watershed groups, Northern California Tribes, and other interested stakeholders that identifies, evaluates, and selects for funding water quality projects, which include projects for water and wastewater infrastructure, water recycling, storm water capture, and groundwater management. The NCRP region covers over 19,000 square miles – 12% of the California landscape – and includes the Tribal lands and the counties of Del Norte, Humboldt, Trinity, Siskiyou, Modoc, Mendocino and Sonoma.

Since 2004, the partnership has engaged in collaborative, integrated planning and project implementation, investing over \$67 million of local, state, and federal funding in hundreds



of projects that benefit the North Coast Region's communities and watersheds. The NCRP has been active in securing funding for failing water and wastewater infrastructure, and for projects that promote community health and safety.

Additional information about NCRP can be found on its webpage.  
<http://northcoastresourcepartnership.org/>

#### **12.3.1.3 — LINKED DEPOSIT PROGRAM**

In a linked deposit program, a local public agency typically applies to the State Water Board to establish "linked deposit loans" to address a specific water quality problem in its area. The State Water Board arranges with local banks to provide loans to individual property owners for the specific water quality projects or actions. The CWSRF agrees to buy a Certificate of Deposit (CD) at below market rate. In exchange, the bank agrees to provide reduced interest rate loans to private property owners for eligible projects that were reviewed and approved by the local public agency.

#### **12.3.1.4 — SAFE DRINKING WATER STATE REVOLVING FUND**

The Safe Drinking Water Act, as amended in 1996, established the Drinking Water State Revolving Fund (DWSRF) to make funds available to drinking water systems to finance infrastructure improvements. A noted priority of the program is to provide funds to small and disadvantaged communities and to programs that encourage pollution prevention as a tool for ensuring safe drinking water. The fund provides low interest loans, grants, and other assistance to public water systems for the purpose of infrastructure improvements to correct system deficiencies and improve water quality. Detailed information on the program can be found in the annual Intended Use Plan.

#### **12.3.1.5 — PROPOSITION 50**

, the Water Security, Clean Drinking Water, Coastal and Beach Protection Act of 2002 (Water Code Section 79500, et seq.) was passed by California voters in the November 2002 general election. DDW is responsible for portions of the Act that deal with water security, safe drinking water, and treatment technology. DDW currently has funding available for projects designed to remove contaminants from drinking water supplies and/or install UV or ozone disinfection.

#### **12.3.1.6 — PROPOSITION 84**

, the Safe Drinking Water, Water Quality and Supply, Flood Control, River and Coastal Protection Act of 2006 (Public Resources Code Section 75001, et seq.), was passed by California voters in the November 2006 general election. DDW is responsible for portions of the Act that deal with safe drinking water supplies, including emergency and urgent funding, infrastructure improvements, and groundwater quality. The Integrated Regional Water Management program from DWR has funding available under Proposition 84 for

projects that address critical drinking water supply or water quality needs for Disadvantaged Communities. Funding is also available for Urban Water Suppliers implementing leak detection and repair and installation of water meters as Best Management Practices.

#### **12.3.1.7 — PROPOSITION 84 STORM WATER GRANT PROGRAM**

The Public Resources Code (PRC) requires that the Proposition 84 Storm Water Grant Program (SWGP) funds be used to provide matching grants to local public agencies for the reduction and prevention of storm water contamination of rivers, lakes, and streams. The Legislature may enact legislation to further define this grant program.

AB 739 requires the development of project selection and evaluation guidelines for the Proposition 84 SWGP, and provides additional information regarding types of projects eligible for funding. AB 739 also requires creation of a Storm Water Advisory Task Force that will provide advice to the State Water Board on its Storm Water Management Program that may include program priorities, funding criteria, project selection, and interagency coordination of State programs that address storm water management.

#### **12.3.1.8**

#### **12.3.1.3 EMERGENCY SOLUTIONS GRANTS PROGRAM**

The Emergency Solutions Grants program (ESG) provides funds for a variety of activities to address homelessness as authorized under the federal HEARTH Act of 2009 and State program requirements. The State of California Department of Housing and Community Development (HCD) administers the ESG program with funding received from the U.S. Department of Housing and Urban Development (HUD).

The federal ESG program provides grant funding to 1) engage homeless individuals and families living on the street; (2) rapidly re-house homeless individuals and families (2) help operate and provide essential services in emergency shelters for homeless individuals and families; (4) prevent individuals and families from becoming homeless.

Additional information can be found on the HCD webpage

<http://hcd.ca.gov/financial-assistance/emergency-solutions-grant-program/index.html>  
<https://www.hudexchange.info/programs/esg/>

#### **12.3.1.4 CLEAN BEACHES INITIATIVE GRANT PROGRAM**

The Clean Beaches Initiative (CBI) Grant Program provides funding for projects that restore and protect the water quality and the environment of coastal waters, estuaries, bays, and near shore waters. The CBI Grant Program was initiated in response to the poor water quality and significant exceedances of bacterial indicators revealed by Assembly Bill (AB) 411 (Stats. 1997, Ch. 765) monitoring at California's beaches. Scientific studies have

shown that water with high bacteria levels can cause infections rashes, and gastrointestinal and respiratory illnesses.

The CBI Grant Program has provided about \$100 million from voter-approved bonds for approximately 100 projects since it was started under the 2001 Budget Act. Typical projects include the construction of disinfecting facilities, diversions that prevent polluted storm water from reaching the beach, and scientific research that will enable early notification of unhealthy swimming conditions. Round 2 Implementation includes \$90 million that will become available in the Summer 2019.

Additional information about the CBI Grant Program can be found on the State Water Board website.

[https://www.waterboards.ca.gov/water\\_issues/programs/beaches/cbi\\_projects/](https://www.waterboards.ca.gov/water_issues/programs/beaches/cbi_projects/)

#### **12.3.1.10 — AGRICULTURAL DRAINAGE PROGRAM**

~~The was created by the Water Conservation and Water Quality Bond Act of 1986 to address treatment, storage, conveyance, or disposal of agricultural drainage water that threatens waters of the State. Loan repayments are for a period of up to 20 years. Eligible applicants include any city, county, district, joint powers authority or other political subdivision of the State involved with water management. Projects must address treatment, storage, conveyance or disposal of agricultural drainage that threaten waters of the State.~~

#### **12.2.1.5 Cleanup & Abatement Account**

The State Water Board's Cleanup and Abatement Account (CAA) was created by Water Code Sections 13440-13443 to provide grants for the cleanup or abatement of a condition of pollution when there are no viable responsible parties available to undertake the work. The CAA is supported by court judgments and administrative civil liabilities assessed by the State Water Board and the Regional Water Boards. Eligible entities include:

- Public agencies, including Regional Water Boards.
- Tribal government on the California Tribal Consultation List maintained by the Native American Heritage Commission and is a disadvantaged community (DAC).
- Not-for-profit organizations serving a DAC; or
- Community water systems serving a DAC.

Available funding varies for this program.

[https://www.waterboards.ca.gov/water\\_issues/programs/grants\\_loans/caa/cleanup\\_and\\_abatement.html](https://www.waterboards.ca.gov/water_issues/programs/grants_loans/caa/cleanup_and_abatement.html)

### 12.3.2 SUMMARY OF PERTINENT FEDERAL FUNDING PROGRAMS

Several federal agencies, including but not limited to the U.S. EPA, NOAA Fisheries, U.S. Fish and Wildlife Service, and U.S. Department of Agriculture (USDA) Natural Resources Conservation Service also provide grants and other funding opportunities. Table 12.9 presented below provides a summary of the pertinent federal funding programs. Not all of the programs are currently available, but they are listed for educational purposes and in the case that they become available in the future.

The U.S. EPA provides access through its webpage to a catalog of federal funding opportunities: [http://water.epa.gov/grants\\_funding/shedfund/databases.cfm](http://water.epa.gov/grants_funding/shedfund/databases.cfm)

#### 12.3.2.1 (USDA) NATURAL RESOURCES CONSERVATION SERVICE

~~The USDA has a wide variety of financial support programs that provide assistance to agricultural producers to help plan and implement conservation practices that address natural resource concerns and for opportunities to improve soil, water, plant, animal, air and related resources on agricultural land and non-industrial private forestland. In addition to agriculture-related assistance, USDA also provides low interest loans to very low income homeowners to finance vital improvements necessary to make their homes decent, safe, and sanitary and provides grants to elderly very low income homeowners to remove health and safety hazards. USDA Multi-Family Housing Programs offer Rural Rental Housing Loans to provide affordable multi-family rental housing for very low-, low-, and moderate-income families; the elderly; and persons with disabilities. In addition, rental assistance is available to eligible families.~~

The United States Department of Agriculture Rural Development has more than 40 programs to support investments in infrastructure, housing, and economic and community development projects throughout rural California. USDA's loan and grant programs work in partnership with state and local sources to help build stronger rural communities. Eligible applicants include: public agencies, special districts, nonprofit corporations and federally recognized tribes. Funding available in the Water and Environmental (WEP) programs include water and wastewater loan and grant, emergency community water assistance grants, Native American grants and Special Evaluation Assistance for Rural Communities and Households (SEARCH) grants. WEP also provides funding to organizations that provide technical assistance and training to rural communities in relation to their water and waste activities. Some examples of eligible projects include: water, waste treatment and disposal, and constructed wetlands.

Additional information can be found on the USDA webpage

Additional information regarding housing assistance for rural communities can be found at:  
<https://www.rd.usda.gov/>

### **12.3.3 SUMMARY OF PERTINENT PRIVATE FUNDING PROGRAMS**

In addition to the range of government entities that offer financial resources to advance environmental projects, there are a number of private funding programs that can be used to finance public infrastructure projects. Private funding organizations often provide funds through non-profit corporations.

#### **12.3.3.1 (IBANK) INFRASTRUCTURE STATE REVOLVING FUND PROGRAM**

The California Infrastructure and Economic Development Bank (IBank) provides funding to finance public infrastructure and private development that promote a healthy climate for jobs, contribute to a strong economy and improve the quality of life in California communities. The Infrastructure State Revolving Fund (ISRF) program provides financing to public agencies and non-profit corporations, sponsored by public agencies, for a wide variety of infrastructure and economic development projects (excluding housing). ISRF funding is available in amounts ranging from \$50,000 to \$25 million with loan terms for the useful life of the project up to a maximum of 30 years. Some examples of eligible projects include: water, sewage, flood control, waste disposal, streets, highways, public transit, public safety, educational, cultural, social, parks and recreation facilities, ports and goods movement.

Additional information can be found on the IBank webpage at:  
<http://www.ibank.ca.gov/about-us/>

<b>Table 12.9 Summary of Federal Funding Programs</b>		
<b>Funding Program</b>	<b>Programs Description</b>	<b>2019 Funding</b>
<b>Agency : U.S. Department of Agriculture</b>		
<a href="#">Sustainable Agriculture Research and Education</a>	The Sustainable Agriculture Research and Education (SARE) program of the U.S. Department of Agriculture National Institute of Food and Agriculture (NIFA) works to advance farming systems that are productive, profitable, environmentally sound and good for communities through a regional grants program. SARE funds research and extension activities to reduce the use of chemical pesticides, fertilizers, and toxic materials in agricultural production; to improve management of on-farm resources to enhance productivity, profitability, and competitiveness; to promote crop, livestock, and enterprise diversification and to facilitate the research of agricultural production systems in areas that possess various soil, climatic, and physical characteristics; to study farms that are managed using farm practices that optimize on-farm resources and conservation practices; and to promote partnerships among farmers, nonprofit organizations, agribusiness, and public and private research and extension institutions. Click on program name and check the link in the Primary Internet box for more information about grant opportunities and program results. <a href="https://www.sare.org/Grants">https://www.sare.org/Grants</a>	\$22.7 million

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<b>Table 12.9 Summary of Federal Funding Programs</b>		
<b>Funding Program</b>	<b>Programs Description</b>	<b>2019 Funding</b>
	<a href="https://www.westernsare.org/Professional-Development-Program/State-and-Protectorate-Pages/California">https://www.westernsare.org/Professional-Development-Program/State-and-Protectorate-Pages/California</a>	
<a href="#"><u>Environmental Quality Incentives Program</u></a>	<p>The USDA Natural Resources Conservation Service's Environmental Quality Incentives Program (EQIP) was established to provide a voluntary conservation program for agricultural producers to address significant natural resource needs and objectives. Through a competitive process, EQIP offers financial assistance contracts with a maximum term of ten years, to help implement eligible conservation practices. Persons or legal entities, who are owners of land under agricultural production or who are engaged in livestock or agricultural production on eligible land, including private non-industrial forest land, or Indian Tribes may participate in EQIP. Conservation practices implemented through EQIP are subject to NRCS technical standards adapted for local conditions. NRCS or Technical Service Providers (TSPs) help applications develop a plan of operations which identifies practices needed to address natural resource concerns and support the EQIP contract. EQIP-related programs include Conservation Innovation Grants (CIG), Resource Conservation Partnership Program (RCPP), and the National Water Quality Initiative (NWQI).</p> <p><a href="https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/financial/eqip/">https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/financial/eqip/</a></p>	\$981.7 million Estimate (Cost Share)
<a href="#"><u>National Integrated Water Quality Program (NIWQP)</u></a>	<p>The National Integrated Water Quality Program (NIWQP) provides funding for research, education, and extension projects aimed at improving water quality in agricultural and rural watersheds. The NIWQP has identified eight "themes" that are being promoted in research, education and extension. The eight themes are (1) Animal manure and waste management (2) Drinking water and human health (3) Environmental restoration (4) Nutrient and pesticide management (5) Pollution assessment and prevention (6) Watershed management (7) Water conservation and agricultural water management (8) Water policy and economics. Awards are made in four program areas - National Projects, Regional Coordination Projects, Extension Education Projects, and Integrated Research, Education and Extension Projects. Please note that funding is only available to universities.</p> <p><a href="https://nifa.usda.gov/national-integrated-water-quality-program-frequently-asked-questions">https://nifa.usda.gov/national-integrated-water-quality-program-frequently-asked-questions</a></p>	Not currently available
<b>Agency : U.S. Department of Housing and Urban Development</b>		
<a href="#"><u>Community Development Block Grants/Entitlement Grants</u></a>	<p>The objective of this program is to develop viable urban communities, by providing decent housing and a suitable living environment, and by expanding economic opportunities, principally for persons of low and moderate income. Recipients may undertake a wide range of activities directed toward neighborhood revitalization, economic development and provision of improved community facilities and services.</p> <p><a href="https://www.hudexchange.info/programs/cdbg/">https://www.hudexchange.info/programs/cdbg/</a></p>	\$1.95 billion (est.)



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Table 12.9 Summary of Federal Funding Programs		
Funding Program	Programs Description	2019 Funding
<b>Agency : U.S. Environmental Protection Agency</b>		
<a href="#">Source Reduction Assistance Grant Program</a>	<p>The Source Reduction Assistance Grant Program provides grants and cooperative agreements to fund pollution prevention (source reduction and resource conservation) activities. Specifically, the Agency is interested in funding projects that help reduce hazardous substances, pollutants, or contaminants entering waste streams or otherwise released into the environment (including fugitive emissions) prior to recycling, treatment, disposal or energy recovery activities.</p> <p><a href="https://www.epa.gov/p2/fy-2018-and-fy-2019-request-proposals-source-reduction-assistance-grant-program">https://www.epa.gov/p2/fy-2018-and-fy-2019-request-proposals-source-reduction-assistance-grant-program</a></p>	\$2.0 million (est.)
<a href="#">Clean Water State Revolving Fund</a>	<p>The EPA's Clean Water State Revolving Fund (CWSRF) program provides a permanent source of low-cost financing for a wide range of water quality infrastructure projects. These projects include traditional wastewater treatment and collection, nonpoint source pollution controls, and estuary management. Funds to capitalize the program are provided annually through federal grants and state matching funds (equal to 20 percent of federal grants). Monies are loaned to assistance recipients at below-market rates. In addition, states also have the ability to customize loan terms to benefit small and disadvantaged communities. Loan repayments are recycled back into the programs to fund additional projects. Since its inception, the CWSRF has provided over \$95.4 billion in assistance to eligible borrowers, including communities of all sizes, farmers, small businesses, and nonprofit organizations. More information on the CWSRF program can be obtained at</p> <p><a href="https://www.epa.gov/cwsrf">https://www.epa.gov/cwsrf</a></p>	<p>\$1.1 billion (est.)</p> <p>Estimated 70 million in Grants for California</p>
<a href="#">Nonpoint Source Implementation Grants (319 Program)</a>	<p>Through its 319 program, U.S. EPA provides formula grants to the states, territories and tribes to implement nonpoint source programs and projects and programs in accordance with section 319 of the Clean Water Act (CWA). Nonpoint source pollution projects can be used for a wide range of activities including agriculture, forestry, construction, and urban challenges. When set as priorities within a state's Nonpoint source management program, projects may also be used to protect source water areas and high quality waters. Examples of previously funded projects include installation of best management practices (BMPs) for animal waste; design and implementation of BMP systems for stream, lake, and estuary watersheds; and basin-wide landowner education programs. Most states provide opportunities for 3rd parties to apply for funds under a state request for proposal.</p> <p><a href="https://www.waterboards.ca.gov/water_issues/programs/nps/319grants.html">https://www.waterboards.ca.gov/water_issues/programs/nps/319grants.html</a></p>	\$4 million Estimated for California
<a href="#">Urban Waters Small Grants</a>	EPA's Urban Waters Program protects and restores America's urban waterways. EPA's funding priority is to achieve the goals and commitments established in the Agency's Urban Waters Strategic Framework ( <a href="http://www2.epa.gov/urbanwaters/urban-waters-strategic-">www2.epa.gov/urbanwaters/urban-waters-strategic-</a>	\$2.08 (est.)

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**Table 12.9 Summary of Federal Funding Programs**

Funding Program	Programs Description	2019 Funding
	<p>framework). This program has an emphasis on engaging communities with environmental justice concerns. The objective of the Urban Waters Small Grants is to fund projects that will foster a comprehensive understanding of local urban water issues, identify and address these issues at the local level, and educate and empower the community. In particular, the Urban Waters Small Grants seek to help restore and protect urban water quality and revitalize adjacent neighborhoods by engaging communities in activities that increase their connection to, understanding of, and stewardship of local urban waterways.</p> <p><a href="https://www.epa.gov/urbanwaters/urban-waters-small-grants">https://www.epa.gov/urbanwaters/urban-waters-small-grants</a></p>	Currently not available
<a href="#">Pollution Prevention Grant Program</a>	<p>The Pollution Prevention Grant Program provides grants and cooperative agreements to state agencies, instrumentalities of a state and federally recognized tribes to implement pollution prevention projects that provide technical assistance to businesses. The program requires applicants to work towards reducing pollution, conserving energy and water, and saving dollars through P2 efforts; as identified in EPA's Strategic Plan under Goal 4: Ensuring Safety of Chemicals and Preventing Pollution, Objective 4.2: Promote Pollution Prevention.</p> <p><a href="https://www.epa.gov/p2/grant-programs-pollution-prevention">https://www.epa.gov/p2/grant-programs-pollution-prevention</a></p>	\$4.69 million (est.)
<a href="#">Five-Star Restoration Program</a>	<p>The U.S. EPA supports the Five-Star Restoration Program by providing funds to the National Fish and Wildlife Foundation and its partners, the National Association of Counties, NOAA's Community-based Restoration Program and the Wildlife Habitat Council. These groups then make subgrants to support community-based wetland and riparian restoration projects. Competitive projects will have a strong on-the-ground habitat restoration component that provides long-term ecological, educational, and/or socioeconomic benefits to the people and their community. Preference will be given to projects that are part of a larger watershed or community stewardship effort and include a description of long-term management activities. Projects must involve contributions from multiple and diverse partners, including citizen volunteer organizations, corporations, private landowners, local conservation organizations, youth groups, charitable foundations, and other federal, state, and tribal agencies and local governments. Each project would ideally involve at least five partners who are expected to contribute funding, land, technical assistance, workforce support, or other in-kind services that are equivalent to the federal contribution.</p> <p><a href="https://www.nfwf.org/fivestar/Pages/2018rfp.aspx">https://www.nfwf.org/fivestar/Pages/2018rfp.aspx</a></p>	TBD

[https://ofmpub.epa.gov/apex/watershedfunding/?p=109:1:0::NO:RP::#search\\_results](https://ofmpub.epa.gov/apex/watershedfunding/?p=109:1:0::NO:RP::#search_results)

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## CHAPTER 13 ANTIDEGRADATION ANALYSIS

### 13.1 OVERVIEW

This chapter analyzes whether approval of the amendment would be consistent with the federal and state antidegradation policies.

### 13.2 STATE AND FEDERAL ANTIDEGRADATION POLICIES

The federal antidegradation policy, described in 40 CFR § 131.12, requires that existing instream designated uses and the level of water quality necessary to protect the existing uses be maintained and protected. Where, however, the quality of the water exceeds levels necessary to support propagation of fish, shellfish, and wildlife, and recreation in and out of the water, that quality must be maintained and protected unless the state finds that:

1. Such activity is necessary to accommodate important economic or social development in the area in which the waters are located;
2. Water quality is adequate to protect existing beneficial uses fully; and
3. The highest statutory and regulatory requirements for all new and existing point source discharges and all cost-effective and reasonable best management practices for nonpoint source control are achieved.

In addition, the federal antidegradation policy requires that where high quality waters constitute an outstanding National resource that water quality shall be maintained and protected.

The state antidegradation policy incorporates the federal Antidegradation Policy ~~(see State Water Board Order No. WQ 2001-16, p. 19, fn 83).~~<sup>49</sup> (The state Antidegradation Policy applies to high quality waters.<sup>50</sup> The state policy establishes several conditions that must be met before the quality of high quality waters may be lowered by waste discharges. ("Statement of Policy With Respect to Maintaining High Quality Waters in California", State Water Board Resolution No. 68-16; See also Basin Plan pages 3-2.00 to 3-3.00). The state must determine that lowering the quality of high quality waters:

1. Will be consistent with the maximum benefit to the people of the state,
2. Will not unreasonably affect present and anticipated beneficial uses of such water, and
3. Will not result in water quality less than that prescribed (e.g., by water quality objectives).

<sup>49</sup> See State Water Board Order No. WQ 2001-16, fn 83).

<sup>50</sup> Baseline water quality for the purposes of the antidegradation analysis is the best quality of water measured since 1968, considering the state antidegradation policy, or 1975, considering the federal antidegradation policy, unless a subsequent lowering of water quality was allowed consistent with state and federal antidegradation policies.

In addition, before any degradation of water quality is permitted, it must be shown that the discharge will be required to meet waste discharge requirements that result in best practicable treatment or control of the discharge necessary to assure that:

1. Pollution or nuisance will not occur;
2. The highest water quality consistent with maximum benefit to the people of the State is maintained.

### **13.3 APPLICABILITY TO THE RUSSIAN RIVER WATERSHED PATHOGEN INDICATOR TMDL ACTION PLAN AND WASTE DISCHARGE PROHIBITION**

The Action Plan is based in part on the principles contained in the state and federal antidegradation policies. High concentrations of fecal indicator bacteria in ambient waters infer the presence of human and animal fecal waste and associated disease-causing microorganisms that pose a risk to human health. The water quality of the Russian River does not support the recreational beneficial use.<sup>51</sup> The Action Plan is designed to improve water quality conditions and protect uses of water for recreational activities such as wading, swimming, fishing and rafting. ~~The Action Plan is expected to result in an increase in water quality and will maintain and protect beneficial uses.~~ The Action Plan is expected to result in an improvement in water quality compared to existing conditions and will promote attainment of water quality standards and protection of beneficial uses pursuant to the schedule established in the Action Plan. While not a specific component of an antidegradation analysis or required for compliance with state or federal antidegradation requirements, the Action Plan incorporates monitoring requirements to provide feedback on whether the actions that parties must implement are effective in improving water quality and avoiding further degradation. Both individual and comprehensive monitoring programs will help determine areas where site-specific management measures and further monitoring are necessary to achieve water quality goals.

It is important to note that the proposed Action Plan includes a prohibition of the discharge of fecal waste materials that cause or contribute to an exceedance of bacteria water quality objectives not authorized by action of the Regional or State Water Board. The Action Plan identifies a wide range of factors affecting the fate and transport of pathogens and the appropriate choice of compliance measures that will help attain water quality standards. The Action Plan also allows measures tailored to a particular site and includes iterative planning based on monitoring feedback (e.g., advanced protection management plan for OWTS, sanitary sewer management plans, etc.).

While the Action Plan directs the Regional Water Board staff to incorporate pathogen protection measures into its point source and nonpoint source permitting actions, it does not itself authorize or permit any activity that will discharge waste into high quality waters. An antidegradation analysis is appropriate at the time of permit development, with the proper findings made by the Regional Water Board prior to adoption, including findings

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that where any lowering of water quality is authorized that the discharges will ensure water quality objectives are not exceeded, are to the maximum benefit to the people of the state, and are subject to best practicable treatment and control methods.

The proposed Action Plan complies with antidegradation policies by ensuring the protection of contact recreation use, and by implementing a program to achieve bacteria source reduction and to reach attainment of water quality objectives if discharges are to occur. The waste load allocations and load allocations are set at a level that ~~would be~~ expected to improve conditions in the Russian River Watershed. Additionally, the prohibition of the discharge of fecal waste materials that cause or contribute to an exceedance of bacteria water quality objectives will help to ensure the attainment of standards. This amendment is consistent with the State Antidegradation Policy (State Water Board Resolution No. 68-16), and the federal Antidegradation Policy (40 CFR § 131.12), in that it does not allow degradation of water quality, but requires restoration of water quality and attainment of water quality standards.

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## CHAPTER 14

### PUBLIC PARTICIPATION SUMMARY

This chapter describes the opportunities for the public to participate in the development of the Russian River Watershed Pathogen TMDL and Program of Implementation.

#### 14.1 STAKEHOLDER AND PUBLIC OUTREACH

Regional Water Board staff has held numerous meetings to update and inform key stakeholders and the public throughout the Russian River Watershed TMDL assessment and Action Plan development process. The outreach meetings related to this project have included both public meetings and meetings targeted to small groups of individuals and local agency representatives who were identified by Regional Water Board staff as key stakeholders in the Russian River Watershed. A list of the stakeholder and public meetings that have been held regarding the Pathogen TMDL and Action Plan is presented in Table 14.1. Meetings before the Regional Water Board are identified in **bold**.

**Table 14.1 Stakeholder and Public Meetings for the Russian River Watershed Pathogen TMDL and Action Plan**

Subject	Date	Participants
<b>Update on Regulatory and TMDL Efforts</b>	<b>January 27, 2011</b>	<b>Regional Water Board meeting, all interested stakeholders</b>
<b>Early TMDL Implementation and Monitoring</b>	<b>November 3, 2011</b>	<b>Regional Water Board meeting, all interested stakeholders</b>
<b>Update on Russian River Watershed TMDL</b>	<b>August 23, 2012</b>	<b>Regional Water Board meeting, all interested stakeholders</b>
Monte Rio Community Forum	October 20, 2012	Public Meeting in Monte Rio
Public Outreach	May 28, 2013	Fitch Mountain Neighborhood Association Sonoma County Supervisor Mike McGuire
Implementation Plan Outreach	August 21, 2013	Sonoma County Community Development Agency
<b>Russian River Biological Opinion, Fish Habitat and Water Rights Project and Pathogen TMDL</b>	<b>August 22, 2013</b>	<b>Regional Water Board meeting, all interested stakeholders</b>
<b>Update on Russian River Watershed TMDL</b>	<b>March 13, 2014</b>	<b>Regional Water Board meeting, all interested stakeholders</b>
Implementation Brainstorming Session 1	May 20, 2014	Sonoma County Water Coalition Russian Riverkeepers Green Valley Watershed Committee
Implementation Brainstorming Session 2	June 5, 2014	Sonoma County Continuum of Care
Implementation Brainstorming Session 3	June 5, 2014	Sonoma County Water Agency Sonoma County Permit and Resource Management Department (PRMD) Sonoma County Community Development Agency Board Members Bill Massey and David Noren

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**Table 14.1 Stakeholder and Public Meetings for the Russian River Watershed Pathogen TMDL and Action Plan**

Subject	Date	Participants
Implementation Brainstorming Session 4	July 1, 2014	Sonoma County Water Agency Sonoma County PRMD City of Santa Rosa City of Sebastopol City of Cotati City of Rohnert Park Town of Windsor City of Ukiah Sonoma County Agricultural Commissioner
Implementation Brainstorming Session 5	July 3, 2014	Sonoma County Department of Health Services
Implementation Brainstorming Session 6	July 9, 2014	Sonoma Resource Conservation District Gold Ridge Resource Conservation District Mendocino Resource Conservation District Sonoma County Agricultural Commissioner
Implementation Plan Update	August 15, 2014	Summer Home Park Monte Rio Villa Grande Russian River Redevelopment Oversight Committee (Fitch Mountain) Sonoma County Supervisor Efren Carrillo Sonoma County Water Agency Sonoma County PRMD Board Members Bill Massey and David Noren
Implementation Plan Outreach	August 28, 2014	Public Meeting in Santa Rosa
Stakeholder Outreach Meeting	January 9, 2015	North Bay Association of Realtors in Santa Rosa
Russian River Watershed Pathogen TMDL Technical Group Meeting	January 30, 2015	Representatives from the Communities of: Guerneville Occidental Monte Rio Villa Grande Fitch Mountain Northwood Property Owners
Public Workshops on draft TMDL and Action Plan	September 22, 2015 September 23, 2015 September 24, 2015	Staff-led workshop, Lower River stakeholders Staff-led workshop, Upper River stakeholders Staff-led workshop, Middle River stakeholders
<b>Regional Water Board Information Item</b>	<b>November 19, 2015</b>	<b>Regional Water Board meeting, all interested stakeholders</b>
<b>Regional Water Board Information Item</b>	<b>August 11, 2016</b>	<b>Regional Water Board meeting, all interested stakeholders</b>
Fitch Mountain Community Meeting	November 19, 2016	Fitch Mountain Community
<b>Regional Water Board Public Workshop</b>	<b>December 15, 2016</b>	<b>Regional Water Board meeting, all interested stakeholders</b>



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**Table 14.1 Stakeholder and Public Meetings for the Russian River Watershed Pathogen TMDL and Action Plan**

Subject	Date	Participants
Program of Implementation Update for Lower Russian River OWTS Owners Group	January 20, 2017	Sonoma County PRMD, Sonoma County Supervisors Lynda Hopkins and James Gore, Regional Water Board Member David Noren, private individuals residing in lower Russian River area
Program of Implementation Update for LUAP Subcommittee	March 16, 2017	Sonoma County PRMD, Sonoma County LUAP subcommittee members
Program of Implementation Update for Lower Russian River OWTS Owners Group	May 20, 2017	Sonoma County PRMD, Sonoma County Supervisors Lynda Hopkins and James Gore, private individuals residing in lower Russian River area
Program of Implementation Update for Lower Russian River OWTS Owners Group	June 5, 2017	Sonoma County PRMD, Sonoma County Supervisor Lynda Hopkins, private individuals residing in lower Russian River area
Program of Implementation Update for Lower Russian River OWTS Owners Group	June 21, 2017	Sonoma County PRMD, Sonoma County Supervisor Lynda Hopkins, private individuals residing in lower Russian River area
Revisions to Program of Implementation	May 5, 2018	Lower Russian River stakeholders
Revisions to Sonoma County OWTS Manual and APMP Requirements	May 14, 2018	Sonoma County Supervisor Lynda Hopkins
<b>Executive Officer's Report article on status of TMDL project</b>	<b>July 11, 2018</b>	<b>Regional Water Board, all interested stakeholders</b>
Monte Rio Tour	July 17, 2018	Sonoma County Supervisor Lynda Hopkins, Sonoma County Water Agency, CAG Members
Sonoma County OWTS Manual and APMP Requirements	August 15, 2018	Sonoma County Supervisor Lynda Hopkins, Sonoma County Supervisor James Gore, Permit Sonoma, Regional Water Board Member David Noren
Sonoma County OWTS Manual Community Workshop (Monte Rio)	September 29, 2018	Permit Sonoma, Interested Public
Sonoma County OWTS Manual Community Workshop (Healdsburg)	October 10, 2018	Permit Sonoma, Interested Public
Sonoma County OWTS Manual Community Workshop (Santa Rosa)	October 11, 2018	Permit Sonoma, Interested Public
Sonoma County OWTS Manual Community Workshop (Guerneville)	October 17, 2018	Permit Sonoma, Interested Public
Sonoma County OWTS Manual and APMP Requirements	October 26, 2018	Sonoma County Supervisor Lynda Hopkins, Permit Sonoma
<b>Executive Officer's Report article on status of TMDL project</b>	<b>November 14, 2018</b>	<b>Regional Water Board, all interested stakeholders</b>

#### **14.1.1 COMMUNITY AND INTERAGENCY GROUPS**

Owners of OWTS within the boundaries of the APMP may be required to implement corrective actions when their OWTS are not in compliance with the minimum standards set forth in the TMDL Action Plan. In some cases, upgrades to individual OWTS to meet the APMP minimum standards may be infeasible or cost prohibitive. To foster community-based solutions to area-wide wastewater treatment and disposal challenges, Regional Water Board staff, in coordination the Sonoma County Water Agency, representatives of Sonoma County's 5th Supervisory District, Permit Sonoma, the Gold Ridge Resource Conservation District (RCD), and the Sonoma RCD formed an Interagency Committee to guide a pilot project that would explore community alternatives, public funding options for local projects, and to encourage community engagement for a community solution. This Interagency Committee meets quarterly, or more frequently as needed.

To facilitate community involvement, build consensus on potential solutions, and secure funding for the planning, development and implementation of sustainable solutions to address the failing septic systems located in disadvantaged Russian River communities, the Interagency Committee encouraged the formation of a Community Advisory Group (CAG). In January 2018, the Sonoma County Board of Supervisors provided notice of the need for the formation of a CAG and requested that members of the lower Russian River communities of Monte Rio, Northwood, Villa Grande, and Camp Meeker whom were interested in participating in the CAG submit a letter of interest. The Interagency Committee selected 12 applicants from an applicant pool of 23 applicants. The first monthly meeting of the CAG occurred in June 2018. The CAG is expected to continue in its advisory role for a term of approximately two years. Meetings of both the CAG and the Interagency Committee are listed in Table 14.2.

**Table 14.2 Interagency Committee and Community Advisory Group – Monte Rio and Villa Grande Wastewater Treatment Project Meetings**

<b>Subject</b>	<b>Date</b>	<b>Participants</b>
Interagency Committee Meeting	March 28, 2018	County of Sonoma, Sonoma RCD, Gold Ridge RCD, Rural California Assistance Corporation (RCAC)
Community Advisory Group Kick-off Meeting	June 5, 2018	CAG Members
Interagency Committee Meeting	July 12, 2018	County of Sonoma, Sonoma RCD, Gold Ridge RCD, RCAC
Community Advisory Group	July 23, 2018	CAG Members
Community Advisory Group	August 21, 2018	CAG Members
Community Advisory Group	September 18, 2018	CAG Members, Interested Public
Interagency Committee Meeting	October 9, 2018	County of Sonoma, Sonoma RCD, Gold Ridge RCD, RCAC
Interagency Committee Meeting	October 24, 2018	County of Sonoma, Sonoma RCD, Gold Ridge RCD
Community Advisory Group	October 25, 2018	CAG Members, Interested Public
Community Advisory Group	November 29, 2018	CAG Members
Interagency Committee Meeting	December 10, 2018	County of Sonoma, RCD, Gold Ridge RCD
Community Advisory Group	December 27, 2018	CAG Members, Interested Public

**Table 14.2 Interagency Committee and Community Advisory Group – Monte Rio and Villa Grande Wastewater Treatment Project Meetings**

Subject	Date	Participants
Interagency Committee Meeting	January 10, 2019	County of Sonoma
Community Advisory Group	January 24, 2019	CAG Members, Interested Public
Interagency Committee Meeting	February 14, 2019	County of Sonoma
Interagency Committee Meeting, Project Flow Chart Planning	February 21, 2019	County of Sonoma, CAG Subcommittee
Interagency Committee Meeting	March 14, 2019	County of Sonoma
Community Advisory Group	March 28, 2019	CAG Members, Interested Public
Interagency Committee Meeting	January 10, 2019	County of Sonoma, CAG Subcommittee
Community Advisory Group	April 25, 2019	CAG Members, Interested Public

### 14.1.2 CEQA SCOPING MEETING

The purpose of the California Environmental Quality Act (CEQA) Scoping Meeting was to solicit public comments to help staff assess the potential environmental scope of the environmental analysis. Holding a scoping meeting is a requirement of the CEQA. The CEQA scoping meeting for the Russian River Watershed TMDL was held on January 30, 2015, in Santa Rosa, CA. The comments received at the CEQA scoping meeting that concerned the scope of the environmental review are summarized in Chapter 11. These comments, and others, helped to shape the scope of the environmental review and specific aspects of the analysis.

### 14.1.3 RUSSIAN RIVER WATERSHED TMDL WEBPAGE

In addition to holding public meetings, Regional Water Board staff has maintained a webpage on the North Coast Regional Water Quality Control Board's website where the latest, up-to-date information on the Russian River TMDL development process can be found. The webpage also includes a map of the watershed, a description of the current Clean Water Act Section 303(d) listing, project documents, quality assurance plans, technical memoranda, and board presentations. The website also includes the public comment letters received on both the 2015 draft Staff Report and Action Plan and the 2017 draft Staff Report and Action Plan. The website can be accessed at:

[http://www.waterboards.ca.gov/northcoast/water\\_issues/programs/tmdls/russian\\_river/](http://www.waterboards.ca.gov/northcoast/water_issues/programs/tmdls/russian_river/)

## 14.2 PRESENTATIONS TO THE REGIONAL WATER BOARD

Periodically, Regional Water Board staff has presented updates and status reports to the Regional Water Board and interested members of the public on the Russian River Watershed Pathogen TMDL. The presentations were opportunities for the public and Board members to hear status updates and background information regarding progress and emerging issues related to the TMDL development process. At each of these meetings, the public also had the opportunity to give comment before the Board. All such comments

are part of the public record. Table 14.1 includes in **bold** a complete list of the presentations given to the Regional Water Board.

### 14.3 PRESENTATIONS TO COUNTY SUPERVISORS

In order to keep local agencies informed of the details of the Russian River Watershed TMDL, Regional Water Board staff met with County Supervisors from Sonoma County and Mendocino County. A list of these presentations is available in Table 14.23. Regional Water Board staff also met with Sonoma County supervisors, administration staff, legal counsel, and staff from the Sonoma County Community Development Commission to develop a Memorandum of Understanding (MOU) between the agencies that would establish the roles and responsibilities of the parties with respect to the parties' joint efforts to implement the Action Plan for the Russian River Watershed Pathogen TMDL. These coordination meetings occurred on March 17, 2016 and August 9, 2016. The MOU was signed by the Sonoma County Administrative Officer and the Regional Water Board Executive Officer and made final on December 13, 2016.

Table 14.3 Presentations to County Supervisors		
Subject	Date	Venue
Russian River TMDL	January 22, 2015	Sonoma County Board Supervisors Efren Carrillo and James Gore
Russian River TMDL	February 6, 2015	Sonoma County Board Supervisor Shirlee Zane
Russian River TMDL	February 9, 2015	Sonoma County Board Supervisor David Babbitt
Russian River TMDL	February 18, 2015	Sonoma County Board Supervisor Susan Gorin
Russian River TMDL	April 6, 2015	Sonoma County Board Supervisors Efren Carrillo and James Gore

### 14.4 PEER REVIEW

Prior to development of the Public Review Draft of the Russian River Watershed TMDL Staff Report, a peer- review draft report was reviewed by the following two professors as part of a formal state-mandated peer-review process:

- Dr. Nicholas J. Ashbolt, Alberta Innovates Translational Research Chair in Water, School of Public Health, at the University of Alberta, Canada;
- Dr. Patricia A. Holden, Professor of Bren School, Director of UCSB Natural Reserve System at the University of California, Santa Barbara

### 14.5 ~~AUGUST 2015~~ PUBLIC REVIEW ~~DRAFT~~DRAFTS

A draft Staff Report and the Action Plan were posted and available for public review and comment beginning on August 21, 2015 with the public review period closing on October 8,

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2015. Numerous, detailed comments were submitted requiring consideration and revision to the Program of Implementation. Revisions to the 2015 Staff Report were also required as a result of public comment, but the basic tenets of the technical analysis have remained the same. Due to the extent of public comments, the item scheduled for the November 19, 2015 Board Meeting was changed from an adoption hearing to an Information Item.

Staff have reviewed public comments received in 2015 and revised the Staff Report and Action Plan, accordingly. ~~The 2017A revised Draft Staff Report and Action Plan are out for public review until September 30, 2017, providing was prepared and made available in August 2017 for a 45-day public review period and accounting for holidays.~~ An adoption hearing ~~will~~was scheduled to be held before the Regional Water Board at its December 12-13, 2017 meeting, ~~after public comments have been appropriately considered but was postponed as a result of the wildfires in October 2017 and final~~ in order to accommodate changes to the statewide bacteria objectives. In January 2018, the State Water Board posted for public review statewide bacteria objectives to supersede Basin Plan bacteria objectives to protect REC-1. The adoption hearing was held in August 2018, at which time the State Water Board adopted statewide bacteria objectives. Regional Water Board staff postponed bringing the Russian River Pathogen TMDL and Action Plan to the Regional Water Board for adoption until the State Water Board acted on the statewide objective.

Following the August 2018 adoption of statewide bacteria objectives, staff made revisions to the draft Action Plan proposed TMDL staff report and Action Plan to account for the new statewide objectives. The statewide bacteria objective specified a six-week rolling method for calculating compliance with the geometric mean, which differed from the static calculation method used to assess data in the Russian River. Staff recompiled all of the ambient water quality data collected in the Russian River Watershed and conducted a reassessment to bring the conclusions of the TMDL up to date with respect to the new statewide objective.

Throughout the Basin Plan amendment process, there are opportunities for public participation and comment, including at the CEQA scoping meetings, Regional Water Board workshops, Regional Water Board adoption hearing, and the State Water Board approval process. Interested parties are advised to check the Regional Water Board website for announcements regarding Regional Water Board meetings, updates to the Russian River Watershed TMDL project, and to sign up for the Russian River TMDL lyrics list.

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## **CHAPTER 15**

### **NINE KEY ELEMENTS**

#### **15.1 OVERVIEW**

The California Nonpoint Source Grant Program allocates Clean Water Act section 319(h) funding from the U.S. EPA to support projects that implement watershed plans to address water quality problems in surface water and groundwater resulting from nonpoint source pollution. Before receiving 319 grants for projects, the project proponent/grantee must demonstrate that a watershed plan is in place and includes the U.S. EPA's nine key elements. The purpose of this chapter is to explicitly explain how the nine key elements are included in this TMDL and described in this Staff Report.

In California, wide ranges of plans are used to comply with the nine key elements, often in combination with each other. Examples of other plans include bacteria load reduction plans, erosion control plans, local watershed plans, coordinated resource management plans, comprehensive conservation and management plans, and Regional Water Quality Control Plans (Basin Plans). Applicants that need assistance may work with their Regional Water Boards to verify that the combination of plans has the nine elements. More information about the nine key elements can be found in U.S. EPA's "Handbook for Developing Watershed Plans to Restore and Protect Our Waters" (U.S. EPA 2008).

The following describes how the nine key elements are included in this TMDL Staff Report.

#### **ELEMENT 1: IDENTIFICATION OF CAUSES & SOURCES**

Element 1 includes the identification of causes of impairment and pollutant sources or groups of similar sources that need to be controlled to achieve needed load reductions, and any other goals identified in the watershed plan. Sources that need to be controlled should be identified geographically along with estimates of the extent to which they are present in the watershed.

Chapter 6 (Source Analysis) describes the geographic distribution of pathogenic indicator bacteria by type (i.e., human, grazer, and bird) and by land cover (i.e., forest, shrubland, agriculture, developed sewer, developed non-sewered) throughout the watershed. Chapter 6 also identifies individual nonpoint sources, including onsite wastewater treatment systems, recreation, runoff from homeless encampments, recycled water discharges from landscape irrigation, pet waste, livestock waste, and runoff from dairies and land application of manure.

#### **ELEMENT 2: LOAD REDUCTIONS EXPECTED FROM MANAGEMENT MEASURES**

An estimate of the load reductions expected from management measures. Estimates for loading reductions should be provided at the same level as that required in the scale and scope component in Element 1.

Chapter 7 (TMDL Calculations and Allocations) describes the point source waste load allocations and nonpoint source load allocations that will attain water quality standards. These allocations are expressed as concentrations of *E. coli* and enterococci bacteria in surface waters and in discharges. Chapter 7 also provides estimates of the reductions that will be needed to achieve the concentration-based load allocations at numerous locations in the watershed. These load reductions are expected to be attained upon the completion of the management measures, which are also known as implementation actions, described in Chapter 9.

### **ELEMENT 3: DESCRIPTION OF NONPOINT SOURCE MANAGEMENT MEASURES**

Element 3 includes the nonpoint source management measures that will need to be implemented to achieve the load reductions in Element 2, and a description of the critical areas in which those measures will be needed. to implement this plan. Management measures are groups or categories of cost-effective management practices that are implemented to achieve comprehensive goals.

Chapter 9 (Implementation) describes the nonpoint source management measures that satisfy Element 3. The management measures are better known as implementation actions. They are specific to each type of source of pathogenic indicator bacteria. Within the source category, the management measures/implementation actions are specific to individual facilities and/or areas which are critical for achieving the TMDL and water quality standards.

### **ELEMENT 4: TECHNICAL AND FINANCIAL ASSISTANCE NEEDED, COSTS, SOURCES OF FUNDING, AND IMPLEMENTATION AUTHORITY**

Element 4 includes an estimate of the amounts of technical and financial assistance needed, associated costs, and/or the sources and authorities that will be relied upon to implement the watershed plan. Available federal, state, local, and private funds and resources should be considered and shortfalls between needs and actuals should be identified.

Chapter 12 estimates the costs for implementing the management measures, for both point and nonpoint sources. Chapter 12 also identifies potential sources of funding from public and private sources. Chapter 1 describes the Regional Water Board's authority to require the implementation of management measures.

Technical assistance will be necessary for many responsible parties as they implement the required management measures. The amount will vary depending on their technical capability and knowledge. Some responsible parties will be able to fully implement on their own, while others will need assistance with funding, project design, permitting, implementation, monitoring, reporting, and maintenance. There are several entities throughout the watershed and across the state that can help provide technical assistance, including:

- Sonoma Resource Conservation District



- Gold Ridge Resource Conservation District
- Mendocino County Resource Conservation District
- University of California Cooperative Extension
- Sonoma County Permit and Resource Management Department
- Mendocino County Planning and Building Services
- Natural Resource Conservation Service's District Conservationists

## **ELEMENT 5: INFORMATION AND EDUCATION**

Element 5 includes an information and education component used to enhance public understanding of the project and encourage the public's early and continued participation in selecting, designing, and implementing the nonpoint source management measures that will be implemented.

Chapter 14 (Public Participation Summary) describes the meetings held and efforts made to update, inform, and solicit input from key stakeholders and the public throughout the TMDL development process, including the public review process. In addition, the Regional Water Board is collaborating with the Russian River Watershed Association to establish a Russian River Regional Monitoring Program through which substantial education and outreach will occur.

Information on individual implementation projects (e.g., grant-funded projects on an individual property) may require additional outreach and education to neighbors and the public. Such project-specific information should be included in a project-specific plan.  
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## **ELEMENT 6: SCHEDULE**

Element 6 includes a schedule for implementing the nonpoint source management measures that is are identified in the plan and are reasonably expeditious.

9 (Implementation) describes specific compliance dates for required management measures/implementation actions.

## **ELEMENT 7: INTERIM MEASUREABLE MILESTONES**

Element 7 includes interim measurable milestones for determining whether nonpoint source management measures or other control actions are being implemented.

Chapter 9 (Implementation) describes the steps necessary to fully implement appropriate controls for each of the sources areas of concern. Milestones are given as deadlines, deliverables, and concentration trends.

## **ELEMENT 8: BENCHMARKS FOR TRACKING PROGRESS**

Element 8 includes criteria or benchmarks that can be used to determine whether loading reductions are being achieved over time and substantial progress is being made toward attaining water quality standards. Interim benchmarks can be direct measurements (e.g., *E. coli* concentrations) or indirect indicators of load reductions (e.g., number of beach caution postings). This element also includes how plans will be revised if interim targets are not met.

Chapter 5 (Numeric Targets) and Chapter 8 (Linkage Analysis) describe the targets or benchmarks proposed to measure protection of beneficial uses and their linkage to the existing water quality objective. Chapter 10 (Watershed Monitoring) describes the procedures for attainment and non-attainment of the target concentrations/loading capacities.

## **ELEMENT 9: MONITORING**

Element 9 includes a monitoring component to evaluate the effectiveness of the implementation efforts over time, measured against the benchmarks established in Element 8. Watershed-scale monitoring can be used to measure the effects of multiple programs, projects, and trends over time. Instream monitoring does not have to be conducted for individual management practices unless that type of monitoring is relevant and appropriate.

Chapter 10 (Watershed Monitoring) describes requirements and responsible parties for monitoring, assessment, and adaptive management. It also provides an umbrella stewardship approach for cooperation and collaboration in regards to monitoring: the Russian River Regional Monitoring Program.

## **15.2 SUMMARY**

This TMDL Staff Report contains all of the nine key elements of a watershed plan that are needed to qualify for 319(h) nonpoint source grants. Additional, project-level detail may be required to supplement the broader management measures described in this Staff Report. Bacteria load reduction plans, erosion control plans, watershed plans, and other planning documents may be useful when identifying the nine key elements and requesting grants for funding.

## CHAPTER 16

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