

**RRWPC**  
**Russian River Watershed Protection Committee**

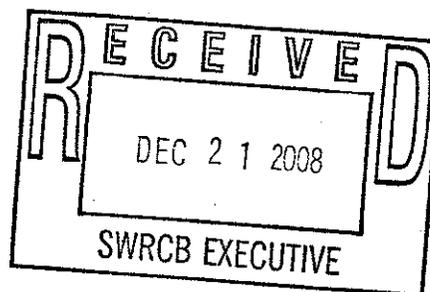
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December 22, 2008

Via Electronic Mail: [commentletters@waterboards.ca.gov](mailto:commentletters@waterboards.ca.gov)

Jeanine Townsend  
Clerk to the Board, Executive Office  
State Water Resources Control Board  
P.O. Box 100  
Sacramento, CA 95812-0100

**Re: State Water Recycling Policy**



Dear Ms. Townsend:

***About RRWPC...***

I am writing on behalf of Russian River Watershed Protection Committee (RRWPC), a California nonprofit corporation in existence since 1980. We represent property owners, tourists, recreationists, business people, and most others who love the Russian River, 80 miles north of San Francisco. We have about 1500 people on our mailing list, and have also experienced extensive support from numerous others who love and cherish our river and its ecosystem.

RRWPC has tracked wastewater and water quality issues in the lower Russian River and its tributaries for all those years. We have especially focused on Santa Rosa's wastewater system and its impact on the Laguna de Santa Rosa and Russian River since its huge illegal 800 million gallon spill of 1985. We have watched the Laguna de Santa Rosa degrade extensively over that period, even while the City greatly upgraded and improved their treatment and discharge systems.

We recognize that the degradation is not solely caused by Santa Rosa's wastewater, but most is caused by discharges in conjunction with upstream urban activities in (and runoff from) Santa Rosa, Rohnert Park, and Cotati. There are also dairies and some natural causes contributing to the problems.

Over the years, RRWPC played a significant role in the listing of the Laguna on the 303(d) list for its impairment by numerous pollutants including dissolved oxygen, nitrogen, phosphorus, temperature, sediments, and mercury. We are not scientists or lawyers, but rather persistent citizen advocates who have won extensive acknowledgment for our work and have joined forces at one time or another with most Sonoma County environmental groups concerned about water issues.

### ***Santa Rosa's interest in Recycled Water Policy...***

We have provided a significant amount of commentary to the Regional Board and discussed our concerns with them about this issue. We know that the City of Santa Rosa has been putting extensive pressure on the State to come up with a Basin Plan Amendment that allows for "incidental runoff".

Santa Rosa has been planning an urban recycled water project for about six years now and have stated numerous times that they won't offset potable water supplies without the Basin Plan "incidental runoff" provision. The City has paid State Lobbyist, Craig Johns, about \$1,000,000 over the last six years or so to help them to accomplish this goal. The proposed North Coast Basin Plan Amendment, which alters the Summer Discharge Prohibition by allowing "incidental runoff" is now out for public review. We will be commenting extensively on that as well.

The City has written a detailed plan for managing wastewater irrigation. There are many specific protections contained in it. But there are enormous limitations as well. For example, they will not institute significant penalties for repeat offenders or cut them off from the wastewater supply. We have heard some city water users brag that they use 70,000 gallons a month and they are willing to pay the price. To our knowledge, the City takes their money.

When push comes to shove, the City has been upfront about admitting that they know over-irrigation will occur, and they don't want to be subject to the possibility of citizen lawsuits because of it. This is an outright admission that they can't control the problem and they want to function with impunity since no one is going to file a lawsuit over a broken sprinkler head. In addition we are extremely skeptical that the promoted controls will be carefully monitored and that "accidents" will probably be a common occurrence. Regional Board staff will not have the time to carefully monitor and the "fox will be guarding the chicken house". (One City staffer admitted to me privately that the business park across from Santa Rosa's Utility Building over-irrigates all the time.)

We recommend that this reuse policy, should it move forward, require the establishment of an independent "water cop" monitoring program wherever "incidental runoff" is allowed and that severe penalties, including cut offs, be established for repeat offenders. This program can be self-supporting with graduating penalties, separate from water charges, imposed on water wasters. Most citizens didn't mind the program and even called in with "tips" about

people who were careless. We also recommend that generous set backs from creeks and streams of 200' be established to assure most runoff incidents won't make it to the surface water.

### ***Lack of Adequate "incidental runoff" Definition....***

One of our greatest concerns is the lack of adequate specificity in defining "incidental runoff". The refusal to state a specific amount in the definition, or the method of determining that amount is very problematic. The North Coast Board's proposed MS4 Permit suggests that 100 gallons is the point where a minor spill becomes a significant one and comes under different guidelines. Nowhere is such an amount suggested here. In light of people's propensity to carelessness, including wastewater managers themselves, we can't imagine how this policy is going to work in the real world.

This policy also makes no attempt to define the cumulative impacts of multiple runoff incidents. Who will make the determination as to whether a spill is truly incidental and what would prevent those responsible from miss-communicating the extent of the problem? I don't believe this program would work without an independent program of water "cops".

### ***Alternatives to Policy....***

RRWPC has major concerns about implementation of the Water Recycling Policy. We recognize the very hard times the State is experiencing in regards to adequate water supply and that this policy is an attempt to develop a standardized approach to address that concern. The policy clearly conveys the urgency with which the State views this need and we sympathize with those communities that are facing the greatest shortfalls. Nevertheless, we believe that the implementation of widespread reuse of wastewater, with what we believe are inadequate protections of all beneficial uses, is a grave mistake.

We appreciate that Regional Boards have been given the authority to impose more stringent requirements on local, site-specific projects. Nevertheless, we are concerned that the North Coast Regional Board lost about 50 staff people in the last few years and their budget has been cut to the bone. We seriously doubt that they can accomplish all the protections of beneficial uses that are promised in this Policy. We are also very concerned that this policy nurtures the idea, through the renaming of wastewater as recycled water, thereby conveying the impression that wastewater is entirely safe.

In 2007, Sonoma County water supplies were so low that the Sonoma County Water Agency called for stringent conservation efforts. They were particularly concerned about the irrigation issue and strongly pushed conventional conservation goals (i.e. water in early morning and late afternoon, do not waste water with over-irrigation, repair leaks, etc.). People began noticing who had the super green lawns. There was a call to use drought resistant landscaping. Water cops turned people in. Enormous savings occurred. The impetus of strict

conservation should be promoted as an everyday value and not something that only happens in an emergency.

Soon things went back to normal. On various occasions we have even seen irrigation puddles in front of the administration building of the wastewater treatment plant and in front of their Utilities Offices. We have pictures of extensive over-irrigation in front of the North Coast Regional Board. We discussed this situation and others extensively in our letter to the Board on September 1, 2008. We resubmit that letter here for the record and would like it responded to as part of these comments.

### ***Water Recycling Alternatives...***

We believe that there are other options and alternatives that can and should be more fully pursued before you allow "incidental runoff" and cause widespread wastewater irrigation use to be pursued with great vigor. We wonder why the State doesn't get a handle on agricultural water use, including over-use? We question why rural property owners don't have to pay for the use of the water and the restoration of habitat that should be partly their responsibility? Why doesn't the State regulate all water use, including groundwater, and stop the massive illegal appropriations that are said to occur? While it may seem as though the recycling of wastewater is a good idea when we know so little about its effects, how much wiser would we be to use what we have much more judiciously in the first place?

In our earlier comments we described one alternative that, to our knowledge, no one has ever proposed. Significant water savings can be realized by fixing leaky sewer pipes. RRWPC examined the flow records of eight wastewater dischargers in the Russian River and discovered that there is a wide disparity between summer and winter flows indicating a great deal of infiltration and inflow into treatment systems. We studied the data between 1995 and 2007 of these dischargers and discovered that an average of 1.5 billion gallons of rain water a year leaks into Santa Rosa's wastewater system alone, forcing them to treat and dispose of the wastewater at great monetary expense, great energy usage, as well as damage to the environment from known and unknown pollutants.

The smaller towns of Ukiah, Cloverdale, Healdsburg, Windsor, Forestville, and Russian River Area, lost about 7 billion gallons combined over the 12-year period. That comes to about 584 million gallons of water lost by small communities in our area every year. Combined with Santa Rosa, that accounts for a loss of about 2 billion gallons a year of potable water in the area from Ukiah to Guerneville, and represents 25% of the water rights increase sought for the last ten years by the Sonoma County Water Agency. How much water and energy could be saved Statewide if everyone maintained their sewage infrastructure, which they should do anyway? Changing focus this way makes sense from the perspective of water-savings, pollution-prevention, and energy.

We also note that the Policy alludes to leaky water pipe repair. Some of our local small communities lose as much as 15% a year. Has anyone done a study of potential savings that could be realized through an infrastructure repair program? Instead of promoting the reuse of wastewater that may contain numerous unregulated contaminants, it would be wiser to invest in maintenance of existing hardware. That would also save a lot of energy and would be a far more environmentally safe way to stretch our water supplies and avoid the possibility of contamination of our rivers and streams.

Our deep concern about the extensive reuse of wastewater in an urban environment evolves from the burgeoning amounts of information coming forward that indicate widespread species' impairment and even extirpation resulting from unregulated toxins, some of which are known, but many that are not. While there are upwards of 80,000 chemicals available in the market place, and grow in numbers every day, our regulatory process can't keep up. Only 126 toxins are currently regulated in a meaningful way. We have no idea what problems many of these unregulated substances create, at what amounts, or how they bio-accumulate and interact with one another.

### ***Recent Articles & Studies on Species Loss & Endocrine Disruption:***

- Aug. 3, 2008: Three important scientists stated: *"There is growing recognition that the diversity of life on earth, including the variety of genes, species and ecosystems, is an irreplaceable natural heritage crucial to human well-being and sustainable development. There is also clear scientific evidence that we are on the verge of a major biodiversity crisis. Virtually all aspects of biodiversity are in steep decline and a large number of populations and species are likely to become extinct this century."*

*And further, "Scientists estimate that 12% of all birds, 23% of mammals, 24% of conifers, 33% of amphibians and more than half of all palm trees are threatened with imminent extinction. Climate change alone could lead to the further extinction of between 15% and 37% of all species by the end of the century." Finally they say, "Everywhere we look, we are losing the fabric of life, it's a major crisis."*

(G. Mace of UK Institute of Zoology, Robert Watson from the World Bank, and Peter Raven of the Missouri Botanical Garden state, in the publication, "Nature"),

How does this policy protect threatened and endangered species in light of unknown and unregulated chemicals in the wastewater?

- Winter, 2008 issue of "The Drift", put out by Californians for Alternative to Toxics (page 4): *"Seven decades of using pesticides to grow food has*

devastated populations worldwide of our traditional agricultural helpers, birds, bees, frogs, and bats. Although toxic chemicals have been implicated as a root cause in their slide towards oblivion, the chemicals continue to be pumped into the environment." Incidental runoff may cause the unintended consequence of allowing lawn chemicals to run off into waterways. What was considered in this regard during the formulation of the Policy? Why not prohibit wastewater irrigation on land that has been treated with pesticides? Also how would chemicals in reused wastewater and chemical applications on lawns interact with one another?

- August 3, 2008: "National Survey Reveals Biodiversity Crisis - Scientific Experts Believe We Are in Midst of Fastest Mass Extinction in Earth's History": "The American Museum of Natural History and Louis Harris and Associates, Inc., in conjunction with the opening of the Museum's new Hall of Biodiversity, developed a nationwide survey titled Biodiversity in the Next Millennium."

Highlights: "Seven out of ten biologists believe that we are in the midst of a mass extinction of living things, and that this dramatic loss of species poses a major threat to human existence in the next century." "This mass extinction is the fastest in Earth's 4.5 billion-year history and, unlike prior extinctions, is mainly the result of human activity and not of natural phenomena." "Scientists rate biodiversity loss as a more serious environmental problem than the depletion of the ozone layer, global warming, or pollution and contamination." (emphasis added) Also, one result will be, "Destruction of the natural systems that purify the world's air and water." How might irrigated lands be affected by global warming? Would any chemical changes take place that could impact affected species?

- December, 2008: Chemtrust: "Effects of Pollutants on the Reproductive Health of Male Vertebrate Wildlife: Males Under Threat" (page 4), "Many wildlife species are now reported to be affected by pollutants, and similarities can be seen in the effects recorded. The target sites, which are the focus of this review, include male developmental pathways. It is clear that structural intersex features, including effects on the male reproductive tract, result from exposure before birth. On the other hand, abnormal secretion of the egg yolk precursor protein, VTG, in male fish, birds, and reptiles, can result from later adult-life exposure to feminizing pollutants. VTG is normally produced in females, and when found in males in elevated concentrations it confirms the presence of sex hormone disrupting contaminants in the environment, and indicates feminisation of the male. Reduced reproduction has also been included, although it may result from female or male reproductive impairment, or from lack of viability of the offspring." Would the State be willing to test for signs of feminization in areas where wastewater is applied? Could the policy be suspended in areas testing positive for endocrine disruption?

- March, 2008: AP Study on drugs in water supplies: (AP story by Jeff Donn, Martha Mendoza, and Justin Pritchard): *"A vast array of pharmaceuticals – including antibiotics, anti-convulsants, mood stabilizers and sex hormones – have been found in the drinking water supplies of at least 41 million Americans, an associate Press investigation shows."* During a five-month inquiry, AP researchers found that drugs were detected in the water supplies of 24 major metropolitan areas.

In response to the question of how drugs get in the water, the article states, *"(it)...is flushed down the toilet. The wastewater is treated before it is discharged into reservoirs, rivers, or lakes. Then, some of the water is cleansed again at drinking water treatment plants and piped to consumers. But most treatments do not remove all drug residue."* It seems as though it would be valuable to test any wastewater to be irrigated for endocrine disruptors and not allow any irrigation with waters testing positive. Would the State be willing to make that part of this policy?

The study found that many water systems do not test for pharmaceuticals; but only a few that tested had negative results. Pharmaceuticals were also found in ground water. *"Some drugs, including widely used cholesterol fighters, tranquilizers and anti-epileptic medications, resist modern drinking water and wastewater treatment processes. Plus, the EPA says there are no sewage treatment systems specifically engineered to remove pharmaceuticals."* At a conference last summer the director of environmental technology for Merck & Co. Inc., Mary Buzby stated, *"There's no doubt about it, pharmaceuticals are being detected in the environment and there is genuine concern that these compounds, in the small concentrations that they're at, could be causing impacts to human health or to aquatic organisms."* (This is particularly meaningful coming from a drug company representative.)

- Feb. 17, 2008: LA Times: "Study finds human medicines altering marine biology", by Kenneth R. Weiss: *"Sewage treatment plants in Southern California are failing to remove hormones and hormone-altering chemicals from water that gets flushed into the coastal ocean waters, according to the results of a study released Saturday."* *"(The Study) confirms the findings of smaller pilot studies from 2005 that discovered male fish in the ocean were developing female characteristics, and broadened the scope of the earlier studies by looking at an array of man-made contaminants in widespread tests of seawater, seafloor sediment and hundreds of fish caught off Los Angeles, Orange and San Diego counties. The results, outlined by a Southern California toxicologist at a conference in Boston, reveal that a veritable drugstore of pharmaceuticals and beauty products, flame retardants and plastic additives are ending up in the ocean and appear to be working their way up the marine food chain."* And scientists add, *"Dilution is not the solution for some of these newer compounds, said Steven Bay, a toxicologist..."* The big issue is whether endocrine disruptors

are ending up in the sediments and being reintroduced into the water column and whether these pollutants are situated in the estuary and ocean as well.

- July 10, 2007: "Down the Drain: Sources of Hormone-Disrupting Chemicals in San Francisco Bay" Environmental Working Group: "95% of wastewater samples show widespread use of chemicals" *"Advances in technology allow an unprecedented look at chemical contaminants in water bodies throughout the United States. In 2002, the first nationwide study of man-made chemicals and hormones in 139 streams revealed that 80% of streams tested were contaminated. (Kolpin 2002) Several of the chemicals examined are known or suspected of disrupting the hormone systems of animals and people. Of these, only a small fraction have been regulated at all, much less tested for toxicity, persistence in the environment, or other harmful characteristics, such as hormone disruption. Some of the same unregulated, widely-used, hormone-disrupting chemicals have been detected at trace levels in the San Francisco Bay (Oros 2002)" .....*

*"Damage to the reproductive health of vulnerable fish populations may result in detrimental consequences to local fisheries and aquatic ecosystems; in addition, there is concern that people could become further exposed to hormone-disrupting chemicals by eating contaminated fish (Houghton 2007)" "Analysis of 19 wastewater samples for 3 hormone-disrupting substances reveals widespread contamination."*

- Dec. 16, 2008: "Ocean Scientists Urge New Administration and Congress for "Bailout" of Ocean Ecosystems and Economies", (from website: Oceana.org): Summary of main concerns by scientists about ocean conditions included over-fishing, climate change, nutrient and other pollution and synergistic effects. *"Efforts to reduce nutrient pollution in the United States have been only modestly successful, not only because of inadequate controls on emissions but also because degraded ecosystems resist recovery....Although scientists have observed progress in reducing toxic pollution, contaminants from human activities are distributed and persist over wide areas of the ocean, often resulting in subtle but significant effects on marine animals, even in remote polar regions."*
- Dec. 7, 2008: The most shocking to humans and perhaps the most attention getting; "It's Official: Men Really Are the Weaker Sex" by Geoffrey Lean (based on CHEMTrust report by Gwynne Lyons: "EFFECTS OF POLLUTANTS ON THE REPRODUCTIVE HEALTH OF MALE VERTEBRATE WILDLIFE" The Independent (London, U.K.) The article quotes the author as saying, *"Males of species from each of the main classes of vertebrate animals (including bony fish, amphibians, reptiles, birds and mammals) have been affected by chemicals in the environment...."*

*Feminization of the males of numerous vertebrate species is now a widespread occurrence. All vertebrates have similar sex hormone receptors, which have been conserved in evolution. Therefore, observations in one species may serve to highlight pollution issues of concern for other vertebrates, including humans....*

*Fish, it says are particularly affected by pollutants as they are immersed in them when they swim in contaminated water, taking them in not just in their food but through their gills and skin. They were among the first to show widespread gender-bending effects. Half the male fish in British lowland rivers have been found to be developing eggs in their testes....more than three quarters of sewage works have been found also to be discharging demasculinising man-made chemicals." (Note: Europe is way ahead of the USA in testing for these emerging contaminants. In the US, most sewage treatment plants really don't want to know.)*

*And more alarming...."And a study at Rotterdam's Erasmus University showed that boys whose mothers had been exposed to PCBs grew up wanting to play with dolls and tea sets rather than with traditionally male toys."*

- For those who think that tiny amounts won't cause harm....

May 22, 2007: "Estrogen threatens minnow manhood by Marin Mittelstaedt, "Environmental Reporter" It states, "Exposing fish to tiny doses of the active ingredient in the pill (synthetic estrogen), amounts little more than a whiff of estrogen, started turning male fish into females. Instead of sperm, they started developing eggs. Instead of looking like males, they became indistinguishable from females. Within a year of exposure, the minnow population began to crash. Within a few years, the fish, which at one time teemed in the lake, had practically vanished." The amount of estrogen used was the same amount found in sewage treatment plants in Canada.

- Finally, Nov. 21, 2008: "SOS: California's Native Fish Crisis, Prepared by Cal Trout and based on report by Dr. Peter B. Moyle, Dr. Joshua A. Israel, and Sabra E. Purdy. The introduction states: "As detailed in the pages that follow, what's been suspected for years we now know for certain—California's native salmon, steelhead and trout are in unprecedented decline and teetering towards the brink of extinction. The collision of climate change with decades of water mismanagement have brought us to where we are today...If present trends continue, 65% of our native salmonid species will be extinct within 50-100 years, with some species—such as coho, chum, pink salmon and summer steelhead—disappearing much sooner." We include the pages describing the status of the three listed salmonid species listed for the Russian River: California Coast Coho Salmon and Chinook Salmon and Steelhead.

One of the solutions provided in this Policy to address the issue of emerging contaminants is to establish an ADVISORY scientific panel. We have had too many experiences with scientists who sell themselves to the establishment willing to provide whatever conclusions the politicians want. If you let a true

scientist select the panel; someone who has been working in the field for a very long time and has a spotless reputation (like Lou Guillette), perhaps then it might be a partial and temporary solution. But actually things are degrading so fast, we don't have enough time to wait for new regulations to cure this dire problem. At the very least, we need to not make the problem worse, which this policy is very likely to do. (Sorry to be so harsh, but that's my opinion based on all the information I've received in the last several years. Time is running out!) It would be far more valuable to focus on conservation and infrastructure repair.

### ***Title 22 and Section 7 Consultation (low flows)...***

In general, we are very concerned about the reliance on Title 22 for asserting that water quality objectives will be met. There appears to be an underlying assumption that "incidental runoff" will not end up in our rivers and streams although no set back limits are required and few means of assurance are defined. In fact, it is totally unclear what amount of runoff is under consideration here. Under most circumstances, we find Title 22 very limited for meeting human health needs and totally inadequate for addressing wildlife and aquatic life concerns. It focuses mostly on acute diseases and does little for the rest.

There seems to be a logical disconnect between allowing "incidental runoff" and guaranteeing that runoff won't end up in surface water. We totally support Howard Wiltshire's comments in this regard. We fail to see how this policy is protective (other than through assertion) of all beneficial uses, when in fact, the waterways in proximity to the areas of use are already extremely degraded and are likely to become more so. This policy simply does not demonstrate how those uses will be protected.

If it is assumed that there will be no wastewater discharge (recycled water IS wastewater, not potable water), then it becomes irrelevant to talk about stream flow, but we believe that would be a grave omission. One important issue for the Russian River is the Section 7 Consultation under the Endangered Species Act between the National Marine Fisheries Service and Sonoma County Water Agency and Army Corps of Engineers. A Biological Opinion was recently released and it calls for significant flow changes under Decision 1610, which will come before the State Board sometime in the next two years. The Opinion calls for a permanent lowering of summer Russian River flows of at least a third at the Hacienda Bridge in the lower river (Other flow changes will be proposed as well, but this is the one that has the greatest impact on downstream uses.)

The goal of NMFS is to permanently close the mouth of the river in summer so as to improve breeding habitat in the estuary. We are concerned that the estuary may or has become a sink for all kinds of upstream pollution and will create unanticipated problems for not only fish, but also birds, marine mammals and other species. (The recently released BO can be found at the Sonoma County

Water Agency's website.) Already dissolved oxygen and nutrient problems have been noted on the estuary bottom.

So we wonder how possible cumulative "incidental runoff" incidents would fare in streams that have minimal flows? If you add this to the prospect of global warming, it appears we can have a serious problem, even if the "accidents" are small in scale. Many of the studies noted above mentioned that with endocrine disruptors, it doesn't take much to cause toxicity and the conventional wisdom that the "dose makes the poison" does not apply here. Furthermore, as Howard states, "*Little is known of the complex processes of transport and fate of most pollutants in treated wastewater.*" I would add that even less is known about what pollutants are picked up by the runoff on its way to wherever it goes.

But wait, this is not all. The Sonoma County Water Agency recently (in the last two weeks) released their 3000 page EIR for their long-range water supply project (also available at their website). We have not had the time to examine it yet, but we ask that whoever responds to these comments examine the interrelationship between this new policy, the Biological Opinion, and the new Water Supply EIR. We are looking at numerous major policy and/or management changes for the Russian River and NO ONE is looking at how they all interact with one another.

### ***Anti-degradation Policy....***

Howard Wiltshire clearly pointed out the weaknesses of the Anti-Degradation portions of this policy, which we strongly support. I recently received a copy of the Environmental Law Foundations over 40 pages of comments on the proposed Revision of the State's Antidegradation Implementation Guidelines dated Dec. 17, 2008, and written on behalf of 25 environmental and other groups. The commentary challenges the decision process of Regional Boards on "best professional judgment" in the absence of standards. It questions the absence of objective standards on which to base decision-making. Such limitations have serious implications for the basic assumptions in the proposed Recycled Water Policy.

It also comments on the fact that "The Guidance Improperly Ignores Cumulative Impacts", a concern we have already raised. Another section deals with, "The Guidance Improperly Allows for a Sliding Water Quality Baseline". In fact, the Laguna de Santa Rosa and its tributaries are one of the most impaired water bodies in the North Coast and subject to all kinds of nutrient and other pollution, partially a result of irrigation practices in the Rohnert Park area. There has been no attempt to control runoff in that area, even while the invasive specie *Ludwegia* is totally blocking the stream channel. Attempts to remove and control the invasive were partially successful for a brief time. When the removal project ran out of funds (after about \$2 million was spent), the problem came back full force and perhaps worse than what it had been before. (see pictures)

There is really nothing in the proposed Policy that assures that things won't get worse under this policy. The Antidegradation Policy is supposed to improve clean water, not provide language that actually allows for exacerbation of the problem. We also wonder how this Policy will interface with the new General Permit, final version not yet released. The Regional Board is now looking at the General Permit, the MS4 Permit that includes non storm water discharges, and the Basin Plan Amendment for "Low Threat" discharges that also includes "incidental runoff". It is very unclear how these documents will all relate to one another and also the other documents recently released by SCWA.

We have not had a great deal of time to study the Environmental Law Foundation's comments on the Antidegradation Policy, but we hope that you will address all the issues raised there in reference to the proposed Recycled Water Policy. We ask that more time be allowed for everyone to look at all these documents synergistically, so we actually move towards solving our complex water needs, instead of setting future generations up for disaster. We are so concerned that the people writing these policies are sitting in a cubicle somewhere completely out of touch with actual natural processes.

RRWPC strongly supports the comments of Linda Sheehan in her letters of March 27, 2007, Oct. 26, 2007, and June 26, 2008 (on "Statewide General Permit for Landscape Irrigation Uses of Recycled Water"). We also will quote from and include here, the Dec. 17, 2008 letter by the Environmental Law Foundation on the States revision of the "Anti-degradation Implementation Guidelines". Finally, we are in complete agreement with the comments of all of the above and also Howard Wiltshire for PEER and Jane Nielson for SWIG. All of these contributions are brilliant and go far beyond our expertise in identifying the problem of reusing wastewater from a legal and scientific perspective. We urge your Board to thoroughly respond to all contributions.

RRWPC will try to include all attachments with this letter. We will also send you a hard copy of the letter and will include any attachments we could not include electronically.

Sincerely,

Brenda Adelman: Chair

Russian River Watershed Protection Committee

CC: Cat Kuhlman: North Coast Regional Board

PS: I appreciate that the Policy includes a separate section on nutrient/salt policy. In truth, I share Howard Wiltshire's concerns about its adequacy. I have included the Final Report on the Ludwigia Control Project which includes pictures taken after project completion. I have also included a picture of the regrowth this year taken from the same location as the pictures in the Report. As you can see, it's as though the project did not even occur.



# ENVIRONMENTAL LAW FOUNDATION

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December 17, 2008

*Via Electronic Mail:* [commentletters@waterboards.ca.gov](mailto:commentletters@waterboards.ca.gov)

Jeanine Townsend  
Clerk to the Board  
State Water Resources Control Board  
1001 I Street, 24<sup>th</sup> Floor  
Sacramento, CA 95814

**Re: Revision of the State's Antidegradation Implementation Guidelines**

Dear Ms. Townsend:

On behalf of the Environmental Law Foundation, American Rivers, Butte Environmental Council, California Sportfishing Protection Alliance, California Trout, Center for Biological Diversity, Clean Water Now!, Coast Action Group, Community Water Center, Environmental Defense Center, Environmental Justice Coalition for Water, Friends of the River, Humbolt BayKeeper, Klamath Riverkeeper, Orange County Coastkeeper, Pacific Coast Federation of Fishermen's Associations and the Institute for Fisheries Resources, Russian Riverkeeper, San Diego Coastkeeper, San Francisco Baykeeper, San Luis Obispo Coastkeeper, Santa Barbara Channelkeeper, Santa Monica Baykeeper, Surfrider Foundation, and Monterey Coastkeeper, the undersigned wish to make the following comments with respect to the State Water Resources Control Board's ("State Board" or "Board") review of the state's anti-degradation policy and its implementation, and our July 17, 2007 petition to the board regarding the same ("petition"), attached hereto as Exhibit A. We appreciate your consideration of the petition, for fostering dialogue on this important issue, and for the opportunity to comment on this matter.

As discussed in detail in the petition, it is necessary for the Board to revise the implementation procedures for the state's anti-degradation policy in order to effectuate the spirit and letter of that policy, which at its core requires that water quality be maintained. Resolution 68-16 (Statement of Policy with Respect to Maintaining High Quality of Waters in California), which announced the state's anti-degradation policy, need not be altered. However, the current guidance for implementation of that policy is vague and unenforceable. Thus, implementation of that policy has been inconsistent and flawed, allowing polluters to skirt the anti-degradation mandate, and resulting in the degradation of the waters of the state.

The state's guidance for implementation of the anti-degradation policy is flawed in numerous, important ways. The state guidance improperly funnels implementation through a process

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Re: Implementation of California's Antidegradation Policy

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which is discretionary and devoid of enforceable standards, ignores cumulative impacts, and improperly injects the concept of "significant degradation" into the anti-degradation policy. The guidance also allows for a sliding, improper water quality baseline, and improperly authorizes reliance on California Environmental Quality Act documents that are inadequate for purposes of implementing the state's anti-degradation policy. Moreover, the guidance fails to address implementation of the anti-degradation policy with regard to general permits, and with regard to effluent dominated and ephemeral/intermittent streams.

As illustrated by the examples presented in the petition of regional boards' failure to properly implement the anti-degradation policy, the state's lack of enforceable, administerable guidelines has resulted in inconsistent and flawed application of the anti-degradation policy, or no application of the policy, which has resulted in degradation of the state's water quality. Accordingly, we hereby reiterate our request that the State Board take action to remedy the state's failure to properly implement its anti-degradation policy.

#### *Application of Anti-Degradation Policy to Groundwater*

While the petition does not specifically highlight groundwater or the application of the anti-degradation policy to groundwater, it is the intent of the undersigned that the petition applies with equal force to groundwater as to surface water. It is clear that increased guidance on regulation of discharges into groundwater is necessary. Groundwater is an extremely important resource for the state of California. In addition, pollution of groundwater raises complex and unique issues,<sup>1</sup> and treatment and remediation of groundwater can be costly. However, though the California anti-degradation policy clearly applies to groundwater, guidance for the protection of groundwater, particularly with respect to the anti-degradation policy, is scant, and there has been essentially no enforcement of the policy with respect to groundwater discharges. This absence of meaningful implementation of the policy with respect to groundwater is in violation of the law.

As a result of this failure to implement and enforce the policy, many activities that affect groundwater quality, such as groundwater extraction and discharge of pollutants into groundwater, evade meaningful environmental review and enforcement. Thus, our groundwater is becoming degraded at an alarming rate, with disastrous consequences for California residents. Consistent, enforceable guidelines for the application of the anti-degradation policy to groundwater are, therefore, essential. Such guidelines would not only help to preserve this important resource for use by Californians, but would also help to alleviate the much-lamented costs of remediating already polluted groundwater resources,<sup>2</sup> and the harm to communities and natural resources that result from groundwater degradation.

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<sup>1</sup> For example, as discussed during the November 17, 2008 scoping workshop ("scoping workshop"), groundwater, as opposed to surface water, does not benefit from initial dilution of pollutants or a mixing zone. Rather, groundwater pollution tends to travel as a plume for long distances, and for some contaminants, such as nitrates, there is no attenuation in groundwater.

<sup>2</sup> During the scoping workshop, it was argued that the Board should use caution with regulating groundwater pollution because of the potentially high cost of groundwater remediation. This argument only serves to emphasize

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### *Anti-Degradation and Cost/Benefit Analysis*

The Board should clarify the quantification of baseline water quality. While many highly complex methods may exist or be developed for determining whether a proposed use would degrade water quality, we echo the recommendations of the Environmental Protection Agency during the scoping workshop in urging the Board to define these concepts in terms of reduction of a water body's assimilative capacity.

We also encourage the State Board to make clear that compliance with the anti-degradation policy requires that the regional boards, in deciding whether a particular activity should be permitted under the anti-degradation policy, engage in a specific, well-defined anti-degradation analysis in order to determine whether any degradation will occur as a result of the proposed activity, and what the true costs and benefits of that activity will be. The purpose of the anti-degradation policy is to have a uniform process for performing anti-degradation analysis that allows the regional water boards to make decisions about potentially degrading activity in a fully informed and transparent manner. The regional boards should consider the true costs and benefits of any potentially degrading activity in a transparent manner, supported by evidence-based findings. In addition, in performing any cost/benefit analysis, the regional boards should determine whether the benefits to the people of California of a particular activity outweigh the true costs of that activity, including costs that are frequently externalized, such as the costs of mitigation and remediation, and the costs to impacted communities and ecosystems, if degradation is allowed to occur. In other words, the cost/benefit analysis of allowing degradation to occur should include a calculation to quantify *all* of the impacts of allowing a particular discharge to occur. Failure to engage in this analysis, make appropriate findings, or support any findings with evidence constitutes noncompliance with the policy.

In addition, where degradation is allowed to occur, those who engage in the degrading activity could be responsible for paying the costs of mitigation and remediation. By conducting a full anti-degradation analysis for each discharge permit, the State Board would be able to integrate a mitigation and remediation fee into the permit requirements for any activities that result in degradation of water quality. This would mean that dischargers seeking permission to degrade state waters could accurately gauge the costs of the proposed activity and that the public would not pay the price for such pollution. Such analysis would also assist the regional boards in complying with the spirit of the anti-degradation policy, which is to prevent degradation from occurring.

### *Water Recycling Programs*

The issue of water recycling programs was raised during the scoping workshop. Several speakers warned against the impact of anti-degradation implementation on water recycling programs. As water is a precious and sometimes scarce resource in this state, we fully support the development and implementation of water recycling programs. However, such programs

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the importance of consistent, strong regulation of pollution before entering groundwater. If the Board implements regulations which prevent damage to groundwater resources, funds need not be spent to erase that damage.

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should not be used as a means to evade mandated environmental review, and we urge the Board to simply apply the same standards to water recycling programs as to any other potential source of discharge.

*Consideration of Other States' Anti-Degradation Implementation Guidelines*

While the protection of water quality in California presents unique challenges and opportunities, we encourage you to examine the effective anti-degradation policies and implementation procedures of other states. As discussed in the petition, other states have created consistent, enforceable implementation guidelines.<sup>3</sup> California is a state of tremendous resources and ingenuity, and we should implement the Clean Water Act's anti-degradation mandate legally and effectively in part by learning from the methods other states have successfully employed. We urge the Board to consider other states' guidelines, such as those of Arizona, New Mexico and Ohio, in revising the anti-degradation implementation guidelines for this state.<sup>4</sup>

The petition provides the Board with general procedures for the state's anti-degradation implementation policy. The undersigned urge adoption of the suggested procedures. In addition, we recommend that the implementation guidance be adopted as regulations, in order to guarantee that the implementation procedures are enforceable, are implemented consistently, and are not interpreted as merely "advisory." The undersigned also recommend that the Board consider performing routine audits of the regional boards' implementation of 68-16 and any revised implementation guidance, so as to guarantee consistent implementation across the state.

Thank you very much for your time and consideration of this important matter.

Sincerely,



Erin Ganahl  
Environmental Law Foundation  
1736 Franklin St, 9<sup>th</sup> Floor  
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*on behalf of*

<sup>3</sup> For example, Arizona's implementation guidelines require full anti-degradation analysis for general permits where degradation has been caused by permit non-compliance, and mandate that the permitting authority consider cumulative impacts in determining whether a proposed action will impact water quality.

<sup>4</sup> See River Network's Antidegradation Online Report Database, which documents various states' anti-degradation policies and implementation guidelines, at: <http://rivernetwork.org/rn/antidegradation>.

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**EXHIBIT A**



# ENVIRONMENTAL LAW FOUNDATION

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July 17, 2007

*Via Hand Delivery*

Chairwoman Tam Doduc and Fellow Board Members  
State Water Resources Control Board  
1001 I Street  
Sacramento, CA 95814

**Re: Implementation of the State's Antidegradation Policy**

Dear Chairwoman Doduc and fellow Board Members:

On behalf of the Environmental Law Foundation, American Rivers, Butte Environmental Council, California Sportfishing Protection Alliance, California Trout, Center for Biological Diversity, Clean Water Now!, Coast Action Group, Community Water Center, Environmental Defense Center, Environmental Justice Coalition for Water, Friends of the River, Humbolt BayKeeper, Klamath Riverkeeper, Orange County Coastkeeper, Pacific Coast Federation of Fishermen's Associations and the Institute for Fisheries Resources, Russian Riverkeeper, San Diego Coastkeeper, San Francisco Baykeeper, San Luis Obispo Coastkeeper, Santa Barbara Channelkeeper, Santa Monica Baykeeper, and Surfrider Foundation, the undersigned hereby petition the State Water Resources Control Board ("State Board" or "Board"), pursuant to California Government Code Section 11340.6 and Water Code Section 13143, to revise and formalize the procedures needed to faithfully implement the state's antidegradation policy, which at its core requires that water quality be maintained. Such revisions are necessary because the existing procedures, which are presently contained in several informal guidance documents, are inconsistent with that policy. Moreover, the State Board must formalize those procedures given widespread failure by the regional boards statewide to properly follow the existing guidance. Such problems with the present guidance have not only led to a failure to improve water quality throughout the state, they have caused water quality to deteriorate. Accordingly, the undersigned hereby request that the State Board take action to remedy the state's failure to properly implement its antidegradation policy.

**A. *Water Quality in California Has Deteriorated***

Despite the initial successes in cleaning up California's waters in the early years of the Clean Water and Porter-Cologne Acts, water quality in California has deteriorated. For instance, between 1996 and 2002, the most recent years wherein the state's methodology for completing Section 305(b) reports assessing the state of California's waters was the same, the proportion of assessed water bodies that fully support all assessed uses has progressively decreased while the proportion of water bodies with at least one threatened use, or that are impaired for at least one

use, has progressively increased. (See California 305(b) Reports on Water Quality, 1996-2002.) The same pattern appears across individual uses such as aquatic life support, swimming, and drinking water supply. For these uses, as well as others, the proportion of assessed waters fully supporting these uses has shifted in favor of those waters where such uses are threatened, only partially supported, or not supported at all. Not surprisingly, the state's 303(d) list that lists the state's impaired water bodies grew 49% between 1996 and 2002.

Other indicators of water quality also show a general decrease in water quality statewide. For instance, between 1998 and 2002 the areal extent of fish advisories by the Office of Environmental Health Hazard Assessment increased both in lakes and rivers. (See California 305(b) Reports on Water Quality, 1998-2002.) Likewise, between 1998 and 2005, the number of drinking water standard violations reported by the Department of Health Services normalized by annual rainfall has increased over time. (See Division of Drinking Water and Environmental Management, CA Dept. of Health Services, Public Water Systems Violations Reports & Annual Compliance Report for Public Water Systems, 1998-2005, at <http://www.dhs.ca.gov/ps/ddwem/publications/default.htm>.)

The degradation, moreover, is not only limited to surface water. Groundwater too has been degraded over time. For instance, a 1998 report by the USGS noted that nitrate concentrations in ground water in the San Joaquin-Tulare Basins have increased since the 1950s. (Dubrovsky, N.M., Kratzer, C.R., Brown, L.R., Gronberg, J.M., and Burow, K.R., 1998, Water Quality in the San Joaquin-Tulare Basins, California, 1992-95: U.S. Geological Survey Circular 1159, at <http://water.usgs.gov/pubs/circ1159>, updated April 17, 1998.) The same is true for the Santa Ana basin. (Kenneth Belitz, et al., Water Quality in the Santa Ana Basin, California, 1999-2001 (Circular 1238, 2004), p. 8.)

None of this degradation should be occurring, though, given that the federal Clean Water Act and state Porter-Cologne Act both have as their central goal the protection and *maintenance* of water quality. (33 U.S.C. § 1251 (a) (objective is "to restore and maintain the chemical, physical, and biological integrity of the Nation's waters"); Water Code § 13000 ("the state must be prepared to exercise its full power and jurisdiction to protect the quality of waters in the state from degradation"); see also Pub. Res. Code § 30231 ("the quality of coastal waters, streams, wetlands, estuaries, and lakes appropriate to maintain optimum populations of marine organisms and for the protection of human health shall be maintained and, where feasible, restored").) In fact, California's Porter-Cologne Water Quality Control Act is specifically premised on the fact that "[w]ater resources that have once become degraded may be practically impossible to restore to a useable or acceptable quality." (Final Report of the Study Panel to the California State Water Resources Control Board I (March 1969).) The Study Panel to the California State Water Resources Control Board ("State Board") that recommended passage of the Porter-Cologne Act further noted that "[i]t costs much less in the long run—and the result is much more certain—to spend the money needed for an effective water quality control program than to try to salvage water resources that have been allowed to become unreasonably degraded." (*Id.*; see also Sen.Rep. No 92-414, 1st Sess., pp. 76-77 (1971) ("Striving toward, and maintaining the pristine state is an objective which minimizes the burden to man in maintaining a healthy environment, and

which will provide for a stable biosphere that is essential to the well-being of human society.") The water quality degradation that has occurred in the state, therefore, not only offends the law, it also offends common fiscal sense. The State Board, accordingly, must act to halt and reverse these trends in water quality. (See State Water Resources Control Board Mission Statement at <http://www.waterboards.ca.gov/about/mission.html> ("The State Board's mission is to preserve, enhance and restore the quality of California's water resources."))

**B. California's Antidegradation Policy**

Part of the arsenal that California has at its disposal to prevent water quality degradation is the state's antidegradation policy. This policy, announced in Resolution 68-16-Statement of Policy with Respect to Maintaining High Quality of Waters in California--was developed in response to a directive from the United States Department of the Interior calling for the adoption of state "antidegradation" policies. This policy states:

1. Whenever the existing quality of water is better than the quality established in policies as of the date on which such policies become effective, such existing high quality will be maintained until it has been demonstrated to the State that any change will be consistent with maximum benefit to the people of the State, will not unreasonably affect present and anticipated beneficial use of such water and will not result in water quality less than that prescribed in the policies.
2. Any activity which produces or may produce a waste or increased volume or concentration of waste and which discharges or proposes to discharge to existing high quality waters will be required to meet waste discharge requirements which will result in the best practicable treatment or control of the discharges necessary to assure that (a) a pollution or nuisance will not occur and (b) the highest water quality consistent with maximum benefit to the people of the State will be maintained.

(State Water Resources Control Board, Resolution 68-16 (Oct. 24, 1968).)

In 1986, the State Board interpreted this policy to incorporate the requirements set out in 40 C.F.R. § 131.12 for a state antidegradation policy under the Clean Water Act.<sup>1</sup> Those

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<sup>1</sup> See *In re Rimmon C. Fay*, SWRCB WQO 86-17 (Nov. 20, 1986), p. 20 ("The federal antidegradation policy is part of the Environmental Protection Agency's water quality standards regulations, and has been incorporated into the state's water quality protection requirements."); see also *id.* at p. 23, fn. 11 ("For waters subject to the federal antidegradation policy, both the requirements of the federal antidegradation policy and the express requirements of State Board Resolution No. 68-16 should be satisfied.").

requirements set out three tiers of protection that must be applied to protect water quality against degradation. First, existing instream water uses and the level of water quality necessary to protect the existing uses shall be maintained and protected. (40 C.F.R. § 131.12(a)(1).) This represents what is called "Tier 1" protection. Second, where the quality of the waters exceeds levels necessary to support the propagation of fish, shellfish, and wildlife and recreation in and on the water, that quality shall be maintained and protected unless the state (1) finds, after full satisfaction of the intergovernmental coordination and public participation provisions of the state's continuing planning process, that allowing lower water quality is necessary to accommodate important economic or social development in the area in which the waters are located; (2) assures water quality adequate to protect existing uses fully; and (3) assures that the highest statutory and regulatory requirements for all new and existing point sources and all cost-effective and reasonable best management practices for nonpoint source control are being achieved. (*Id.* § 131.12(a)(2).) This represents Tier 2 protection. Last, where high quality waters constitute an outstanding national resource, such as waters of national and state parks and wildlife refuges and waters of exceptional recreational or ecological significance, existing water quality shall be maintained and protected. (*Id.* § 131.12(a)(3).) This represents Tier 3 protection.

The federal requirements also mandate that a state "identify the methods for implementing . . . [its antidegradation] policy." (40 C.F.R. § 131.12.) Accordingly, the State Board has issued two informal guidance documents: a memorandum dated October 7, 1987 from William Attwater, Chief Counsel to the State Water Resources Control Board, to the Regional Board Executive Officers (the "Attwater Memo") and an Administrative Procedures Update from the State Board to the regional board staff dated July 2, 1990 (APU 90-004). There is also a September 13, 1994 "Fact Sheet" prepared by Frances L. McChesney, Senior Staff Counsel, Office of Chief Counsel, that analyzes the state's antidegradation policy in a Q&A format. Together, these documents set out the basic procedure by which regional boards should implement the state's antidegradation policy. According to this guidance, "if the Regional Board has no reason to believe that existing water quality will be reduced due to the proposed action," no antidegradation findings must be made at all. (APU 90-004, p. 2.) If some degradation is expected, the guidance directs that a full antidegradation analysis be conducted only when "in the Regional Board's judgment, [a regulatory action] will result in a significant increase in pollutant loadings." (*Id.*, p. 3.) Otherwise, as long as the "Regional Board decides that the discharge will not be adverse to the intent and purpose of the State and federal antidegradation policies," only a cursory analysis, if any, is required. (*Id.*, p. 2.)

**C. *The Failure to Maintain Water Quality Has Resulted from Defective and Ineffective Implementation of the State's Antidegradation Policy***

In 1998, EPA noted that across the country, antidegradation policies were "significantly underused as a tool to attain and maintain water quality and plan for and channel important economic and social development that can impact water quality." (63 Fed.Reg. 36742, 36780 (July 7, 1998).) Such is the case in California where implementation of the state's antidegradation policy has clearly failed to fulfill either the spirit or the letter of that policy. This failure is partially the result of defective implementation guidance that is inconsistent with the policy. The failure is

also the result of nonperformance on the part of the regional boards to apply that policy. All this warrants revision and formalization of the procedures to implement the state's antidegradation policy to ensure proper and effective implementation. Such revisions, as set forth in Section D below, must make implementation more robust, objective, and self-executing.

1. *Implementation of the State's Antidegradation Policy Is Based on Flawed Guidance*

A review of the state's implementation guidance reveals that it is inconsistent with both the state's antidegradation policy itself and EPA's requirements for such implementation guidance. Those requirements are fairly clear. First, "the State should develop procedures to document the degree to which water quality exceeds that necessary to protect the uses." (Region 9, U.S. EPA, Guidance on Implementing the Antidegradation Provisions of 40 C.F.R. 131.12 (June 3, 1987), p. 3 [hereafter "EPA Guidance"].) Second, "the State should develop procedures that quantify the extent to which water quality will be lowered as a result of the proposed action." (*Id.*)

Yet the state's implementation guidance fails to faithfully implement these requirements. This can most readily be seen by comparing the implementation flow chart that is appended to APU 90-004—a flowchart that summarizes the prior six pages of guidance setting out how regional boards should implement the state's antidegradation policy—with the flowchart attached to EPA's guidance. Absent from the state's flowchart is the requirement in both Tier 1 and Tier 2 that the regional boards assure that designated and existing uses be fully protected and maintained. Also absent is the requirement that the regional boards determine under Tier 2 that the highest statutory and regulatory requirements are met, or even under Resolution 68-16 that the best practical treatment or control has been applied. Instead, the state's implementation guidance focuses more on establishing categorical exemptions from implementation than setting forth procedures "to document the degree to which water quality exceeds that necessary to protect existing uses" or to "quantify the extent to which water quality will be lowered by a proposed action." (EPA Guidance, p. 3; *see* APU 90-004, p. 2 (setting forth four cases when complete antidegradation analyses are not required).) Moreover, the guidance largely consists of nothing more than normative statements where the regional boards are "urged" to consider things such as the nature of non-threshold pollutants and ambiguous language granting the regional boards a tremendous amount of unfettered discretion in implementing the state's antidegradation policy. (APU 90-004, p. 2.) All told, the guidance is fatally inconsistent with the policy that the guidance is intended to implement.

a. The Guidance Improperly Funnel Implementation Through a Wholly Discretionary and Standardless Process

One way in which the state's implementation guidance is flawed is that it allows a regional board to avoid having to justify a degrading discharge whenever "using its best professional judgement and all available pertinent information, the Regional Board decides that the discharge will not be adverse to the intent and purpose of the State and federal antidegradation policies."

(APU 90-004, p. 2.) Such "guidance" is defective in that it fails to provide the regional boards with any actual, objective standards to drive their decision making. For instance, with the exception of four categorical exemptions, the guidance does not define what might or might not be "adverse to the intent and purpose of the State and federal antidegradation policies." Nor does it define "all pertinent information." The result is that often regional boards simply conclude that the discharge is consistent with the state's antidegradation policy even though the discharge will result in an increased mass loading of pollutants.

In other instances, regional boards simply conclude that no degradation will result because the permit prohibits degrading discharges. This, though, is pure sophistry and tautology with the regional boards simply assuming the conclusion. Absent from the analysis is any consideration of the actual effectiveness of the measures or the likelihood with which the prohibitions will be realized, *i.e.* the likelihood of compliance. This could be based on past compliance history or on a reasoned analysis of general compliance by industry class. Other states specifically consider prior compliance in implementing their antidegradation policy. For instance, New Mexico's antidegradation policy implementation procedures specify that the procedures apply to the renewal of permits for existing discharges including a single source with a history of permit noncompliance. (New Mexico Water Quality Control Commission, State of New Mexico Continuing Planning Process, Appendix A, p. 2 (Dec. 14, 2004).) Likewise, Arizona requires that general permits be subject to full antidegradation review where degradation has been caused by permit noncompliance. (Arizona Department of Environmental Quality, *Antidegradation Implementation Procedures* (March 2005 final draft), p. 3-16 [hereafter "AZ Procedures"].)

This absence of standards is compounded by the fact that the guidance commends the determination of whether the state's antidegradation policy applies in any particular case to the regional boards' "best professional judgment"—a wholly unreviewable and subjective standard.<sup>2</sup> The problem with this is that the guidance funnels implementation of the state's antidegradation policy through "best professional judgment" rather than any objective standard whenever there is uncertainty about whether degradation will actually occur. The guidance, after all, requires a complete antidegradation analysis only in cases where a discharge "will result in a significant increase in pollutant loadings." (APU 90-004, p. 3 (emphasis added).) This results in the absurd consequence that where there is uncertainty about a discharge's water quality impacts, less study and analysis is actually required than where it is certain that degradation will occur. Other states' policies are implemented just the opposite, requiring a complete analysis in any situation where a regulated discharge *has the potential* to degrade water quality. (*E.g.*, AZ Procedures, pp. 1-4, 3-1, 3-16.) Indeed, EPA's guidance mandates that a state perform an antidegradation analysis if "the action *could* or will lower water quality." (EPA Guidance, p. 4 (emphasis added).) All told, then, the state's implementation guidance structurally fails to properly implement the state's antidegradation policy.

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<sup>2</sup> As opposed to using "best professional judgment," regional boards could employ such objective tools as water quality modeling to determine whether a discharge will result in degradation.

b. The Guidance Improperly Ignores Cumulative Impacts

The structural flaws outlined above are compounded by the fact that the state's implementation guidance is completely silent with regard to how regional boards should factor cumulative impacts into their analysis of whether degradation could occur. The guidance assumes a static world in which nothing has changed independent of the discharge being considered. This leads to flawed implementation of the state's antidegradation policy given that "[r]epeated or multiple small changes in water quality (such as those resulting from actions which do not require detailed analyses) can result in significant water quality degradation." (EPA Guidance, p. 6.) Accordingly, EPA mandates that a state's determination of whether or not degradation could occur "include the cumulative impacts of all previous and proposed actions and reasonably foreseeable actions which would lower water quality below the established baseline." (*Id.*; see also Ephraim S. King, Director of Office of Science and Technology, U.S. EPA, mem. to Water Management Division Directors, Regions 1-10, Tier 2 Antidegradation Reviews and Significance Thresholds (Aug. 10, 2005), p. 3 [hereafter "OST Memo"]) (failure to incorporate cumulative impacts can result in the majority of the total assimilative capacity of a water body being used without substantial antidegradation analyses being performed along the way.) Other states' implementation procedures, such as Arizona's, specifically mandate that the permitting authority consider cumulative impacts in determining whether a proposed action will impact water quality. As set out in the March 2005 draft of the Arizona Department of Environmental Quality's Antidegradation Implementation Procedures,

The antidegradation review for individually AZPDES-permitted facilities will be based upon the assigned protection level and baseline water quality . . . of the receiving water, the existing uses of the segment, applicable water quality standards, flow regime of the receiving water, pollutants of concern associated with the discharge, projected impacts on the receiving water, *cumulative impacts from other pollutant sources*, and the significance of any degradation that might occur as a result of the discharge.

(AZ Procedures, p. 3-12 (emphasis added).) California's implementation guidance, however, is silent on this issue, leaving the regional boards to implement the state's antidegradation policy in a way that is inconsistent with the policy itself.

c. The Guidance Improperly Injects the Concept of "Significant Degradation" into the State's Antidegradation Policy

The state's implementation guidance is also inconsistent with the state's antidegradation policy in that the guidance adopts a standard of "significant degradation" in determining when socioeconomic and alternatives analyses must be performed. (APU 90-004, p. 3.) The injection of such a concept into implementation of the state's antidegradation policy, however, is clearly inconsistent with that policy itself. After all, both Resolution 68-16 and the federal requirements for Tier II simply state that existing high water quality "shall be maintained" unless certain

findings are made. (40 C.F.R. § 131.12(a)(2).) Moreover, EPA has stated that to comply with the federal requirements for an antidegradation policy, a "State must find that any action which would lower water quality is necessary to accommodate important economic and social development" *whether or not water quality is significantly lowered*. (EPA Guidance, p. 7.) Part and parcel of making this finding is determining that the development "requires the lowering of water quality which cannot be mitigated through reasonable means." (*Id.*) Obviously, such a determination can only be reached after alternatives to the degrading discharge have been analyzed. Otherwise, the Regional Board could not rationally conclude that the discharge is "necessary." Basic principles of administrative law require that the regional boards do *some* analysis to support the finding that any social development being accommodated by the discharge is "important." (*See Topanga Assn. for a Scenic Community v. County of Los Angeles* (1974) 11 Cal.3d 506, 515-16.) To defer the necessary analyses to cases where the degradation is first determined to be significant, therefore, invites the regional boards to err.

Conducting antidegradation analyses only for "significant" degradation is also fraught with many practical problems. After all, how should "significant degradation" be defined? That term is not defined anywhere in the guidance. Numeric interpretations could be used, but numeric interpretations of "significance" can only be valid in relation to pollutants that have numeric standards. Such numeric interpretations are meaningless with regard to narrative standards, leading all those standards to be substantively ignored in any ensuing analysis. Furthermore, any interpretation has to factor in prior, cumulative degradation as discussed above. To handle that, EPA recommends that states "incorporate a cumulative cap on the use of total assimilative capacity (i.e., the baseline assimilative capacity of a waterbody established at a specified point in time)." (OST Memo, p. 3.) Implementing such a cap, however, introduces another slew of issues including how the values of the variables needed to compute that cap should be determined.<sup>3</sup> Clearly, then, the concept of "significant degradation" is problematic from an implementation perspective, often resulting in more work being expended on avoiding required analyses than would actually be expended conducting them.

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<sup>3</sup> One possible way to conceptualize such a trigger with a cumulative cap is to calculate the cumulative proportion of a water body's baseline assimilative capacity (i.e., determined by the best water quality in a water body historically) that will be used by the discharge. For instance, the trigger, T, can be calculated as

$$T = \frac{WQ_r - B}{WQO - B}$$

where

- WQ<sub>r</sub> = resulting predicted water quality (factoring in prior and cumulative degradation)
- B = baseline water quality
- WQO = pollutant-based water quality objective
- T = proportion of baseline assimilative capacity used

Then, where T is greater than a particular threshold, say 10%, more in-depth socioeconomic and alternatives analyses must take place. The question remains, however, how predicted and baseline water quality are determined, let alone, what trigger is appropriate.

d. The Guidance Improperly Allows for a Sliding Water Quality Baseline

Another flaw in the state's implementation guidance that is that allows regional boards to use present water quality as the baseline for measuring the significance of the degradation that triggers the state's antidegradation policy. As stated in APU 90-004,

Baseline quality is defined as the best quality of the receiving water that has existed since 1968 when considering Resolution No 68-16, or since 1975 under the federal policy, unless subsequent lowering was due to regulatory action consistent with State and federal antidegradation policies. If poorer water quality was permitted, the most recent water quality resulting from permitted action is the baseline water quality to be considered in any antidegradation analysis.

(APU 90-004, p. 4.) When combined with the requirement that antidegradation analyses only be conducted for "significant degradation," the sliding baseline authorized by the state's implementation guidance effectively transforms the state's *antidegradation* policy into a de facto *degradation* policy that assures that all water bodies in the state will eventually be degraded to the very lowest possible level bit by bit, with every existing discharge immunized against consistent, rigorous alternatives reviews during permit renewal. This is inconsistent with the state's antidegradation policy wherein baseline water quality is more properly conceptualized as the level of water quality that *must be protected*. It should, therefore, only be allowed to be adjusted upward, not downward as the state's guidance allows. Indeed, using present water quality as the baseline directly conflicts with EPA guidance that requires that baseline water quality "remain fixed unless some action improves water quality." (EPA Guidance, p. 6; *see also* AZ Procedures, pp. 4-3 ("Antidegradation policy generally does not allow a lowering of BWQ [baseline water quality]. That is, BWQ is not a moving target, unless it moves in the direction that reflects improving water quality."), 1-3 (degradation is determined "from BWQ, not ambient water quality at the time a project application is submitted").) The "immunization" of existing discharges also conflicts with the Clean Water Act's central goal of *eliminating* discharges, not just managing their impacts. (33 U.S.C. § 1251(a)(1) ("it is the national goal that the discharge of pollutants into the navigable waters be eliminated by 1985").) By granting dischargers an effective "license to pollute," the implementation guidance preempts the regional boards from taking advantage of the opportunities provided them through permit renewal. Overall, the sliding baseline authorized by the state's implementation guidance renders that guidance fundamentally and fatally flawed.

e. The Guidance Improperly Authorizes Reliance on CEQA Documents that Are Inadequate for Purposes of Implementing the State's Antidegradation Policy

Yet another flaw in the guidance is that the guidance structurally allows regional boards to base their determinations regarding degradation on CEQA documents. (APU 90-004, pp. 2, 3.) This is problematic given that those CEQA documents analyze impacts based on present water

quality as the baseline. (Cal. Code Regs. tit. 14, § 15125(a) (environmental conditions as they exist at the time of the notice of preparation serve as the baseline for CEQA analyses).) Present water quality, however, as discussed above, cannot be the baseline for any effective antidegradation analysis. Consequently, the regional boards often rely on CEQA documents that are not suitable for antidegradation purposes.

f. The Guidance Fails to Address Implementation of the Antidegradation Policy with Regard to General Permits

Another key deficiency in the state's implementation guidance is that it fails to provide any direction on how the regional and state boards should implement the state's antidegradation policy when issuing general permits. Such permits authorize many discharges at once, across multiple watersheds, usually with minimal or no further discretionary action or review. (See e.g., Water Quality Order No. 97-03-DWQ (statewide general industrial stormwater permit); Water Quality Order 99-08-DWQ (statewide general construction stormwater permit); Order No. R1-2005-0011 (general permit for sand and gravel mining), Order No. R6-00-03 (general construction stormwater permit).) The state's antidegradation policy, though, requires that the regional and state boards consider the characteristics of each individual water body when authorizing discharges. (40 C.F.R. § 131.12(a); see also Water Code §§ 13263(a), 13241(b).) For instance, whether a water body is subject to Tier I, II, or III determines the level of protection that that water body must be given. (EPA Guidance, p. 4 ("Prior to proceeding with a detailed analysis . . . the affected water body should be assessed to determine whether or not it falls into either Tier 1 or Tier III.")) Furthermore, for Tier 2, the regional boards must find that any degradation occurring as a result of a discharge authorized under a general permit is necessary to accommodate social and economic growth *in the area of the waters being affected*. (40 C.F.R. § 131.12(a)(2).) These individualized considerations regarding discharges and receiving waters are "contrary to the concept of a general permit."<sup>4</sup> (*Ohio Valley Environmental Coalition v. Horinko* (S.D.W.Va 2003) 279 F.Supp.2d 732, 761 (quoting Final Reissuance of National Pollutant Discharge Elimination System (NPDES) Storm Water Multi-Sector General Permit for Industrial Activities, 65 Fed.Reg. 64746, 64794 (Oct. 30, 2000)).) Yet the state's implementation guidance is silent on how these considerations should be made when issuing a general permit.

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<sup>4</sup> As the *Horinko* court stated:

When a general permit is issued under section 402 or section 404 [of the CWA], the State simply does not know the specific locations of discharges that might be covered by the general permit; discharge locations are not known until individuals seek permission to discharge under the general permit. In light of this fact, the court does not understand how the State could determine, at the time the general permit is issued, that each potential discharge that might some day be covered by the general permit is "necessary to accommodate important economic or social development in the area in which the waters are located." [citation omitted]

(*Ohio Valley Environmental Coalition v. Horinko* (S.D.W.Va 2003) 279 F.Supp.2d 732, 761.)

The guidance is also silent on how the public participation required by the state's antidegradation policy should take place in the context of issuing a general permit. Clearly, participation only at the time of adopting the general permit is insufficient given that the public (and the state for that matter as noted above) cannot be aware of the nature and location of specific discharges that will be covered under the permit. The public participation that takes place when adopting the permit, therefore, cannot be meaningful.<sup>5</sup> (*Horinko, supra*, 279 F.Supp.2d at p. 761 ("public participation as required by section 131.12(a)(2) would be impossible since the permit issuing authority would not know about the particular discharge to tier 2 waters before a NOI was submitted.")) Yet despite such thorny implementation issues, as noted above, the state's implementation guidance provides no direction for the regional boards (and the State Board) regarding how to implement the state's antidegradation policy with regard to general permits. The result is that general permits are routinely issued with detrimental effects to water quality. (*See, infra*, Section C.2.f.)

g. The Guidance Fails to Address Implementation of the Antidegradation Policy with Regard to Effluent Dominated Waters

Finally, another deficiency in the state's implementation guidance is that it fails to address how the state's antidegradation policy should be implemented in the context of ephemeral and intermittent streams and the creation of effluent dominated waters ("EDWs") through the discharge of wastewater into such streams.<sup>6</sup> This is a major oversight given that a large proportion of the state's waters are intermittent or ephemeral. Moreover, as the Central Valley Regional Board noted in a 2000 draft report, "there are consequences of increasing flows into

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<sup>5</sup> It should be noted that such general permit schemes are not only inconsistent with the state's antidegradation policy, they are also inconsistent with the Clean Water Act's public participation requirements. (*See Environmental Defense Center, Inc. v. U.S. EPA* (9th Cir. 2003) 344 F.3d 832, 857 ("it is the NOIs, and not the general permits, that contain the substantive information about how the operator of a small MS4 will reduce discharges to the maximum extent practicable. Under the Phase II Rule, NOIs are functionally equivalent to the permit applications Congress envisioned when it created the Clean Water Act's public availability and public hearing requirements. Thus, if the Phase II Rule does not make NOIs 'available to the public,' and does not provide for public hearings on NOIs, the Phase II Rule violates the clear intent of Congress."); *Minnesota Center for Environmental Advocacy v. Minnesota Pollution Control Agency* (Minn.App. 2003) 660 N.W.2d 427, 435 ("Neither the single hearing held before the general permit was issued, nor the public meetings to discuss the annual reports after the implementation of the SWPPPs, are substitutes for a public hearing held before the SWPPPs are implemented. Because there is no opportunity for public hearings on each SWPPP, the general permit procedure violates the public participation requirements of the Clean Water Act."))

<sup>6</sup> That the state's antidegradation policy applies to these water bodies is beyond question. (U.S. EPA, Questions and Answers on Antidegradation (Aug. 1995), p. 3, at <http://www.epa.gov/waterscience/standards/handbook/handbookappxG.pdf> ("The fact that sport or commercial fish are not present does not mean that the water may not be supporting an aquatic life protection function. An existing aquatic community composed entirely of invertebrates and plants, such as may be found in a pristine alpine tributary stream should still be protected whether or not such a stream supports a fishery."))

[intermittent or ephemeral] streams that go beyond the traditional chemical concerns."<sup>7</sup> (Central Valley Regional Water Quality Control Board, Effluent Dominated Water Bodies (Sept. 2000 Draft), p. iii [hereafter ["EDW Report"].) In such streams, high quality water is not the only issue. Rather, increased flow and altered flow regimes are important as well. (*Id.*, p. 15; Sheldon, et al., *Using Disaster to Prevent Catastrophe: Referencing the Impacts of Flow Changes in Large Dryland Rivers*, 16 *Regulated Rivers: Research & Management* 403, 404 (2000) ("most river ecologists recognize 'flow' as the driving force in riverine ecology").)

The fact is that changing a stream's flow from ephemeral to perennial through the addition of treated wastewater "can be detrimental to species that respond to the ephemeral nature of the stream." (EDW Report, *supra*, p. 16; Sheldon et al, *supra*, p. 404 ("There is evidence that alteration of a river's natural flow regime is likely to modify the distribution and availability of habitats, with adverse consequences for the native biota.")) For instance, many species of amphibians such as the threatened California red-legged frog are adapted to periodic drying. Ephemeral streams, therefore, are their natural habitat. When water flow is continued throughout the year, this species is subject to competition from the more aggressive bullfrog, which requires perennial stream conditions. Some crustaceans too are particularly adapted to persisting in or colonizing ephemeral waters, including tadpole shrimp, clam shrimp, fairy shrimp, seed shrimp, waterfleas, and copepods.<sup>8</sup> Eggs of these crustaceans can lay dormant in the bottom of ephemeral waters for years until they sense favorable conditions for hatching. The alteration of the flow regimes on which these species depend displaces them in favor of other species better adapted to more constant flows.<sup>9</sup> (See generally O'Keefe and Moor, *Changes in the Physico-Chemistry and Benthic Invertebrates of the Great Fish River, South Africa, Following an Interbasin Transfer of Water*, 2 *Regulated Rivers: Research & Management* 39-55 (1988) (demonstrating considerable changes in taxa resulting from conversion of intermittent stream to perennial stream); Snaddon and Davies, *A Preliminary Assessment of the Effects of a Small South African Inter-basin Water Transfer on Discharge and Invertebrate Community Structure*, 14 *Regulated Rivers: Research & Management* 421-41 (1998) (same); Stromberg, et al., *Altered Stream-flow Regimes and Invasive Plant Species: the Tamarix Case*, 16 *Global Ecology and Biogeography* 381-393 (May 2007); Hassan and Egozi, *Impact of Wastewater Discharge on Channel Morphology of Ephemeral Streams*, 26 *Earth Surface Processes and Landforms* 1285-1302 (2001) (finding that wastewater

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<sup>7</sup> Indeed, the creation of such effluent dominated waters skirts the edge of legality. (40 C.F.R. § 131.10(a) (stating that waste transport or assimilation can never be a designated use for any water of the United States).)

<sup>8</sup> See generally, D.Belk, *Zoogeography of the Arizona Fairy Shrimps (Crustacea: Anostraca)*, 12 *J. Arizona Academy of Science* 70-78 (1978); R. A. Cole, et al, *Diversity of Aquatic Animals in New Mexico*, 36 *New Mexico J. of Science* 79-100 (1996).

<sup>9</sup> There is a common misperception that such species are "hardy" given their adaptation to harsh environmental conditions. Nothing, though, could be further from the truth given that not only are these species particularly susceptible to changed flow regimes, they also are also more sensitive to pollution than other species such as the fish that are often used in establishing water quality standards. (See generally W.J. Birge, et al., Chapter 14a, in *Ecotoxicology of Amphibians and Reptiles* (Society of Environmental Toxicology and Chemistry (SETAC) Press 2000), pp. 727-791.)

flows causes shift from dry ephemeral channel to a continuous flow pattern with attendant changes in supported biota).)

In this context, it is clear that proper implementation of the state's antidegradation policy requires at least some focus on water *quantity* and flows in addition to an analysis of traditional water quality when intermittent or ephemeral streams are at issue. (See U.S. EPA, Questions and Answers on Antidegradation (Aug. 1995), p. 3, at <http://www.epa.gov/waterscience/standards/handbook/handbookappxG.pdf> ("Species that are in the water body and which are consistent with the designated use (i.e., not aberrational) must be protected, even if not prevalent in number or importance." (emphasis in original)).)

The state's implementation guidance, however, is silent with regard to such streams, leaving the regional and state boards to focus only on water quality (if they even conduct an antidegradation analysis for such waterbodies). For example, as of 2000, the Central Valley Regional Board had adopted approximately 50 permits for discharges of treated municipal wastewater into ephemeral water bodies or water bodies with limited dilution capacity, altering the beneficial uses of those water bodies despite the command of the state's antidegradation policy that existing uses shall be maintained and protected. Instead, the physical integrity of these streams was sacrificed, inevitably reducing these streams' biological integrity. (See Attachment to Letter from Chairman Arthur Baggett to U.S. EPA Water Docket Staff, Comment on Advanced Notice of Proposed Rulemaking on Definition of "Waters of the United States" (Mar. 13, 2003), p. 7 (noting that changes to physical integrity invariably reduce biological integrity).) The result is that the varied and sensitive biota that have adapted for millennia to arid conditions and intermittent flows are wiped out—wholly in violation of the Clean Water Act's goal to provide for the protection and propagation of fish, shellfish, and wildlife. (See 33 U.S.C. § 1251(a)(2).) This unfortunate circumstance has arisen largely—and solely—due to deficiencies in the state's guidance on implementing its antidegradation policy, which is supposed to serve as a general water quality standard wherever there is none that would protect existing uses.

Overall then, given all the faults and shortcomings described above, it is clear that the state's implementation guidance is defective and inconsistent with the antidegradation policy that it is intended to implement. These defects have precluded the state from fulfilling the letter and spirit of the state's antidegradation policy—that water quality be protected and maintained—even if the regional and state boards had dutifully followed that guidance to a tee. However, as demonstrated below, the regional and state boards have not even managed to properly implement the guidance, resulting in a double hit to the state's water quality. It is clear then, that the State Board must revise its guidance and set out a more specific and robust implementation policy that will ensure that California's water quality will be maintained.

2. *The Regional Boards Routinely Fail to Properly Implement California's Antidegradation Policy*

The problem with California's antidegradation policy is not just that the implementation guidance is flawed. A major component of the problem is also that the regional boards across the

state fail to faithfully implement the policy regardless of the flawed guidance. For instance, the Central Valley Regional Board staff recently admitted, on the record, that the Board had failed to properly implement the state's antidegradation policy with regard to discharges to land from food processors. According to staff,

Little emphasis was placed on assuring conformance with all of the required elements of the State Water Resources Control Board Resolution No. 68-16, *Statement of Policy With Respect to Maintaining High Quality Waters In California* (hereafter Antidegradation Policy), which is incorporated by reference in the Basin Plan. Waste discharge requirements have allowed wastewater storage and percolation-disposal from unlined or poorly-lined impoundments and application of wastewater to cropland at "agronomic rates" for the nutrients contained in the wastewater. Management measures were largely focused on prevention of nuisance conditions (e.g., stillage guidelines from the wine industry) without test plots or other direct demonstration that they would be effective in preventing unreasonable degradation of groundwater quality.

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Although required by the State Board's Antidegradation Policy, dischargers have not been required to implement "best practicable treatment and control practices" ("BPTC"; i.e., the best of treatment or control practices that have been demonstrated to be technologically practicable and economically feasible) to ensure that any affect on groundwater quality was the minimum reasonably achievable.

(Central Valley Regional Water Control Board, Staff Report accompanying Item 23 on the Board's Jan. 28, 2005 meeting agenda, p. 4, at [http://www.swrcb.ca.gov/rwqcb5/available\\_documents/waste\\_to\\_land/FoodProcessingInfoItem/StaffRpt.pdf](http://www.swrcb.ca.gov/rwqcb5/available_documents/waste_to_land/FoodProcessingInfoItem/StaffRpt.pdf).) This failure to properly implement the state's antidegradation policy occurred despite knowledge that food processing wastewater is typically of much higher strength than domestic wastewater, for which the Regional Board routinely applies more stringent treatment or control. (See Central Valley Regional Water Control Board, Staff Report accompanying Item 15 on the Board's Mar. 17, 2006 meeting agenda, p. 1, at <http://www.waterboards.ca.gov/centralvalley/tentative/0603/food-processing/food-processing-staff-rpt.pdf>.) The result is that over 90% of the food processors that monitor groundwater are known to have or suspected to have degraded groundwater with salts, nitrates, and other pollutants.

The simple fact is that unless the regional and state board staffs are called on their implementation of the state's antidegradation policy, they are all too apt to give that policy short

shriff.<sup>10</sup> This results in a categorical failure statewide to properly implement the state's antidegradation policy. As demonstrated below—and as demonstrated by the various petitions for review filed by ELF and other petitioners with the State Board—such failure is not an isolated event. Rather regional boards (and the State Board) routinely skirt the state's antidegradation policy, failing to implement that policy properly.<sup>11</sup> For instance, regional boards hardly ever establish what baseline water quality is, often assuming without any basis that existing water quality is the baseline. (See e.g., Tentative Order R5-2007-XXXX, NPDES Permit No. CAXXXXXXX, Waste Discharge Requirements for the City of Angels Wastewater Treatment Plant.) Regional boards also often fail to fully document their findings as required by the implementation guidance not to mention standard principles of administrative law. (See, e.g., Tentative Order No. R7-2007-0034, NPDES No. CA0105007, Waste Discharge Requirements for the City of Westmorland, Westmorland Wastewater Treatment Plant.) Other common implementation failures include failing to adapt template language to specific circumstances relating to particular discharges. (See, *infra*, Section C.2.g.) These are just some of the recurrent themes that any systematic audit of regional and state board actions will reveal, themes that are demonstrated in the case studies below.

a. San Vicente Creek - Region 3

San Vicente Creek is a Class I stream located in the Santa Cruz Mountains that enters the Pacific Ocean approximately 9 miles north of the city of Santa Cruz. The stream has approximately 9.3 miles of main stem and 11.3 miles of tributary blue line stream, and drains a watershed of approximately 11.1 square miles. That watershed is primarily privately owned and is managed for timber production, open pit mining, cattle grazing, urbanization, and water diversion. San Vicente Creek is the sole source drinking water supply for the town of Davenport and it supports an anadromous fishery for endangered Coho Salmon and Steelhead Trout.

The Creek was put on the state's 303(d) list for sediment in 2006. In the four years preceding the listing, the Regional Board took only two actions regarding the creek,<sup>12</sup> issuing waivers of waste discharge requirements for two timber harvest plans, one for Redtree Properties

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<sup>10</sup> In a stunning admission, a senior engineer with the Central Valley Regional Board recently stated in an email regarding implementation of the state's antidegradation policy that "[i]mplementation of this policy is new to many of us." That implementation should be "new" to regional board staff in 2007, twenty years after the Attwater Memo, is beyond the pale.

<sup>11</sup> The highlighting of only a few case studies below should not suggest that some regional boards are consistently and faithfully applying the state's antidegradation policy. Indeed, since February 2007, ELF has filed over 20 comments on permits before regional boards across the state noting deficiencies in each regional board's implementation of the state's antidegradation policy. The exclusion of some regional board actions here was necessary simply for brevity and to avoid redundancy.

<sup>12</sup> The only other action that the Regional Board took with regard to San Vicente Creek preceding its listing was to issue revised waste discharge requirements to RMC Pacific Materials' cement plant. Those discharges, however, do not affect the creek as the plant discharges to the Pacific Ocean, not San Vicente Creek.

to selectively log 278 acres (THP No. 1-03-042 SCR) and one for RMC Pacific Materials to selectively log 740 acres (THP No. 1-03-082 SCR). These two harvests were to be conducted concurrently over the following two years.

A review of the Board's resolutions and staff reports regarding these two harvest plans reveals that the Board relied heavily on CEQA documents prepared by the California Department of Forestry and Fire Protection ("CDF"). According to the Board, CDF had "considered all the potential significant environmental effects of the Plan[s] and made a finding that the timber operations will not have a significant effect on the environment." (R3-2004-0009 (Mar. 19, 2004), p. 1; R3-2004-0035 (May 13, 2004), p. 1.) The Board therefore concluded with regard to each timber harvest that "[i]f the proposed timber harvest is conducted in the manner prescribed in the Plan, and the conditions of this Order a waiver of the ROWD and waste discharge requirements is in the public interest and is consistent with applicable water quality control plans, including the Water Quality Control Plan, Central Coast Region." (R3-2004-2009, p. 2; R3-2004-0035, p.2.)

The Board, however, never made any statement regarding the state's antidegradation policy, nor is there any analysis in the waivers or the staff reports that would indicate that the Board considered the state's antidegradation policy. Clearly, that policy applied in the context of issuing the waivers. After all, San Vicente Creek is a water of the United States and even non-point sources of pollution must still be made to comply with that policy. (Attwater Memo, p. 6 ("The federal antidegradation policy is applicable to changes in water quality resulting from either point source or nonpoint source discharges."); EPA Guidance, p. 5 ("Both point and non-point sources of pollution are subject to antidegradation requirements.")) Moreover, waivers of waste discharge requirements are specifically subject to the state's antidegradation policy. (Attwater Memo, p. 9 ("A proposed waiver of waste discharge requirements would also be subject to the federal antidegradation policy if the waiver would result in a lowering of surface water quality.")) Thus, one would expect the Regional Board to have conducted an antidegradation analysis, particularly here where the Board recognized that the harvest plans constituted at least a moderate risk to water quality. Indeed, the staff noted their specific concern with the re-grading of roads during the rainy season but opted not to analyze the impacts above and beyond the conclusion by CDF that the timber operations would not have significant effects on the environment. (Staff Report for Regular Meeting of March 19, 2004, Item 13, Waiver of Waste Discharge Requirements for the RMC 2004-2006 Timber Harvest, THP No. 1-03-082 SCR, Santa Cruz County Order No. R3-2004-0009, p. 10 ("Re-grading of roads during the wet season is a concern of Regional Board staff. However, no reports or evidence of water quality problems caused by such grading have been reported.")) Consequently, the harvests took place with no special measures in place to protect San Vicente Creek.

Unfortunately, water quality data demonstrate that the authorized timber operations tipped the balance in San Vicente Creek sharply toward impairment. For instance, turbidity monitoring data from the Davenport Sanitation District demonstrates that in the two years subsequent to the granting of the waivers, the number of water quality standard exceedances resulting from turbidity in San Vicente Creek more than doubled from an average of 16 per water year between 2002-

2004 to 36 in 2005 and then more than doubled again to 80 in 2006 when the bulk of the impacts from the harvesting would have been felt.<sup>13</sup>

Clearly degradation resulted from the issuance of the waivers, degradation that would have been avoided if the Board had actually engaged in any form of substantive antidegradation analysis. After all, the Board recognized that there was a risk of impairment from the timber operations in issuing the waivers. A properly conducted antidegradation analysis would have placed San Vicente Creek at least into Tier 2—a water body that was not at the time listed as impaired, where “water quality objectives are currently being attained.”<sup>14</sup> (Staff Report, p. 4.) Under Tier 2, the waivers could not have been issued unless they ensured that all cost-effective and reasonable best management practices were being employed. Yet all the waivers did was add a set of monitoring requirements above and beyond those management practices set out in the timber harvest plans<sup>15</sup>—management practices that are widely recognized as being insufficient to protect water quality.<sup>16</sup> Indeed, those practices have never actually even been fully certified as “best management practices” under the Porter-Cologne and Clean Water Acts. (See Letter from Daniel W. McGovern, EPA Region IX administrator, to SWRCB, July 29, 1988) (declining to take action to certify forest practice rules as best management practices under the CWA.) Proper implementation of the state's antidegradation policy would have lead the Regional Board to specify additional best management practices to minimize the degradation to the maximum extent

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<sup>13</sup> Some of this increase could be attributed to increased rainfall in the Santa Cruz area between 2002 and 2004, which tended to be average, and 2005 and 2006 in each of which rainfall was 143% of average. The increase in rainfall cannot account, however, for the over two fold increase in the number of exceedances between 2005 and 2006, years with closely similar rainfall amounts and monthly precipitation patterns.

<sup>14</sup> In light of the 2006 listing and the fact that the number of water quality exceedances already surpassed the impairment threshold, it could be argued that San Vicente Creek was already a Tier 1 water body at the time the Board issued the waivers. The Board, though, never addressed which protective tier San Vicente Creek fell in because the Board never conducted any form of antidegradation analysis. Had the Regional Board done so and determined that San Vicente Creek was subject to Tier 1 protection, the harvests would likely not have been allowed given the threat of degradation.

<sup>15</sup> See Staff Report at p. 1 (“No additional mitigation measures beyond those contained in the timber harvest plan are proposed to be added via this Waiver, except for recommended monitoring and reporting requirements.”).

<sup>16</sup> See, e.g., University of California Committee on Cumulative Watershed Effects, et al., A Scientific Basis for the Prediction of Cumulative Watershed Effects 24 (Report No. 46, June 2001) (“it is the collective judgment of this committee that BMPs do NOT remove off-site impacts. They may reduce them, when the BMPs function well, but they do not remove them, especially when they are tested by severe storms. It is the collective failure of BMPs to mitigate off-site impacts that results in residual, significant cumulative effects.”); Report of the Scientific Review Panel on California Forest Practice Rules and Salmonid Habitat 24 (June 1999) (“the F[orest] P[ractice] R[ule]s, as currently written, do not ensure sufficient protection of salmonid habitat nor offer scientifically-based determinations of the potential impacts of THPs on salmonids.”); California Senate Office of Research, Timber Harvesting and Water Quality 1 (Dec. 2002) (“California forestry practices have been criticized in a number of state and federal government and scientific and academic reports as insufficient to protect public trust resources such as fisheries and water quality.”).

practicable—including prohibiting the harvesting if necessary. The Regional Board, though, did not do so, in large part because it failed to consider and implement the state's antidegradation policy. The result has been that water quality in San Vicente Creek has deteriorated to such an extent that it is now listed as an impaired water body—a poster child for the failure of the regional and state boards to faithfully implement the state's antidegradation policy.

b. Laguna de Santa Rosa - Region 1

The City of Santa Rosa owns and operates the Santa Rosa Subregional Water Reclamation Facility that discharges treated wastewater to the Laguna de Santa Rosa, a water of the United States that is presently severely impaired by biostimulatory substances, i.e. nutrients such as nitrogen and phosphorus. As Catherine Kuhlman, Executive Officer of the North Coast Regional Board stated in a letter to the State Board,

One of the most widely recognized impacts to the Laguna de Santa Rosa water quality has been the exceedance of the assimilative capacity for biostimulatory substances (nutrients), primarily phosphorus and nitrogen. The level of phosphorus entering the Laguna de Santa Rosa in sediment, agricultural runoff, and effluent discharges is so great that phosphorus is sequestered into the sediment, and cycled into the biota with any additions of available nitrogen. The nitrogen levels are additionally seen in concentrations that have direct impacts on water quality, including transient levels of unionized ammonia in exceedance of wildlife criteria. Together, the excess biostimulatory substances (phosphorus and nitrogen) contribute to additional secondary water quality impairments, including nuisance plant growth (*Ludwigia* is a recent example of particular concern) impairing REC1 and REC2 beneficial uses, and low dissolved oxygen levels.

(Cat Kuhlman, Executive Officer, North Coast Regional Water Quality Board, letter to Selicia Potter, Acting Clerk to the State Board (Dec. 1, 2005), *Comments on SWRCB Staff Recommendation for the 2004-2006 303(d) List Update*, p. 1-2.) In a follow-up letter, Ms. Kuhlman reiterated that

In the case of Laguna de Santa Rosa, it is clear (1) that beneficial uses are impaired by excessive aquatic growth, including the invasive *Ludwigia hexapetala*, (2) that infestations of nuisance aquatic growth including *Ludwigia hexapetala* are associated with nutrient enrichment, among other facts, and (3) nutrient loads (both ongoing and historic) have a reasonable potential to be a promoting factor in the observed impairment by *Ludwigia hexapetala* and other aquatic vegetation. Nutrients thus pose a risk to maintenance of water quality standards in the Laguna.

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(Cat Kuhlman, letter to Tam Doduc (Jan. 31, 2006), *Additional Comments for the 2004-2006 303(d) List Update*, p. 2.)

Despite this impaired state, the Regional Board reissued the discharge permit to Santa Rosa, finding that the permit was "consistent with the antidegradation provision of 40 CFR 131.12 and State Water Board Resolution 68-16" despite the fact that the Board recognized that further degradation of the Laguna could result. (See California Regional Water Quality Control Board, North Coast Region, Order No. R1-2006-0045, NPDES No. CA0022764 (Sept. 20, 2006) Finding L.) As the fact sheet explained,

This Order may allow some degradation of the quality of waters of the state by virtue of the fact that it permits the discharge of waste exerting a biochemical oxygen demand, containing suspended solids, biostimulatory substances and elevated temperature above ambient conditions into a waterway impaired for dissolved oxygen, sediment, nitrogen, phosphorus, and temperature. Nevertheless, this Order is consistent with Resolution 68-16 because (1) such degradation is consistent with the maximum benefit to the people of the state, (2) the discharge is the result of wastewater utility service that is necessary to accommodate housing and economic expansion, and (3) it results in a high level of treatment of sewage waste. This Order requires tertiary treatment or equivalent, which is a high level of treatment that is considered BPTC for most constituents in the wastewater and will result in attaining water quality standards applicable to the discharge.

(Order No. R1-2006-0045, p. F-11.) These were the only statements made by the Board in connection with the state's antidegradation policy.

Even the most cursory review of the Order and accompanying Fact Sheet, however, demonstrates that the Regional Board failed to properly implement the state's antidegradation policy—the Board justified this degradation only in relation to Resolution 68-16. Absent from the Board's discussion is any evidence of their analysis under 40 C.F.R. § 131.12. Laguna de Santa Rosa, though, is a water of the United States. (Order No. R1-2006-0045, p. F-2.) The federal antidegradation policy, therefore, clearly applies. (Attwater Memo, p. 3 ("the State and regional Boards must apply the federal antidegradation policy to all 'waters of the United States' within the State of California".)) So where is the Board's analysis under 40 C.F.R. § 131.12? For instance, where is the recognition that the Laguna is a Tier 1 water body with respect to many of the impairing pollutants in the discharge?<sup>17</sup> In this connection, the Board admitted that it was allowing degradation, setting the limit for nitrogen at 10 mg/L—the drinking water

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<sup>17</sup> "[T]he requirement that existing instream uses be protected is not satisfied if existing instream beneficial uses will be impaired, even for a portion of a water body." (Attwater Memo, p. 11.)

standard—without any relation to the level of nitrogen already impairing the Laguna. Under the federal components of the state's antidegradation policy, such degrading levels of nitrogen would be prohibited. But nowhere is there any recognition of this requirement.

Furthermore, even if the Laguna were only a Tier 2 water body, where is the evidence to support the finding that the degradation is “necessary to accommodate important economic or social development?”<sup>18</sup> This finding requires that the Regional Board look at alternatives, both in terms of treatment levels and in terms of discharge amounts—in order to assure that the least amount of degradation arises from the discharge. (63 Fed.Reg. 36742, 36784 (July 7, 1998) (state must “ensure[] that all feasible alternatives to allowing the degradation have been adequately evaluated, and that the least degrading reasonable alternative is implemented”).) Moreover, where is the analysis—let alone finding—that demonstrates that the economic development being accommodated is “important?”<sup>19</sup> (*See id.* (“The significance of determining if an activity will provide for important social or economic benefit is that, absent important social or economic benefit, degradation under tier 2 must not be allowed.”).) The absence of these findings and the analysis that would support these findings indicate a failure to fully and faithfully implement the state's antidegradation policy.<sup>20</sup> This is critical given that proper implementation would have resulted in substantial modifications to the permit with increased requirements on the discharger.

Third, even with regard to the discharge's consistency with Resolution 68-16, there is nothing in the record to support any of the Regional Board's sub-conclusions it made in making its findings. For instance, the Regional Board says that the potential degradation is consistent with the maximum benefit to the people of the state. On what did the Regional Board base this conclusion? Clearly, not the administrative record it had before it given that that record demonstrates that the biostimulatory pollutants in the discharge contribute to the growth of *Ludwigia hexapetala*, an invasive aquatic weed that provides protective habitat for mosquitos rendering largely ineffective the application of insecticides. These mosquitos, in turn, serve as vectors for the West Nile virus. Eradication of *Ludwigia* will cost local agencies \$1.9 million over five years. (Cat Kuhlman, letter to Tam Doduc (Jan. 31, 2006), *Additional Comments for the 2004-2006 303(d) List Update*, p. 1.) How, then, did the Regional Board conclude that allowing

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<sup>18</sup> This determination must be made “whether or not water quality is significantly lowered.” (EPA Guidance, p. 7.)

<sup>19</sup> In this connection, the record is devoid of any information about a purported housing and economic expansion that would otherwise support any degradation. Indeed, the City in its permit application disclaimed any need for the discharge based on housing and economic expansion. Instead, the City opted to cap their discharge at the currently permitted level and handle the increased waste volumes through their Integrated Recycled Water Program. Thus, there was no justification for the Board to conclude that the likely degradation was necessary in order to accommodate any housing and economic expansion.

<sup>20</sup> Also absent is any finding, required under Tier 2, “that all *other* new and existing point sources are achieving the highest regulatory requirements and that nonpoint sources are controlled by best management practices.” (*Horinko, supra*, 279 F.Supp.2d at p. 751 (emphasis in original).)

a discharge that will only worsen the *Ludwigia* infestation is in the maximum benefit to the people of the state? Unfortunately, the Regional Board did not conduct a complete antidegradation analysis that would have included a complete analysis of the economic and social costs of the discharge.

Last, the Regional Board's justification for the discharge—that the facility already applies tertiary treatment or the equivalent, “which is a high level of treatment that is considered BPTC for most constituents in the wastewater”<sup>21</sup>—is inapposite given that “[t]he critical issue in determining whether the three-part test established by the policy must be applied is not the level of treatment provided, but whether receiving waters will be effected [sic].” (Attwater Memo, p. 5.) In the case of the Santa Rosa permit, the record was replete with evidence that the discharger could do more through facility optimization and improvements to achieve greater de-nitrification in its discharge. Yet the Board shirked its responsibility to require such improvements, leaving the discharger instead only to *study* the feasibility of improvements all while water quality in Laguna de Santa Rosa would continue to degrade. The result is an overall failure on the part of the regional board to faithfully implement the state's antidegradation policy.

c. Agricultural Waiver of Waste Discharge Requirements - Region 5

It is well accepted that agriculture is the leading source of pollution in assessed rivers and streams as well as lakes across the nation. (Office of Water, U.S. EPA, National Water Quality Inventory, 2000 Report 15, 22 (EPA-841-R-02-001, Aug. 2002).) This is no different in California where, statewide, approximately 9,493 miles of rivers/streams and some 513,130 acres of lakes/reservoirs are listed on the 303(d) list as being impaired by irrigated agriculture. (State Water Resources Control Board, About Agricultural Waivers at [http://www.waterboards.ca.gov/agwaivers/docs/about\\_agwaivers.pdf](http://www.waterboards.ca.gov/agwaivers/docs/about_agwaivers.pdf).) Of these, approximately 2,800 miles, or approximately 28%, have been identified as impaired specifically by pesticides. (*Id.*)

With such a dramatic impact on the environment, one would expect that implementation of the state's antidegradation policy with respect to agricultural discharges would be particularly stringent. That, however, is not the case. For example, in 2006, the Central Valley Regional Water Quality Control Board adopted two conditional waivers of waste discharge requirements for discharges from irrigated lands: one for individual dischargers, Order No. R5-2006-0054, and one for categorical groups of dischargers, R5-2006-0053.

The findings that the Regional Board made with regard to these waivers and their consistency with the state's antidegradation policy are located in Finding 23 of the coalition group waiver and Finding 21 of the individual discharger waiver. The two findings are identical. According to the Regional Board, it was not necessary to conduct an antidegradation analysis because (1) many of the water bodies impacted by the discharges were already impaired water

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<sup>21</sup> Order No. R1-2006-0045 p. F-11.

bodies such as to preclude application of Resolution 68-16, which only applies to high quality waters; and (2) the waivers prohibit discharges that would result in any degradation anyway.

Such statements indicate that the Regional Board has not learned any lessons from the mistakes it made with regard to degradation and its regulation of food processors. First, in adopting the 2006 waivers, the Regional Board only applied Resolution 68-16, ostensibly because "[t]he Conditional Waivers implement the Water Code, not the Clean Water Act." (Staff Report in Support of Item \_\_, June 22, 2006, Appx, B Response to Comments, p. 22.) As discussed above, however, the federal requirements of the state's antidegradation policy also apply to conditional waivers and non-point sources. (*Supra*, p. 16; *see also* Attwater Memo, pp. 6, 9; EPA Guidance, p. 5.) After all, the policy is part of the state's water quality standards such that it cannot be ignored even when just implementing the Water Code. Thus, the Regional Board should have analyzed and made findings regarding the impact that the waivers would have on water quality even in impaired waters, conducting a Tier 1 analysis.

Second, with regard to the high quality waters, the Regional Board states on the one hand that the waivers do not authorize further degradation of such waters, yet on the other, requires only that discharges comply with water quality standards. Water quality in so-called "high quality waters," though, exceeds water quality standards, so allowing discharges that meet water quality standards will *de facto* lower the high water quality to the water quality standard. As such, Tier 2 findings would be required, yet such findings—regarding the necessity of lowering water quality to accommodate important economic or social development in the area, and that the highest statutory and regulatory requirements for all new and existing point sources and all cost-effective and reasonable best management practices for non-point sources are being achieved—are absent from the waivers or the supporting staff report.

Third, the Regional Board's antidegradation analysis assumed full compliance with the waiver such that participants would actually apply best management practices that would meet water quality objectives. However, the waivers themselves never specify the best management practices that should be adopted. Thus, the Board adopted a "wait and see" approach wherein degradation that arises as a result of the waivers would be dealt with in the future. This, though, was the same approach that the Board adopted with the food processors—an approach that has proven itself to be entirely inadequate.

d. Sterling Caviar LLC - Region 5

Sterling Caviar, LLC owns and operates a fish farm that produces white sturgeon and caviar. The farm discharges waste that includes solids from uneaten feed and fish feces, along with arsenic, nitrate, and manganese as well as chemicals and therapeutic agents into the Betts-Kismat-Silva preserve, a wetland established by the Natomas Basin Conservancy as part of a habitat conservation plan for protecting the endangered Giant Garter Snake and the Swainson's Hawk.

For the past 21 years, this discharge has been occurring without any authorization. In March 2007, the Central Valley Regional Board finally issued the facility a permit. In doing so, the Board reasoned that issuing the permit was consistent with the state's antidegradation policy because the permit did not provide for an increase in the volume and mass of pollutants that had been discharged up till then. (Order No. R5-2007-0012, p. F-26.) In other words, the Board used present water quality as the baseline for their analysis *even though that water quality had resulted from an illegal discharge*. Not only does this fly in the face of the state's antidegradation policy itself, it also runs counter to the state's implementation guidance that says that the baseline for analysis is the best water quality obtained since 1968 "unless subsequent lowering was due to regulatory action consistent with State and federal antidegradation policies." (APU 90-004, p. 4.) An illegal discharge, however, is not regulatory action "consistent" with the state's antidegradation policy. As such, the baseline in this case could not include the unlawful discharge. Rather, the Board should have utilized background water quality absent the unlawful discharge as the baseline.

Using that baseline, degradation under the permit will clearly occur even though the permit assures compliance with water quality objectives—background water quality is by definition cleaner than the water quality objectives. Thus, the Board should have conducted a Tier 2 analysis. Instead, the Board made a series of findings that the Board interpreted as demonstrating consistency with the state's antidegradation policy. These findings, however, are inadequate and inapposite to that policy. For instance, the Board found that the permitted discharge was consistent with the state's antidegradation policy because the discharge "will not have significant impacts on aquatic life, municipal and domestic supply, and recreation uses." (Order No. R5-2007-0012, p. F-27.) The requirement for an antidegradation analysis, however, "does not depend upon identification of any discernible impact on beneficial uses." (Attwater Memo, p. 5.) Rather, what matters is whether a discharge will degrade water quality in relation to the baseline.

Next, the Board found that the permitted discharge was consistent with the state's antidegradation policy because compliance with the permit "will ensure the discharge does not cause a violation of water quality objectives, requires the use of best practicable treatment or control of the discharge, and ensures the highest water quality consistent with the maximum benefit to the people of the State will be maintained." (Fact Sheet, F-27.) Absent from this finding is the finding under Tier 2 that the lowering of water quality is necessary to accommodate important economic and social development. As EPA Guidance sets out, such a finding must be made "whether or not water quality is significantly lowered." (EPA Guidance, p. 7.) According to EPA, such a finding must include a determination that economic and social development will occur as a result of the discharge, that that development *requires* a lowering of water quality that cannot be mitigated through reasonable means, and that the lowering of water quality does not result from inadequate treatment, less-than-optimal operation of adequate treatment facilities, or a failure to implement methods to reduce or eliminate non-point source pollution. (*Id.*)

The Board made none of these findings. Indeed, nowhere in the record is there any consideration of any alternatives to the discharge. For discharges to a Tier 2 water body, the absence of such consideration clearly manifests faulty implementation of the state's

antidegradation policy. This is particularly unfortunate in this case given that the receiving water is a preserve established to protect endangered species. By cursorily allowing degradation of that receiving water, the Regional Board put those species and the plans to protect them at risk. Clearly, this is not a result that could ever have been intended under the Porter-Cologne and Clean Water Acts.

e. Fish Hatcheries - Region 6

On a single day in 2006, the Lahontan Regional Water Quality Control Board considered the renewal of five discharge permits for five fish hatcheries on the east slope of the Sierra: Hot Creek Fish Hatchery (R6V-2006-0027), Mojave River Fish Hatchery (R6V-2006-0028), Mount Whitney Fish Hatchery (R6V-2006-0029), Fish Springs Fish Hatchery (R6V-2006-0030), and Black Rock Fish Hatchery (R6V-2006-0031). In terms of implementing the state's antidegradation policy, the five permits were identical. Each contained a single finding that stated:

Section 131.12 of 40 CFR 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 Water Board Resolution No. 68-16, which incorporates the requirements of the federal antidegradation policy. Resolution No. 68-16 requires that existing quality of waters be maintained unless degradation is justified based on specific findings. As discussed in detail in the Fact Sheet (Attachment F) the permitted discharge is consistent with the antidegradation provision of 40 CFR §131.12 and State Water Board Resolution 68-16.

Each order also included the following single statement in Attachment F:

Section 131.12 of 40 CFR 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 Water Board Resolution No. 68-16, which incorporates the requirements of the federal antidegradation policy. Resolution No. 68-16 requires that existing water quality is maintained unless degradation is justified based on specific findings. As discussed in detail in this Fact Sheet, the permitted discharge is consistent with the antidegradation provision of 40 CFR §131.12 and State Water Board Resolution No. 68-16.

No other "detail," however, was provided in either the orders or the fact sheets, not even the pro forma analysis often found in permit renewals that because the permit maintains the status quo, no degradation will occur. The basis behind the Regional Board's determination that these

orders were consistent with the state's antidegradation, therefore, remains a complete mystery.<sup>22</sup> This not only violates the letter and spirit of the state's antidegradation policy, it also violates the basic requirements of administrative law that the Regional Board "bridge the analytic gap between the raw evidence and ultimate decision or order." (*Topanga Assn. for a Scenic Community v. County of Los Angeles* (1974) 11 Cal.3d 506, 515-16.)

f. General Industrial Stormwater Permit - State Board

The State Board itself is not wholly without fault in failing to implement the state's antidegradation policy. For example, in 1997, the State Board adopted Water Quality Order No. 97-03-DWQ, a statewide general permit authorizing the discharge of industrial stormwater under certain conditions. As a NPDES permit, one would have expected the State Board to make some finding regarding the state's antidegradation policy. However, no such finding can be found in the permit or the supporting fact sheet.

Indeed, as noted above, it is not even clear how the State Board could have even made such a finding—and thereby issue the general permit—given that the state's antidegradation policy requires that findings be made that are specific to the particular and individual water bodies that will be impacted. (See 40 C.F.R. § 131.12(a)(2) (requiring finding that "allowing lower water quality is necessary to accommodate important economic or social development *in the area where the waters are located.*" (emphasis added)); EPA Guidance, p. 4 ("Prior to proceeding with a detailed analysis . . . the affected water body should be assessed to determine whether or not it falls into either Tier I or Tier III.")) In the case of the industrial stormwater permit, then, the State Board would have had to have required some review and approval of the NOI's filed subsequent to the permit with specific focus and attention given to the individual water bodies that would be receiving the discharges. (*Horinko, supra*, 279 F.Supp.2d at p. 761.) No such review or approval takes place, however, under this permit. Consequently, there was and will

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<sup>22</sup> The use of such "boilerplate" language is not isolated to these cases, but rather is rampant, demonstrating a failure on the part of the regional boards to give each discharge the particularized attention it deserves. For instance, in the course of a single year (2006), of the ten individual NPDES permits issued by the North Coast Regional Water Quality Control Board, six contained identical language as above in the findings and fact sheet referencing a nonexistent discussion in the fact sheets regarding how the permit was consistent with the state's antidegradation policy. (See Order No. R1-2006-0020, NPDES No. CA0006017, Pacific Lumber Company, PALCO Scotia; Order No. R1-2006-0049, NPDES No. CA0022888, City of Ukiah Wastewater Treatment Plant; Order No. R1-2006-0027, NPDES No. CA0024520, Sierra Pacific Industries, Arcata Division Sawmill; Order No. R1-2006-0022, NPDES No. CA0022978, Redway Community Services District, Redway Wastewater Treatment Facility; Order No. R1-2006-0007, NPDES No. CA002357, Covelo Community Services District, Wastewater Treatment Plant; Order No. R1-2006-0001, NPDES No. CA0022756, City of Crescent City, Wastewater Treatment Facility.) One permit contained no language at all in its Fact Sheet regarding antidegradation (Order No. R1-2006-0021, NPDES No. CA0022748, City of Rio Dell), and one permit focused its entire discussion regarding antidegradation on whether the permit authorized any backsliding—a completely separate requirement under the Clean Water Act. (See Order No. R1-2006-0004, NPDES No. CA0022977, City of Cloverdale.) Of the remaining two permits adopted in 2006, one was for the City of Santa Rosa discussed *supra*, and one was for a groundwater remediation project. In the course of the year, therefore, the North Coast Regional Water Quality Control Board completely failed to properly implement the state's antidegradation policy.

never be any antidegradation review at all for these discharges, clearly a violation of the state's antidegradation policy.<sup>23</sup> The result has been an abject failure to maintain water quality. For instance, between 2001 and 2002, 99.9% of samples taken from industrial facilities enrolled under the general permit in Region 4 exceeded the California Toxics Rule continuous criteria for copper. (Watershed Advisory Group, California Industrial Stormwater Data Presentation, submitted to State Board as comments on Draft Industrial Stormwater Permit (June 23, 2003).) The failure to meet water quality standards is also evident for lead (99.9% exceedance) and zinc (92.4%). (*Id.*) Clearly, then, degradation of the state's waters is occurring despite the state's antidegradation policy.

g. City of Fortuna WWTP - Region 1

As suggested above, the use of boilerplate language in the findings and the fact sheets of permits is rampant and indicates the failure by the regional boards to give each permitting decision the particularized attention that decision deserves. For instance, the North Coast Regional Board issued a tentative permit for the City of Fortuna Wastewater Treatment Plant in 2007. The fact sheet said that "This Order may allow some degradation of the quality of waters of the state by virtue of the fact that it permits the discharge of waste containing suspended solids and elevated temperature above ambient conditions into a waterway containing suspended solids and temperature." Apparently, this is the same template language that the North Coast Region tends to use in all of its permits. After all, the antidegradation language in the Santa Rosa permit discussed above tracks this language closely. (Order No. R1-2006-0045, p. F-11 ("This Order may allow some degradation of the quality of waters of the state by virtue of the fact that it permits the discharge of waste exerting a biochemical oxygen demand, containing suspended solids, biostimulatory substances and elevated temperature above ambient conditions into a waterway impaired for dissolved oxygen, sediment, nitrogen, phosphorus, and temperature.").)

After ELF provided comments on the draft order, staff altered the finding, finding instead that the discharge would not result in any degradation. According to the response to comments, "[u]pon reviewing this permit template language, I find that it is not applicable to the City of Fortuna wastewater treatment facility." (Lisa Bernard, Sanitary Engineering Associate, North Coast Regional Water Quality Control Board, letter to Dan Gildor, Environmental Law Foundation, Response to Comments on Draft Board Order R1-2007-2007, NPDES Permit No.

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<sup>23</sup> The same is true of the general waste discharge requirements issued by the North Coast Regional Water Quality Control Board for sand and gravel mining, Order No. R1-2005-0011. That Order authorizes such operations regardless of the characteristics of the particular water bodies in which these operations occur. Some of these water bodies, though, are Outstanding National Resource Waters in which no degradation can be allowed. Yet the General Permit is silent with regard to these rivers despite acknowledging that it only assures that water quality objectives will be maintained. (Executive Officer's Summary Report Regarding Public Hearing to Consider Adoption of a Negative Declaration and Order No. R1-205-0011, Item 2, June 21, 2005, pp. 1-2 ("The General WDRs authorize discharges associated with sand and gravel mining, excavation, and aggregate washing activities *only to the extent that such discharges will not violate water quality objectives* of the Water Quality Control Plan for the North Coast Region" (emphasis added)); see also Order No. R1-2005-0011 §§ C (discharge prohibitions), D (receiving water limitations) (detailing compliance only with water quality standards).)

CA0022730, April 23, 2007, p. 1.) This response begs the question why it took a comment letter shining a light on the language regarding compliance with the state's antidegradation policy to have staff "review the permit template language" and adjust it to fit the particular circumstances of the discharge being authorized. One can only wonder how many other permits have been adopted without the benefit of such "review."

Overall, then, it is clear that the state and regional boards are failing to properly implement the state's antidegradation policy. The State Board, therefore, must revise and formalize the procedures to implement that policy if that policy is ever going to be faithfully and consistently implemented.

***D. The State Board Must Revise and Formalize the Procedures to Implement the State's Antidegradation Policy in Order to Prevent Further Unnecessary Degradation***

In light of the above, it is clear that the State Board must revise and formalize the procedures to implement the state's antidegradation policy. The formalized procedures should clearly set out the steps that regional boards must take to properly implement the state's antidegradation policy. Accordingly, the undersigned request that the State Board adopt the following general procedures as the state's policy for implementing the state's antidegradation requirements.

- a) **Scope and Coverage:** The state's antidegradation policy shall extend to any discretionary action undertaken by the State or regional boards that may result in a lowering of water quality. The procedures below must be followed in implementing that policy.
  
- b) **Individual permits:**
  1. **Establishing the baseline:** Prior to approving any application or request relating to a proposed or existing discharge of waste, the state or regional boards shall require the applicant to propose what baseline water quality should be for purposes of conducting future antidegradation analyses. That baseline shall be set at the best water quality of the receiving water since 1968. Upon submission of a proposed baseline, the state or regional boards shall review the proposal and alter it as they deem appropriate. Prior to approving the application, the state or regional boards shall provide for public comment specifically on the baseline subsequent to the public notice provisions below. Once adopted, the baseline shall remain fixed unless water quality in the receiving water improves. The state or regional board shall require dischargers to continually monitor water quality and shall update the baseline accordingly but only in a manner that reflects improving water quality.

If establishing the baseline is infeasible, then the baseline shall be set, for purposes of the present applicant only, at the level of water quality that would

be attained in the water body absent any present and historical discharge by the applicant.

2. Establishing degradation: Prior to approving any application or request relating to a proposed or existing discharge of waste, the state or regional boards shall require the applicant to demonstrate through water quality modeling whether the discharge will possibly lower water quality in the receiving water from the baseline determined above. An increase in mass loading of any pollutant is sufficient to qualify as degradation. This demonstration must factor in all other previous and proposed discharges and reasonably foreseeable discharges to the receiving water as well as the applicant's compliance history.
3. Tier 1 protection: If lower water quality from the baseline is possible for any pollutant in the discharge stream that is presently impairing existing uses in the receiving water, the discharge of that pollutant shall only be allowed pursuant to an adopted and approved TMDL. All effluent dominated waters shall be afforded Tier 1 protection.
4. Tier 3 protection: If lower water quality from the baseline is possible for any pollutant in the discharge stream for a receiving water that is, or is upstream from a water body that is, an Outstanding National Resource Water, the discharge shall be prohibited unless lower water quality
  - (i) is strictly limited in time (i.e., less than one month);
  - (ii) will not impact any of the receiving water's resource values; and
  - (iii) is necessary for an activity that will improve water quality.

Discharges of treated sanitary wastewater may be allowed if there is no alternative discharge location, the discharge will not result in unreasonable lowering of water quality, and if the discharge existed before the receiving water was determined to be an Outstanding National Resource Water.

5. Tier 2 protection: The state or regional boards shall not take any discretionary action determined above to lower water quality for any pollutant in the discharge stream without first demonstrating subject to the public notice provisions below and in conjunction with the discharger if appropriate that (1) there shall be achieved the highest statutory and regulatory requirements for all other new and existing point sources in the watershed in which the degrading discharge occurs; (2) there shall be achieved all cost-effective and reasonable best management practices for nonpoint source control in the watershed in which the discharge occurs; (3) the social or economic

development being accommodated by the discharge is important; (4) the discharge is necessary; (5) lower water quality is in the maximum benefit of the people of the State and (6) resulting water quality fully protects existing uses. This demonstration shall be required regardless of whether the discharge is new or existing and whether the projected lowering of water quality from the baseline is significant or not.

(i) *Demonstrating Importance and Maximum Benefit:* In order to demonstrate whether the economic or social development being accommodated is important and whether the lower water quality is consistent with the maximum benefit to the people of the State, the state or regional boards must fully engage in the public notice provisions below. The state and regional boards shall make their own independent finding regarding importance. The state and regional boards shall not defer to any other finding regarding importance but may take such findings into account. In determining whether lower water quality is consistent with the maximum benefit of the people of the State, the state or regional boards shall consider at a minimum:

- (1) the present condition of the local economy, the changes in the number and types of jobs expected as a result of the proposed activity, state and local tax revenue to be generated as a result of the proposed activity, and other economic and social factors as the state or regional board deems appropriate;
- (2) the anticipated impact of the proposal on human health and endangered or threatened species;
- (3) the benefits associated with maintaining a higher level of water quality for uses such as fishing, recreation, tourism and other commercial activities, aesthetics, or other use and enjoyment by humans;
- (4) the benefits of preserving assimilative capacity for future industry and development.

The state and regional boards may rely on prior findings regarding the importance of the permitted activity provided that nothing has substantially changed that might alter the original finding.

(ii) *Demonstrating necessity:* In order to demonstrate the necessity of the discharge, the discharger shall analyze a range of alternatives

that includes both non-degrading as well as less degrading alternatives and mitigation measures. The alternatives considered must at a minimum include:

- (1) pollution prevention techniques or alternative production methods (such as changes in plant processes, source reduction, and substitution with less toxic substances) and water conservation measures;
- (2) Additional or enhanced treatment levels;
- (3) Improved operation and maintenance of existing treatment systems;
- (4) Discharge to a collection system that provides a higher level of treatment than proposed;
- (5) No-discharge alternatives that incorporate recycling or reusing wastewater, or land application where appropriate;
- (6) Increased storage requirements that preclude or limit the necessity of a discharge;
- (7) Seasonal or controlled discharge options to avoid critical conditions of water quality.

Failure by the discharger to incorporate technologically feasible alternatives shall result in the denial of the permit. Cost savings alone, absent any demonstration as to how these cost savings are necessary to accommodate important social and economic development (see above), shall not be a sufficient basis for determining necessity.

Dischargers that can demonstrate that they are already achieving an advanced level of treatment shall only have to demonstrate that no less degrading or non degrading alternative has become available since the discharge was last authorized. If such an alternative has become available, the discharger must adopt such alternative or else the regional or state board shall deny the permit.

c) General Permits:<sup>24</sup>

1. The coverage of general permits shall not extend to water bodies whose water quality is not sufficient to protect all existing and designated uses or to Outstanding National Resource Waters.
2. In all other cases, general permits may be issued or renewed provided solely that
  - (i) The general permit provides that the requirements set forth above for individual permits are met in each individual application of the general permit and describes in detail how the permit ensures that cumulative uses of the general permit will not result in an unreasonable lowering of water quality.
  - (ii) The general permit prohibits discharges that individually or cumulatively lower water quality or cause or contribute to exceedances of Water Quality Standards.
  - (iii) The general permit contains an adequate monitoring program sufficient to determine compliance with the above prohibition.
  - (iv) The general permit contains provisions to provide public notice of individual applications for coverage under the general permit to all interested parties defined below as well as in the local paper and on the state or regional board's websites. Such notice shall provide the public with 30 days to provide comment on the application and its consistency with the state's antidegradation policy. Such notice shall list the facilities involved and the affected receiving waters; a description of the process used to identify and select the least degrading alternative that can be feasibly implemented; a review by staff of the likelihood that such application and use of the general permit will result in lower water quality within the receiving water; and a contact name to receive comments. Staff's review shall include but not be limited to a review of all sampling data and any other appropriate information available to board staff. A public hearing shall be held regarding the application's consistency with the state's antidegradation policy upon request of any member of the public.

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<sup>24</sup> Nothing herein should be interpreted as an admission regarding the validity of general permits under the Clean Water Act.

- (v) The regional and state boards shall maintain lists of interested parties that shall receive the notices described above. Any member of the public shall be added to such lists upon request.

The state or regional boards shall require an individual permit whenever public comment or the agency's own determination demonstrates that the proposed activity may result in an unreasonable lowering of water quality.

d) Public notice:

- (i) Any public comment period related to implementation of the state's antidegradation policy shall not be for less than 30 days from the date of the notice.
- (ii) The state or regional boards shall provide an early opportunity for public comment on any discretionary act that might lower water quality. For any request for authorization or certification of a discharge or any other request relating to a discharge, notice of the opportunity to comment on such request shall be published within 30 days of receipt of the request. The notice shall provide a description of the proposed activity and shall include an identification of the water quality parameters for which there is expected to be a lowering of water quality, an overview of the water body expected to experience lowered water quality including any information regarding whether the water body should be designated an Outstanding National Resource Water, the uses that are most sensitive to lowered water quality, and a description and overview of the alternatives that the discharger has considered.
- (iii) Notice of all proposed activities that may lower water quality shall also be provided to the California Resources Agency, the Department of Fish & Game, the United States Fish and Wildlife Service, the United States Environmental Protection Agency, and any affected local or areawide planning agencies. The state or regional boards' executive director may initiate additional federal, state, or local intergovernmental consultation as appropriate. The notice shall specifically request in addition to general comments, input regarding a determination that the economic or social development being accommodated is important and whether lower water quality will be consistent with the maximum benefit of the people of the State.
- (iv) A summary of any review comments and recommendations provided by local or regional planning commissions, zoning boards

and any other entities the state or regional boards consult regarding the proposal shall be made part of any tentative or final order.

(v) The state or regional boards shall use all reasonable efforts to provide notice to the community and shall provide notice to all known interested parties. The state or regional board shall maintain a list of such interested parties, and interested parties shall be added to such a list upon request. Notice may be made via electronic mail.

(vi) Upon the close of the public comment period provided in the notice, the state or regional boards shall collect all comments and transmit them, along with any state or regional board comments on alternatives, to the discharger who shall then incorporate the proposed alternatives or demonstrate that the proposed alternatives will either not result in better water quality than originally anticipated under the discharger's plans or are technologically infeasible or economically unreasonable. Failure to incorporate comments in this manner shall result in the denial of the permit.

e) ONRWs:

1. The State Board shall maintain a directory of all water bodies that have been determined to be Outstanding National Resource Waters. In authorizing or certifying any activity in a water body that has not yet been designated an Outstanding National Resource Water, the state or regional boards shall consider and evaluate designating that particular water body as an Outstanding National Resource Water.
2. All Areas of Special Biological Significance shall be considered Outstanding National Resource Waters. River segments that are components of the state and/or federal Wild and Scenic River systems shall also be considered Outstanding National Resource Waters.

f) Findings: In making any finding regarding the consistency of any state or regional board action with the state's antidegradation policy, the state or regional board must document in the findings or supporting fact or information sheet the basis for those findings complete with citations were appropriate.

g) Definitions:

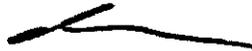
1. *Unreasonable lowering of water quality.* An unreasonable lowering of water quality is the lowering of water quality that can be prevented through the application of technologically feasible alternatives.

2. *Effluent dominated waters:* A water body is an effluent dominated water if it is dominated or greatly influenced by any particular discharge or group of discharges. Such water bodies shall have their physical integrity as it existed prior to 1975 maintained and protected unless it can be established that such physical integrity is not necessary to support any species that were present that are adapted to the ephemeral or intermittent flow conditions and that the physical integrity is not necessary to protect species from invasive species.
3. *Advanced level of treatment.* Dischargers that implement the best available technology or controls shall be determined to provide an advanced level of treatment.

***E. The State Board Has the Authority to Formalize the State's Antidegradation Policy and Revisions to the Policy's Implementing Procedures***

California Water Code Section 13160 designates the State Board as the state water pollution control agency for all purposes stated in the federal Clean Water Act. Thus, it falls on the State Board to develop a statewide antidegradation policy and to identify the methods for implementing that policy given federal requirements for such actions. (40 C.F.R. § 131.12(a).) The same results under state law given that Water Code Section 13140 exclusively empowers the State Board to "formulate and adopt state policy for water quality control." (Water Code § 13140.) Moreover, Water Code Section 13143 requires the Board to periodically review and revise state policy for water quality control, such as the antidegradation policy and its implementation procedures. Accordingly, the State Board has the authority to revise, reissue, and formalize implementation procedures regarding the state's antidegradation policy. The undersigned petitioners, therefore, call on the State Board to take this action today so that the steady decline in water quality in California's waters can be stopped and reversed. Failure on the part of the State Board to do so this will result in Petitioners seeking redress from EPA or the courts as appropriate.

Sincerely,



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*on behalf of*

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Chairwoman Tam Doduc and Fellow Board Members  
Re: Implementation of California's Antidegradation Policy  
Page 36

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cc: Alexis Strauss [via U.S. Mail]  
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## **Russian River Watershed Protection Committee**

**P.O. Box 501**

**Guerneville, CA 95446**

**(707) 869-0410**

**rrwpc-1@comcast.net**

September 1, 2008

Tam Doduc, Chair and Members  
State Water Resources Control Board  
1001 I St.  
Sacramento, CA 95814

VIA EMAIL: [commentletters@waterboards.ca.gov](mailto:commentletters@waterboards.ca.gov)

Re: Statewide General Permit for Landscape Irrigation Uses of Recycled Water and Recycled Water Policy

Dear Ms. Doduc and Board Members:

Russian River Watershed Protection Committee (RRWPC) is aware that your Board has been developing a Recycled Water Policy. We recently learned that you are also developing a Statewide General Permit for landscape irrigation uses of recycled water. We would be interested in obtaining information on how development of the permit and the policy intersect with one another as they evolve through their processes.

RRWPC represents about 1500 supporters who live, work, recreate, and own property and businesses in the lower Russian River. We are a nonprofit corporation and have been in existence since 1980. We have tracked water and wastewater issues in our area all that time, and inform the public of governmental policies and projects that affect and address our water quality and quantity concerns.

Our commentaries are provided to and published by several local newspapers. We also distribute informational mailers to our supporters every other month. We are members of the Sonoma County Water Coalition and the Sonoma County Conservation Council, among others. We attend most meetings of our local Supervisors, Councils, Utilities Departments, Agencies, etc. where water and wastewater issues are addressed.

It is my understanding that the State Water Board is scheduled to soon release for public review a draft policy proposal for recycled water use and a proposed

General Permit for application of irrigated wastewater. I wanted to inform you of our major concerns on this topic. We also intend to provide comments when the draft policy/permit is formally released for public review. We request that this letter and attachments, including 8 pictures be entered as part of the record for these issues. Please inform us of the status of the record and whether we will need to resubmit these documents.

We share the concerns so eloquently expressed by Linda Sheehan of the California Coastkeeper Alliance and others in their two lengthy letters (June 22, 2007 and Oct. 26, 2007) on the Water Recycling Policy and the June 26, 2008 letter on the General Permit. For us, the most salient issue for both the Policy and the General Permit is the unresolved issue of "incidental" runoff.

We also agree that the State is facing severe water shortages and that this new recycling policy and general permit is a way for you to take forward steps in addressing the problem. Our thoughts were encapsulated in a statement by Ned Orrett, a respected environmental engineer from Petaluma (water conservation expert) when he recently wrote, *"Non use of a resource is always preferable to using (and recycling it), especially when non use is the result of improved efficiency so that no sacrifice is involved."*

RRWPC is developing research to show that millions of gallons of water can be saved each year by repairing wastewater infrastructure. This will be a topic for another letter in the near future and we will not go into details now.

We share Linda Sheehan, (et. al.), concerns that many harmful constituents in the wastewater are unregulated, yet their significant harm is becoming more and more apparent. Reports abound not only about harm to the fish, but also to the other aquatic life and particularly the amphibians. Studies have shown that the birds and marine mammals are affected as well. (Reproductive problems of birds have been extensively documented.) Recent reports further indicate that species extirpation has been also documented at an increasingly alarming rate.

The Living Planet Index, compiled by the World Wildlife Fund and others, claims that the bird, fish, mammal, reptile, and amphibian populations have dropped by almost a third in the last 35 years. The main causes for this precipitous decline are attributed to pollution, agriculture, urban expansion, over-fishing and hunting. Between 1960 and 2005, as the world's population doubled, marine bird species have fallen by 30%, land-based species by 25%, marine species by 28%, and freshwater species by 29%. Biodiversity is a significant marker of the health of the environment and these levels are at a level not seen since the dinosaur age.

In regard to the issue of recycling wastewater, of particular concern is the recent discovery of an array of toxins in drinking water supplies nationwide, known to be present in the waste-stream. Pharmaceuticals and personal care products are neither monitored nor regulated, yet are known to cause serious harm to human and environmental health. Regulators have thus far ignored the call to demand precaution from those involved with creating, utilizing, and processing these chemicals, so prevalent in our daily life.

There has been a predominant disassociation between massive cancer incidences, especially among people under 50 years old, and exposure to environmental toxins. As cancer incidences grow, regulators have clung to antiquated risk assessment methodology as the required precursor to regulatory standards. Regulations must be transformed from using consumers, workers, and wildlife as guinea pigs for the chemical, pharmaceutical, personal care, cleaning product, and manufacturing industries. Clean water regulations must protect the public and hold companies accountable for the "collateral damage" from their products.

Nutrients and salts are also cause for concern. It is the nutrient issue that is of particular concern to our area, especially in regard to surface water. We were disappointed that the policy appears to focus exclusively on groundwater and avoids mention of surface water impacts. Below we describe the Laguna de Santa Rosa nutrient and sediment impairments and their impacts on a burgeoning *Ludwigia* problem.

We strongly support Ms. Sheehan's comments that the General Permit must be a Joint NPDES Permit/WDR. She states, (p. 5 of the June 26, 2008 letter), "*By authorizing these discharges with an NPDES permit that includes the conditions needed to protect water quality, the State Board both safeguards beneficial uses and relieves dischargers of potential liability for violating the Clean Water Act...*" We also strongly agree that recycled wastewater (It IS recycled WASTEWATER, and not recycled WATER.) should not be administered under the Storm Water (MS4) permit structure for the reasons she enumerated.

We also support the author's recommendations for the contents and applications of the General Permit and especially support the proposed limits on user eligibility. We are most concerned about the extreme carelessness of current irrigators using potable water. The Sonoma County Water Agency has publicized their concerns extensively about limited summer water supplies. Yet people continue to over-irrigate their lawns. Some of the worst offenders are the business parks, which are slated to use much of Santa Rosa's recycled wastewater when it becomes available.

We remember one wealthy speaker at a hearing on fee increases indicating that he uses 70,000 gallons of water a month, mostly on his garden. Because he has a

lot of money, he's willing to pay the price. Partly because of this situation, during last year's water shortage, the City had to hire a "water cop" to go around and field complaints of over irrigation (articles attached). Citizens are usually willing to cooperate in an "emergency" situation, but if they were using wastewater, which in most cases looks like potable water, they could have a hard time understanding the need for greater care. We can imagine many situations where kids, charged with watering the lawn as one of their chores, might think it funny to spray their younger siblings or friends.

Santa Rosa has been planning a \$150 million dollar recycling project to eventually irrigate about 2 billion gallons a year. They have stated repeatedly that they will not build the project without a Basin Plan Amendment that allows "incidental" runoff, thus far an undefined term. While their system is better than most and seems to be fairly well run most of the time, nevertheless almost every year they have some permit violations. Because of the carelessness of current irrigators, we have deep concerns about allowing wastewater runoff at a time when there is very little water in the streams, and are already severely impaired.

Some City Staff have privately admitted that the business park in which City buildings reside, currently allows irrigation runoff (potable water) on a regular basis, even after all the publicity about needing to conserve water. One day I attended an early meeting at the Santa Rosa Wastewater Treatment Plant and discovered puddles from irrigation with wastewater right before their front door. When I called it to the attention of staff, it was immediately cleaned up, but I doubt that any spill report was made. On subsequent occasions in the same location, I noticed the sidewalk was wet, although there were no puddles. I have also noticed over-irrigation right in front of their Utility Department offices at a different location.

One day, driving down a major road in Sonoma County through an agricultural area, a very powerful irrigation pump was shooting wastewater across the road. If I hadn't closed my window in time, it would have landed on my face. I reported that incident, but never heard anything back on it. Staff should contact the person reporting the incident to inform them of what action has been taken and the outcome. Finally, my last story may be the best of all.

I was doing some research at the North Coast Regional Board in Santa Rosa and briefly chatted with one of the staff people who informed me that their business park wouldn't even allow low water use landscaping. I was told that the managers of the complex frequently allowed water to runoff from their irrigation system. The Sonoma County Water Agency, ostensibly so concerned about conservation, would do nothing about it.

I went away for a while, and when I returned, lo and behold, the sprinklers were watering the grass, the street and the gutters in front of the Regional Board's office. This time I took pictures (August 26, 2008), which I attach to this email. The problem of controlling irrigation practices, even during water short periods, is a difficult one. To give these same people (business park managers/owners) responsibility for managing irrigation with wastewater without ample oversight is asking for large-scale contamination of our waterways and our drinking water supply and must not be allowed.

The thought that "incidental" runoff may be translated to mean that large-scale pollution is permissible is particularly abhorrent to us. It is very telling that in developing their urban irrigation policies, the City of Santa Rosa has refused to include a requirement cutting off repeat offenders from their irrigated wastewater supply even though it would simply mean they would use potable water and not lose their supply altogether.

At the same time, under a Basin Plan Amendment allowing incidental runoff, it is likely that citizens would lose their ability to petition the courts if the Regional Board was unwilling or unable to take action. It is very telling that the current budget impasse may be causing some Regional Board staff to find other employment opportunities. I have heard that most of the RB1 enforcement unit has left and many enforcement actions are temporarily on hold. Furthermore, it is getting more difficult to find qualified, let alone talented people to replace those who leave.

I say this only to point out that real life makes it impossible to protect the environment at all times and adequate protections need to be built in to the regulations so as to acknowledge this reality. (I believe that current staff at RB1 are outstanding. I am not trying to imply their job performance is lacking in any way, merely that circumstances, such as a lack of a State budget and diminished funding for Board programs, sometimes make it difficult for them to perform optimally.)

RRWPC has provided a great deal of input and involvement over the years concerning the 303(d) impairment listings for the Laguna de Santa Rosa. This water body, and its tributaries, is the sink for all the developmental impacts in Santa Rosa, Rohnert Park, and Cotati. It is a flood plain for the Russian River and during large floods; the river backs up and turns the Laguna into a giant lake. The floods even back up into Santa Rosa's Delta Pond, from which they discharge their wastewater. The Pond opens up to allow floodwaters in during large rainfall events, turning the pond into a giant toxic soup.

The Laguna suffers from multiple impairments including nitrogen, phosphorus, dissolved oxygen, temperature, sediment, and mercury. If there were an

impairment called invasive species, the Laguna would top the list. I am including recent photos of two views of two locations taken from a road bridge looking both upstream and downstream. Wall to wall Ludwigia everywhere you look.

For the last three years, ending in 2007, the Laguna Foundation, spending over \$2 million, took on the task of removing the Ludwigia in two main locations. I have attached the Final Report. The photos included in the report show two portions of the location about one half to one mile west of Rohnert Park. It turns out that the photos I took are in the same location as several photos appearing in the final report (Ludwigia Control Project, January, 2008, Laguna de Santa Rosa Foundation)

The Executive Summary includes the following: *"Ludwigia is symptomatic of underlying problems in the Laguna. These problems will be solved only through watershed-level efforts including reduction of nutrient, sediment and summer water inputs, as well as physical changes to the problem areas including large-scale restoration. Because these actions take considerable time, efforts should be taken to ensure that ground gained through the project period is not lost."*

The report states (about the two locations where my photos were taken), *"...the others are fed by urban and agricultural runoff during the dry season."* The channels are largely unshaded. And, *"...until recently the floodplain would drain each summer, it currently retains up to 1/2-3 feet of water during the dry season. Approximately 15% of the floodplain and 80% of the channel was covered with Ludwigia prior to project activities."* From the looks of the photos, things are now back to where they were before the project, if not worse.

Vector control is also a big concern now. Page 27 of the report, in its conclusion states that, *"Reducing inputs of nutrients and sediment is paramount."* One of the suggestions for intermediate management (A TMDL is scheduled for 2011.) is water level manipulation. The document recommends sediment removal, creation of low flow channels, and reduction of summer irrigation runoff. The final statement contains a bit of irony. After spending over \$2 million, it says, *"Ludwigia responds positively to disturbance and sediment removal should always be accompanied by restorative actions such as establishment of riparian forests."* You can see from our current photos that the problem is at least as bad and perhaps worse than ever with no restoration projects planned in the near future.

Rapid growth in Southwest Santa Rosa and Rohnert Park over the last 15 years has caused a great deal of sediment to be released into the waterway. Over ten years ago the Army Corps of Engineers began studying the sediment problem and they have done next to nothing all that time. Nutrients are carried with the sediments into the channels. Lawns are common in Rohnert Park and over-

watering with either water or wastewater causes nutrients to flow into the creeks. The system is flushed with nutrients, while cooling riparian is sparse. Additional irrigation with wastewater will exacerbate the problem.

RRWPC realizes that this letter may be too late for consideration for the Board's meeting on Sept. 2<sup>nd</sup> when you will have a brief update from staff on this issue. Since the policy and permit is still an on-going process, we hope that you will enter these comments into the record and inform us of their standing. We would appreciate any response to our concerns and we welcome any questions you might have. We do not envy the huge task before you, and we would like to help in any way we can.

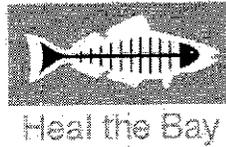
Sincerely,

Brenda Adelman: Chair

Russian River Watershed Protection Committee

CC: Cat Cuhlman: North Coast Regional Board

Linda Sheehan: California Coastkeeper Alliance



June 26, 2008

Tam Doduc, Chair and Members  
State Water Resources Control Board  
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VIA EMAIL: [commentletters@waterboards.ca.gov](mailto:commentletters@waterboards.ca.gov)

Re: Statewide General Permit for Landscape Irrigation Uses of Recycled Water:  
State Board Notice of Workshop/California Environmental Quality Act Scoping Meeting

Dear Chair Doduc and State Board Members:

California Coastkeeper Alliance, Heal the Bay, and Lawyers for Clean Water, Inc. are pleased to submit these comments in response to the State Water Resources Control Board's (State Board) request for public input on the development of a Statewide General Permit for Landscape Irrigation Uses of Recycled Water (General Permit), as required by Assembly Bill 1481 (De La Torre) (AB 1481). As the Project Discussion Paper accompanying the request for public input stated, "the intent of the new law is to develop a uniform interpretation of state standards to ensure the safe, reliable use of recycled water for landscape irrigation uses, consistent with state and federal law." Accordingly, the State Board must ensure that the General Permit fully implements the requirements of the federal Clean Water Act and the Porter-Cologne Water Quality Control Act (Porter-Cologne Act).

We take this opportunity to remind the State Board that the mandate to develop a General Permit is not a mandate to weaken existing requirements to protect the beneficial uses of the waters of the state. Rather, the law invites the State Board to develop clear, generally applicable requirements that are both consistent with the existing laws' mandates to protect water quality and ensure that water is not wasted, either by polluting water supplies with waste or by wasting water that could be safely reused. The adoption of this General Permit should be seen as an opportunity for the State Board to provide consistency in the regulation of landscape irrigation. This consistency will ensure that suppliers and those wishing to use recycled water to irrigate parks, street medians and other municipal properties, industrial and commercial centers, cemeteries, and other appropriate locations, can easily understand what is required and how those requirements can be met.

Our comments, which address the various specific questions presented in the Project Discussion Paper, provide in brief:

- A discussion of what recycled water is, what it contains, and the methods by which it can reach surface waters and ground waters (which establishes the foundation for State Board regulation of its use).
- An explanation of the need for the General Permit to be a joint NPDES permit/WDR and contain provisions that protect all potential receiving waters.
- Suggestions for the structure and required elements of the Permit.
- A discussion of which discharges should be eligible for Permit coverage.
- Insights on coordination of agencies with responsibilities for recycled water and the necessary means to ensure that all beneficial uses of the State's waters are protected.
- Emphasis on the need for full compliance with State Board Resolution No. 68-16, and some necessary elements of the State Board's antidegradation analysis for the General Permit.

### **I. Background on Recycled Water Use in Landscape Irrigation**

The Project Discussion Paper notes that recycled water, as that term is anticipated to apply in the context of the General Permit, refers to water resulting from the treatment of municipal wastewater.<sup>1</sup> Before embarking towards the adoption of a General Permit that regulates the discharge of this treated wastewater, the State Board must engage in a thorough examination of what this water is, what it contains, and how its use to irrigate landscapes will impact groundwater and surface waters downstream from its application.

Though subjected to various levels of treatment, municipal wastewater contains pollutants, including pollutants from industrial operations that discharge to the treatment works. Many of these pollutants are common, well-understood elements and compounds such as copper, lead, zinc, and other heavy metals, oil and grease, suspended and dissolved solids, and nutrients (especially nitrogen) found in biosolids that enter the waste stream.<sup>2</sup> Others are equally well-known but present a greater challenge to treat since they are alive or are otherwise able to adapt to treatment processes, and over time can escape treatment by conventional methods.<sup>3</sup> These pollutants include viral and biological pathogens, including fecal coliform.<sup>4</sup> Municipal wastewater treatment operations have improved considerably in recent years, but even with these gains, wastewater leaving the treatment works contains pollutants that must be carefully managed to prevent environmental degradation.

Municipal wastewater also contains many compounds and substances that are not well-understood, and that conventional treatment systems are not designed to address. These compounds are commonly referred to as emerging contaminants.<sup>5</sup> Emerging contaminants include

<sup>1</sup> See also Section (2)(a)(1) of AB1481.

<sup>2</sup> Municipal wastewater treatment plants require routine monitoring for all these pollutants by dischargers of secondary and tertiary treated wastewater. See e.g., *Revised Monitoring and Reporting Program for Rancho Murieta Community Services District and Rancho Murieta Country Club Wastewater Treatment and Reclamation*, California Regional Water Quality Control Board Central Valley Region, Monitoring and Reporting Program No. 5-010124.

<sup>3</sup> *Id.*; see also *Emerging Technologies for Wastewater Treatment and In-Plant Wet Weather Management*, EPA 832-R-06-006, 6-2 (February 2008). See also [http://toxics.usgs.gov/regional/emc/wastewater\\_treatment.html](http://toxics.usgs.gov/regional/emc/wastewater_treatment.html).

<sup>4</sup> *Id.*

<sup>5</sup> *Emerging Contaminants in the Environment*, United States Geological Survey, available at [http://toxics.usgs.gov/regional/emc/Emerging Contaminants Sources and Source Pathways](http://toxics.usgs.gov/regional/emc/Emerging%20Contaminants%20Sources%20and%20Source%20Pathways), United States Geological

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many compounds associated with common personal care products such as cosmetics and fragrances, as well as over-the-counter and prescription pharmaceuticals.<sup>6</sup> The potential effects of these emerging contaminants once introduced into the environment are not well understood.<sup>7</sup> However, research in the field demonstrates that the harm caused by these products is most severe to ecological receptors, including fish.<sup>8</sup> Especially in the context of developing a permit that will allow the spread of these contaminants throughout the environment into diverse ecological niches, the State Board must ensure that the General Permit contain appropriate controls to protect the environment from these contaminants from the various pathways that might bring them to water bodies. These controls must include consideration of the fact that many of these pollutants behave in complex and sometimes unpredictable manner once introduced into the environment.

The pathways by which pollutants may be introduced into the environment as a result of landscape irrigation with recycled water include:

- Runoff of pollutants in recycled water to surface waters during and immediately following irrigation.<sup>9</sup>
- Runoff of pollutants in recycled water applied during landscape irrigation that attach to sediments and later run off to nearby receiving waters during storm events.<sup>10</sup>
- Leaching of pollutants to ground water beneath the land irrigated with recycled water.
- Overflow of impoundments of recycled water awaiting use in irrigation due to improper management or as a result of rain or other storm events.<sup>11</sup>
- Leaching of recycled water to groundwater beneath these storage impoundments.<sup>12</sup>

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Survey, available at [http://toxics.usgs.gov/regional/emc/sources\\_pathways.html](http://toxics.usgs.gov/regional/emc/sources_pathways.html); *Emerging Contaminants – Wastewater Treatment Plants*, United States Geological Survey, available at [http://toxics.usgs.gov/regional/emc/wastewater\\_treatment.html](http://toxics.usgs.gov/regional/emc/wastewater_treatment.html); *Pharmaceuticals in the Environment – Information for Assessing Risk*, National Oceanic and Atmospheric Administration, available at <http://www.chbr.noaa.gov/peiar/>.

<sup>6</sup> *Emerging Contaminants in the Environment*, United States Geological Survey, available at <http://toxics.usgs.gov/regional/emc/index.html>.

<sup>7</sup> *Pharmaceuticals and Personal Care Products as Pollutants*, United States Environmental Protection Agency, available at <http://www.epa.gov/ppcp/>; *Pharmaceuticals in the Environment – Information for Assessing Risk*, National Oceanic and Atmospheric Administration, available at <http://www.chbr.noaa.gov/peiar/>.

<sup>8</sup> *Id.*; see also “Fish Devastated by Sex-Changing Chemicals in Municipal Wastewater,” National Sciences and Engineering Research Council of Canada (Feb. 2007, presented at 2008 AAAS Annual Meeting, Boston MA), available at [http://www.nserc.gc.ca/news/aaas/2008/2008\\_02\\_15-4\\_e.asp](http://www.nserc.gc.ca/news/aaas/2008/2008_02_15-4_e.asp).

<sup>9</sup> See Memorandum from State Water Resources Control Board Executive Director Celeste Cantú to Regional Board Executive Officers, Subject: “Incidental Runoff of Recycled Water,” (February 24, 2004).

<sup>10</sup> *Id.*

<sup>11</sup> For example, the community of Rancho Murieta uses its treated municipal wastewater to irrigate golf courses within this planned community. *Cease and Desist Order Requiring Rancho Murieta Community Services District and Rancho Murieta Country Club Sacramento County to Cease and Desist from Discharging Contrary to Requirements*, California Regional Water Quality Control Board Central Valley Region, Order No. R5-2006-0001 (*Rancho Murieta CDO*). Several storage impoundments that also serve as landscape features on the golf courses retain treated wastewater prior to its uses for irrigation. *Id.* In the winter, these impoundments were allowed to overflow and the water, which includes up to 48% treated wastewater, flows to the Cosumnes River. *Id.* Rancho Murieta did not (and still does not) have an NPDES permit for these discharges, and as a result has been subject to enforcement by the Regional Board for discharging pollutants without an NPDES permit. *Id.* A General NPDES permit should be designed to address the issues faced by Rancho Murieta and other recycled water users.

<sup>12</sup> *Rancho Murieta CDO*.

All of these pathways for pollutants to enter the environment through the use of recycled water for landscape irrigation must be addressed by the General Permit.

## **II. To Meet the Statutory Mandates, the General Permit Must Be a Joint NPDES Permit/WDR**

The text of AB 1481 and its legislative history, as well as the Clean Water Act and the Porter-Cologne Act, all mandate that the General Permit be issued as an NPDES permit that regulates discharges to surface waters and groundwater hydrologically connected to surface waters<sup>13</sup> using necessary conditions and effluent limitations on the discharges. Further, the State Board may always include provisions that are more stringent than those required by the Clean Water Act pursuant to its authority under Porter-Cologne Act.<sup>14</sup> Here, the State Board must also include provisions in the General Permit to protect all ground waters in the state, not just those within the jurisdiction of the Clean Water Act due to their hydrological connection to surface water.

Unless a joint NPDES permit/WDR is adopted, the State Board will fail in its mandate to protect water quality of all the State's waters. Moreover, owners and operators of landscape irrigation projects that use recycled water will be in violation of the Clean Water Act for their unpermitted discharges of pollutants to waters of the United States each and every time recycled water runs off due to over-application or mis-application, overflows a surface impoundment and flows to a downstream receiving water, or discharges to ground waters within the jurisdiction of the Clean Water Act. *See* 33 U.S.C. § 1311(a) (the discharge of pollutants to waters of the United States is prohibited without an NPDES permit).

AB 1481 accordingly calls for the issuance of a general NPDES permit. Section 1(a) of AB 1481, which sets forth the findings and legislative purpose and findings of the law, declares that U.S. EPA granted the State of California the authority to issue NPDES permits. The Legislature further found that federal regulations specifically allow for the issuance of general NPDES permits. AB 1481, Section 1(b). The Legislature concluded that in passing AB 1481 it intended to "ensure the safe, reliable use of recycled water for landscape irrigation uses *consistent with the state and federal water quality law.*" (Emphasis added.)

The State Board accordingly must address all the regulatory requirements of all applicable laws to succeed in encouraging safe recycled water use without subjecting recycled water projects to duplicative, inconsistent regulation. This means including conditions that protect public health based on Title 22 criteria, conditions that protect all beneficial uses of all receiving waters (both surface water and ground water), the required antidegradation analysis, and the authorization (provided the necessary conditions are met) to discharge the recycled water to surface waters and

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<sup>13</sup> *Northern California Riverwatch v. City of Healdsburg* 2004 WL 201502, \*12 (N.D. Cal. 2004); *Quivara Mining Co. v. EPA*, 765 F.2d 126 (10th Cir. 1985); *Idaho Rural Council v. Bosma* 143 F. Supp. 2d 1169, 1180 (D. Idaho 2001); *HECLA Mining Co.*, 870 F. Supp. 983, 990 (E.D. Wash. 1994); *MESS v. Weinberger*, 707 F. Supp. 1182, 1196 (E.D. Cal. 1988) *vacated on other grounds*, 47 F.3d 325 (9<sup>th</sup> Cir. 1995), *cert. denied*, 516 U.S. 807 (1995); *Friends of Santa Fe County v. LAC Minerals*, 892 F. Supp. 1333, 1357-58 (D.N.M. 1995).

<sup>14</sup> 33 U.S.C. § 1370.

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ground waters. The necessary authorization for discharges to waters of the United States is an NPDES permit, the issuance of which is the only way to avoid duplicative regulation.

The Clean Water Act is clear – discharges of recycled water to waters of the United States are prohibited without an NPDES permit. Yet, as noted by at least one recycled water irrigator at the June workshop, these discharges are in application almost impossible to prevent. By authorizing these discharges with an NPDES permit that includes the conditions needed to protect water quality, the State Board both safeguards beneficial uses and relieves discharges of potential liability for violating the Clean Water Act (provided of course that these discharges are consistent with the terms of the permit, and the permit terms implement the requirements of federal and state law). Other states, including New Jersey and Hawaii, use NPDES permits to simplify permitting processes for recycled water irrigation projects.<sup>15</sup> More detail on how such a permit would be structured (taking cues from these states and other sources) can be found below.

Regulating discharges to surface waters, and hydrologically-connected ground waters, with something other than an NPDES permit will also subject the State Board to potential litigation for failing to comply with its duty as a delegated NPDES permitting authority. See 33 U.S.C. § 1342(b) (the NPDES permitting program is the only method available for regulating pollutant discharges to waters of the United States). A similar situation faced the Central Valley Regional Board when it issued WRRs for recycled water irrigation to the City of Roseville.<sup>16</sup> These WRRs were not issued as an NPDES permit, despite the fact that they contained effluent limitations on discharges to waters of the United States.<sup>17</sup> Citizen groups subsequently filed a petition for writ of mandate alleging the Regional Board violated its duty as a delegated NPDES permitting authority to regulate with NPDES permits.<sup>18</sup> The suit was settled with the Regional Board agreeing to amend the WRRs to make clear that any discharge from the landscape irrigation project to waters of the United States is prohibited without an NPDES permit.<sup>19</sup> As in the Roseville case, issuing a General Permit that regulates discharges to waters of the United States that is not an NPDES permit will potentially expose the State Board to litigation, while also leaving the regulated community without the certainty of compliance with the law that they would obtain through complying with a General NPDES Permit.

During the workshop on June 18, 2008, State Board staff proposed for discussion the idea of authorizing runoff from landscape irrigation projects under municipal separate storm sewer

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<sup>15</sup> See *NJDEP Technical Manual: Reclaimed Water for Beneficial Use*, New Jersey Department of Environmental Protection, at 15 (January 2005), available at <http://www.state.nj.us/dep/dwa/technmans/reuseman.pdf>; see also *NPDES General Permit Authorizing Occasional or Unintentional Discharges from Recycled Water Systems*, Haw. Code R. § 11-55 app. J available at <http://oehc.doh.hawaii.gov/sites/har/AdmRules/11-55appj.pdf>; see also *Guidelines for the Treatment and Use of Recycled Water*, Hawaii State Department of Health: Wastewater Branch, (May 15, 2002) available at <http://hawaii.gov/health/environmental/water/wastewater/pdf/reuse-final.pdf>.

<sup>16</sup> *Master Reclamation Permit for City of Roseville Placer County*, California Regional Water Quality Control Board Central Valley Region, Order No. 97-147.

<sup>17</sup> *Id.*

<sup>18</sup> *Deltakeeper, et al. v. Regional Water Quality Control Board*, Case No.: 04CS01228 (Sacramento Superior Court)

<sup>19</sup> *Id.*; See also California Regional Water Quality Control Board Central Valley Region, Amendment No. 2 to Order No. 97.

system permits (MS4 permits). We strongly disagree with this proposal.<sup>20</sup> The Legislature recognized the unique nature of recycled water discharges and accordingly adopted legislation that specifically calls for a "general permit for landscape irrigation uses of recycled water" for which the CDPH has established recycling criteria. At a minimum, the special attention in AB 1481 to CDPH water recycling criteria make clear that many of the pollutants found in recycled water are unique to that waste stream and require specific attention if recycled water is to be spread on the land and local waterways through landscape irrigation projects. The current MS4 permit structure does not address the public health impacts, or many of the other issues specific to recycled water, such as the elevated salt and nutrient levels in these waters. Rather than reopening and strengthening every MS4 permit in the state as would be required to authorize these discharges under MS4 permits, we recommend that the State Board follow the direction of the Legislature in AB 1481 and develop a General Permit specific to landscape irrigation uses of recycled water.<sup>21</sup>

### **III. A Proposed Structure for the General Permit**

In order to create a permit that can both be generally applicable and responsive to particular water quality protection concerns in specific areas, we offer the following proposal as a structure for the General Permit.

As a threshold matter, we recommend that the State Board adopt a General Permit that covers both the suppliers and users of recycled water. We suggest the State Board impose requirements similar to those currently required in master reclamation requirements; which obligate the supplier and user to enter into an agreement that will result in the appropriate and efficient use of the water supplied. Other states, including New Jersey and Hawaii, have adopted similar programs for permitting landscaping irrigation projects that use recycled water.<sup>22</sup>

In general, we propose a system where the recycled water supplier and users will be permittees with a requirement in the General Permit that users and suppliers for a particular project enter a contract that places responsibility for compliance with permit terms with the party best situated to ensure compliance. For example, development of and compliance with a site-specific pollution management plan (see discussion below) would lie with the user, while ensuring compliance with effluent limitations in the water supplied to the user would lie with the supplier. We recommend the General Permit require agreements between suppliers and users to ensure the recycled water is properly managed throughout the supply chain. The State Board should make both the supplier and the users jointly and severally liable for permit violations (subject to

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<sup>20</sup> During the June 18 workshop, we agreed that if a general recycled water NPDES permit did authorize these discharges, and the permit imposed the terms required by law to control pollutants in the discharges, then the unpermitted runoff problem associated with landscape irrigation with recycled water may be solved. We do not agree that existing MS4 permits, which do not consider the byproducts of recycled water treatment, would cover these discharges in compliance with AB 1481, the Porter-Cologne Act and the Clean Water Act. Further, addressing these discharges under MS4 permits would not solve the problem for discharges in areas without MS4 permits or those discharges from recycled water irrigation projects that go directly to surface waters.

<sup>21</sup> Moreover, as a practical matter, subjecting the runoff element of landscape irrigation projects to a separate permit would not simplify permitting requirements for these projects. Just the opposite, it would result in a situation where landscape irrigation projects would be required to comply with the General Permit while also having to seek separate approval for (and comply with separate conditions likely imposed on) their discharges to the MS4.

<sup>22</sup> See *supra*, fn. 15.

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modification by written contract between the parties). Adoption of a permit with this structure is the only way the State Board can guarantee that appropriate measures will be taken through the entirety of a landscape irrigation project.

Both the user and the recycled water supplier would be responsible for applying for the permit, though some application requirements (such as demonstrating compliance with current wastewater treatment permits - see discussion below) would most likely only apply to the water supplier, while others such as development and implementation of the site-specific pollution management plan would rest in most cases with the user. Each new landscape irrigation project would require a new permit application, as discussed next.

Notification Requirements and Application Forms: AB 1481, Section 2(c) mandates a notification of intent to obtain coverage under the general permit (NOI), as exists for other general permitting schemes in the State. We recommend that the NOI include a requirement to submit forms necessary to facilitate agency review of the application, including at a minimum a form detailing the recycled water supplier's historical record of compliance with their current waste discharge requirements and/or NPDES permit, a detailed explanation of any compliance schedules in their current permits, the site-specific pollution management plan, any necessary storage impoundment management plans, and a copy of any agreements between suppliers and users regarding compliance obligations and liability apportionment.

Agency and Public Review Period: Section 2(d) of AB 1481 requires that the application be subject to a 30-day public review and comment period, and that the State Board consult with the appropriate regional board regarding the application. With respect to the public and agency review period, federal law requires a public comment and agency review period prior to permit coverage to be certain that permittees are not writing the terms of their own permits.<sup>23</sup> As explained below, we recommend adopting a pollution management plan requirement for the General Permit. Agency and public review of these pollution management plans will be critical in ensuring that permittees are not writing the terms of their own permits.

Fees: An additional component required prior to obtaining permit coverage is the payment of fees as required by AB 1481. We recommended that a tiered fee structure be adopted, perhaps based on complexity of the proposed project and volume of water to be discharged, and that these fees be set at a level that will cover the costs of developing, implementing and enforcing the permitting program.

Effluent Limitations and Pollution Management Plans: The General Permit must include effluent limitations applicable to all suppliers of recycled water. Since the General Permit will be a statewide permit, these effluent limitations must be set at levels that will be protective of water quality throughout the State.<sup>24</sup> More detail regarding how effluent limitations should be set is

<sup>23</sup> *Waterkeeper Alliance, et al. v. U.S. EPA*, 399 F.3d 486, 503-504 (2nd Cir. 2005); see also *Environmental Defense Center v. U.S. EPA*, 344 F.3d 832, 855-856 (9th Cir. 2003).

<sup>24</sup> As explained below, the State Board should not use the General Permit to authorize discharges to impaired or protected water bodies (e.g. areas of special biological significance). Provided this course is taken, the General Permit may be able to avoid having to include effluent limitations for discharges to water bodies requiring special attention, maximizing the likelihood that generally applicable effluent limitations can be established.

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provided below (e.g., recommended use of Title 22 criteria). In general, the State Board must ensure that the effluent limitations in the General Permit address all pollutants likely to be present in the water supplied, including emerging contaminants, and are established at levels that will ensure protection of all beneficial uses in all receiving waters.

The General Permit should also require development of site-specific pollution management plans by recycled water users, similar to stormwater pollution prevention plans. As noted above, these plans would be submitted along with permit application forms and the NOI. Among other things, these plans must demonstrate that all salts and nutrients in the recycled water supplied will be applied at agronomic rates (i.e., levels appropriate for the plants to minimize the likelihood that excess salts and nutrients leach to groundwater or discharge to surface water with runoff). Excess watering can also result in nuisance conditions such as the costly fungus growth observed on youth soccer fields in Brentwood last summer, exacerbated as a result of over-application of recycled water with high salt and nutrient content.<sup>25</sup> The management plans should include a description of the water needs of the plants being irrigated and the affected soils, to ensure that no more water than is necessary for plant growth will be supplied. These site-specific management plans must also address metals and other pollutants, including emerging contaminants, in the water supplied to prevent build up of harmful chemicals in the soil where they can be leached to groundwater or discharged with runoff. Enforceable terms that properly limit the amount of water to be applied also must be included in the General Permit.

**Storage Requirements:** The General Permit must include requirements to address storage of recycled water while awaiting application to the landscaping. Since recycled water is generated from municipal wastewater, it will be available at relatively constant rates year-round.<sup>26</sup> However, due to seasonal rainfall, irrigation is generally only required during certain times of the year, and even then at limited intervals during the irrigation season.<sup>27</sup> As a result, the efficient and widespread use of recycled water for irrigation will require the development and implementation of a storage system for this treated wastewater between generation and use. Several concerns, including the possibility for overflow from storage impoundments to surface waters, the leaching of pollutants in these storage impoundments to groundwater, and the impacts to animals (including amphibians, birds, and fish) that will use these storage impoundments as habitat, must be considered to ensure that storage of recycled water does not cause the degradation of water quality and the environment.<sup>28</sup> At a minimum, storage capacity requirements to minimize or eliminate overflow should be required in the General Permit, and the management plans should demonstrate how these requirements will be met. Likewise, the permittee must provide written documentation to show that leaching will not adversely affect groundwater (with a requirement for appropriate lining of impoundments to ensure such protection as necessary). Unless measures are included in the General Permit to address issues related to impoundment of recycled water prior to use, the General Permit will not be protective of water quality as required by state and federal law.

<sup>25</sup> *Brentwood Soccer Fields Have Fungus*, Contra Costa Times (October 10, 2007) available at [http://www.contracostatimes.com/news/ci\\_7045330](http://www.contracostatimes.com/news/ci_7045330).

<sup>26</sup> See e.g., *Rancho Murieta CDO*.

<sup>27</sup> *Id.*

<sup>28</sup> *Id.*

**Monitoring Requirements:** To assist the dischargers and the Regional Boards in ensuring pollution control measures are effective, the General Permit must include monitoring and reporting requirements. The General Permit should require monitoring as the water is delivered prior to irrigation to evaluate compliance with the effluent limitations applicable to suppliers. It should also require regular monitoring of discharges to surface waters from the irrigated site, on a reasonably frequent basis, to evaluate compliance with effluent limitations applicable to the receiving waters and evaluate the effectiveness of site-specific pollution control plans.

To ensure that groundwater resources are not degraded, the General Permit should both require modeling to predict potential impacts and establish groundwater monitoring requirements that will provide sufficient information to detect problems that must be corrected. At a minimum, a basin wide monitoring program must be in place that includes nearby drinking water wells and adjacent to downstream receiving waters. The groundwater should be monitored at least monthly for salts and nutrients, and more often in the effluent for those constituents. CECs should be monitored at least annually in the effluent. Existing monitoring wells should be used as available to minimize the need for additional drilling, though that may be needed depending on the project. Overall, the monitoring requirements must be useful to both the regulated community as feedback for their operations and the regulators to assist in ensuring compliance.

#### IV. Eligibility Criteria

Establishing appropriate eligibility criteria for the General Permit will be critical to ensuring that the General Permit effectively protects water quality. Compared with an individual permit, a General Permit contains fewer elements of Water Board oversight over specific discharges. As a result, the State Board must ensure that only those dischargers that can be expected to meet the necessary conditions, effluent limitations, and other protective requirements in the General Permit are eligible to obtain coverage. As explained above, we propose a system where both suppliers and users of recycled water will obtain permit coverage. Below are our recommendations regarding appropriate limits on which suppliers and which users should be eligible for permit coverage to ensure that the General Permit effectively protects water quality while at the same time provides for simplicity and consistency in the permitting process.

##### A. Limits on Supplier Eligibility

We recommend the following limits on suppliers who may obtain permit coverage. First, the General Permit should only be available to suppliers of recycled water who have a demonstrated history of compliance with the effluent limitations and other requirements in their current WDRs or NPDES permits. Given that coverage will be made simpler (and presumably easier) under the General Permit, then the State Board must build in requirements to guarantee that permittees will be capable of meeting the Permit's requirements. The law and regulations governing the issuance of general permits in California state, among other things, that a general permit is appropriate when "[t]he discharges involve the same or similar types of waste."<sup>29</sup> To be certain that the discharges covered by the General Permit do in fact involve the same or similar types of waste, the State Board should require that dischargers prove they are capable of currently

<sup>29</sup> Cal. Water Code § 13263(i); 40 C.F.R. § 122.28.

and regularly meeting the requirements applicable to their discharges. The most straightforward way to achieve this in a streamlined and efficient manner, without having to revisit a history of compliance analysis for every discharger, is to set a threshold requirement regarding history of permit compliance by dischargers.<sup>30</sup>

Second, coverage under the General Permit should be limited only to those dischargers who do not have compliance schedules in their current WDRs or NPDES permits. If the dischargers cannot presently meet the requirements necessary to ensure compliance with water quality standards in the waters receiving their discharges, they should not be able to supply water that will be subsequently discharged without individual attention from the permitting agency to ensure protection of water quality. Further, since suppliers of recycled water may be profiting while disposing this waste, there can be no excuse for not implementing the necessary controls to protect water quality.

### **B. Limits on User Eligibility**

Both federal and state law place limits on areas where recycled water can be used in landscape irrigation. Since recycled water is a waste that contains pollutants, the State Board should be certain that the discharge of these pollutants will only occur in allowable amounts to areas that require special attention to prevent degradation, or will not occur at all to areas into which the law prohibits pollutant discharges. For example, the General Permit should not be available: (1) where discharges from landscape irrigation projects may reach areas of special biological significance (ASBS), (2) where they may reach water bodies on California's Clean Water Act section 303(d) list of impaired water bodies (303(d) List) for pollutants in the recycled water supplied, (3) where they may reach groundwater already impaired by pollutants in the recycled water supplied, or (4) when a receiving water requires special attention to ensure its protection. This last category can include situations where there is a shallow aquifer beneath the landscape irrigation project (e.g. the Santa Clara Valley Water District) or where very porous soil overlies the groundwater, where a surface water body is within a minimum distance from a recycled water irrigation project, or where pollutants may reach groundwater that is "pristine" (e.g. meets all primary drinking water MCLs). Further explanation regarding each of these necessary limits on the availability of a General Permit is provided below.

First, pollutants may not be discharged to an ASBS, except in limited circumstances after specific findings have been made in a public process.<sup>31</sup> In order to guarantee protection of ASBSs from pollutants from landscape irrigation projects using recycled water, the State Board must require individual permits be obtained when a discharge may reach an ASBS. The attention and care that the permitting agency must take when authorizing a waste discharge in an area that may impact an ASBS is not compatible with the efficiency and simplicity in permitting mandated by AB 1481. We therefore recommend that these discharges not be eligible for coverage under the General Permit.

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<sup>30</sup> We recommend that the State Board accord greater weight to history of compliance with substantive discharge limitations that it does to the history of compliance with reporting requirements or other similar elements of a discharger's permit.

<sup>31</sup> See *California Ocean Plan*, Item III.E.1.

Second, EPA regulations prohibit the State Board from authorizing any new discharges of impairment-causing pollutants to any water body on the 303(d) List.<sup>32</sup> In *Friends of Pinto Creek v. EPA*, the Ninth Circuit ruled that 40 C.F.R. § 122.4, which establishes prohibitions on permit issuance applicable to all NPDES permitting authorities, prohibits the issuance of permits for new discharges of pollutants to water bodies identified as impaired on a 303(d) list.<sup>33</sup> The Court affirmed the categorical prohibition on permitting new discharges in situations where a TMDL has not been prepared, and noted the limited exceptions provided for in situations where a TMDL has been prepared.<sup>34</sup> Under the limited exceptions applicable only when a TMDL exists, a permit authorizing discharges to an impaired water body is only allowed when the discharger can demonstrate that there is a sufficient load allocation to accommodate the discharge, and that all dischargers to the water body are subject to compliance schedules designed to bring the impaired water into compliance with applicable water quality standards.<sup>35</sup> The specific showings a discharger must make in order to obtain permit coverage when a TMDL has been prepared are not conducive to a general permitting scheme. In order to be certain that the State Board does not issue a permit that allows discharges when it should not (or when the required analyses to protect water quality have not been completed), the State Board should not make the General Permit available to cover discharges to 303(d)-listed water bodies that are listed for pollutants in the recycled water waste stream.

Third, the General Permit should also not be available to cover discharges to landscape irrigation projects above already-impaired ground water aquifers. Nitrate contamination of groundwater is already a serious problem in the state, and this Permit should not add to that. Consistent with our overall position that recycled water use only helps fill the State's water shortages when water quality is protected, if a groundwater aquifer is currently not fulfilling its capabilities as a clean, reliable source of water, then additional pollution of this aquifer should not be permitted without careful consideration – and certainly not under a General Permit. Instead, a separate permitting process (*i.e.* individual permits) that will result in appropriate, site-specific requirements to protect already impaired ground waters should be developed in that case.

Fourth, the General Permit should not be available when conditions are such that extraordinary care should be exercised to protect receiving waters. For example, the General Permit is not the appropriate permitting strategy to protect areas where groundwater resources are particularly sensitive to pollutant loading, either because hydrogeologic conditions make contamination highly probable or because the aquifer exhibits such high water quality that protection of this pristine resource should be paramount. Areas where contamination is highly probable include those where pollutants are far less likely to attenuate before they reach the groundwater table, such as areas with a shallow groundwater table and/or areas with very porous soils above the water table. When these conditions are faced, as articulated by the Santa Clara Valley Water District at the June workshop, a one-size-fits-all approach of a General Permit may not ensure the protection of this sensitive resource, particularly where it is also used for drinking water. We therefore recommend that the State Board exclude from eligibility under the General Permit discharges to areas with shallow ground water tables, areas with very porous soils above

<sup>32</sup> 40 C.F.R. 122.4(i).

<sup>33</sup> *Friends of Pinto Creek v. EPA*, 504 F.3d 1007, 1012 (9th Cir. 2007).

<sup>34</sup> *Id.*

<sup>35</sup> 40 C.F.R. § 122.4(i)(1) and (2); *Friends of Pinto Creek*, 504 F.3d at 1012.

the ground water table, and other areas where there is a high risk for pollutant transport to ground water resources.

Similarly, landscape irrigation projects occurring within a minimum distance of a surface water body should not be eligible for coverage under the General Permit. The risk of pollutant loading in these waters from the landscape irrigation project is too high, and therefore an individual permitting process for these projects is recommended. The State Board should establish minimum setback criteria in the General Permit to set the threshold for eligibility under the permit.

Finally, landscape irrigation projects in areas with pristine ground waters, which could be defined as those meeting all primary drinking water MCLs, should also be excluded from eligibility under the General Permit. Along California's North Coast, 95% of groundwater wells tested met all primary MCLs.<sup>36</sup> Protecting these pristine waters should be of paramount concern to the State Board, and all efforts should be made to preserve this valuable resource for the future. These pristine ground water aquifers from eligibility under the General Permit.

### **C. Limits on Types of Projects Considered "Landscape Irrigation"**

Our final comment regarding eligibility addresses the question of which uses of recycled water should be considered "landscape irrigation." During the June 18 workshop the State Board staff identified irrigation of "parks, playgrounds, school yards, residential landscaping and common areas, golf courses, cemeteries, and freeway landscaping" as proposed types of "landscape irrigation." Other commenters encouraged the State Board to add landscaping elements of industrial and commercial properties, and municipal infrastructure such as street medians to the list. While we generally agree that the uses identified by the State Board staff and other commenters seems reasonable, we remind that State Board that the regulations governing general permitting limit general permits to those discharges that "require the same or similar treatment standards." To the extent different treatments may be required, either because the susceptible receptors of pollutants in the waste will be different, or because the end-users can be expected to be more or less compliant with use requirements (consider the differences between a home user and a municipal landscaping department), the State Board must only make the permit available to cover discharges in areas it can be certain only require the same or similar treatment standards, and that it can ensure will be readily accessible for enforcement if needed.

### **V. Agency Coordination and Protection of All Beneficial Uses of All Waters**

The request for comments asked for ideas on how the State Board should coordinate with other agencies and the public when issuing and implementing the General Permit. In general, the State Board should adopt a precautionary approach to recommendations from other agencies, and adopt a recommendation of a coordinating agency if that recommendation will result in a permit condition or requirement that is more protective of water quality than a State or Regional Board requirement. The State Board must implement its obligations to protect all beneficial uses, and

<sup>36</sup> *California's Groundwater – Bulletin 118 Update 2003*, California Department of Water Resources; available at <http://www.groundwater.water.ca.gov/bulletin118/update2003/index.cfm>.

therefore should not limit the effluent limitations and other conditions in the General Permit to only those levels suggested by other agencies, since those recommendations will be based on those agencies' mandates, not the State and Regional Boards'. Further detail and rationale regarding this recommendation is provided below.

During the June 18 workshop, many industry commenters urged the State Board to require nothing more of permittees than to meet the secondary or tertiary treatment requirements, as applicable, mandated by the Title 22 criteria established by the California Department of Public Health (CDPH). Title 22 criteria are designed to protect public health, and imposing effluent limitations in the General Permit commensurate with these criteria should protect public health for those constituents of recycled water that have Title 22 criteria. However, there are many constituents in recycled water that do not have treatment requirements under Title 22 (e.g., emerging contaminants and contaminants subject to "notification levels"), and the State Board must ensure that the Permit protects public health beneficial uses for such contaminants.

Additionally, even where they may protect public health, the Title 22 criteria do not automatically ensure the protection of all beneficial uses of the receiving waters. Indeed, current NPDES permits for the discharge of treated municipal wastewater already include effluent limitations to protect the aquatic life in the receiving water, and any other applicable beneficial use, that are often more stringent than those required solely by Title 22. For example, the aquatic life criteria for copper set in the California Toxics Rule is significantly lower than the Title 22 criteria for copper, which is set at the level safe for human consumption. Title 22 criteria cannot be substituted for an independent, rigorous examination by the State Board of all necessary effluent limitations for all contaminants likely to be in recycled water.

Both emerging contaminants and contaminants with notification levels pose a unique challenge for the State Board since we are just now beginning to understand the harmful effects of some of these substances. There is considerable scientific uncertainty related to emerging contaminants, both with respect to safe exposure levels and their persistence in the environment, though as noted above there is already clear evidence of their impacts on fish. The same is true of contaminants with notification levels, and though there is a greater understanding of health effects of these substances, there is still less certainty than exists for contaminants with MCLs. Considering the potentially devastating and long-term impacts of allowing the widespread release of pharmaceuticals, endocrine disruptors, reproductive toxins, and other emerging contaminants into the environment, the State Board must take a precautionary approach when setting permit limits and requirements in the General Permit for these contaminants. In other words, when the negative consequences to the public health and the environment of taking a certain action are potentially significant or irreversible, then the burden of proof to show the action is in fact *not* harmful should fall with the advocate of taking the action.

With respect to contaminants with notification levels, we recommend that the State Board consult with CDPH with respect to requiring at least those pollutant discharges that will reach drinking water aquifers or surface water drinking water supplies to meet notification levels in the water supplied for the projects.

Finally, the General Permit must contain a reopener clause that will allow the State Board to revisit any effluent limitation or other requirement in the event new or updated information regarding a contaminant, known or unknown, becomes available. This last point is especially important for emerging contaminants, since the uncertainty regarding them is particularly significant.

#### **VI. Antidegradation Policy**

The State Board is seeking comment on considerations that should be included in the General Permit regarding application of the state's antidegradation policy. As an initial matter, we note that since the permit will apply to discharges to waters throughout the State, there can be no doubt that high quality waters will be impacted by discharges authorized by the Permit. Resolution No. 68-16 itself provides the considerations that therefore must be included in adopting the General Permit. Among other things, the General Permit must contain findings that any degradation will be consistent with the maximum benefit to the people of the state, will not unreasonably affect beneficial uses, and will not result in water quality less than allowed in prescribed state policies.

Under Resolution 68-16, the State Board must ensure that waste discharge requirements implement the best practical treatment or control necessary to ensure the maintenance of the highest quality water consistent with the maximum benefit to the people of the State. In conducting this analysis, the State Board must consider not only the benefit of supplementing the State's water supply with recycled water, but also the benefit to the people of the State of not allowing any further degradation of the State's waters. The number of impaired water bodies on the 303(d) List is a testament to the shrinking number of water bodies in California that are capable of meeting all their designated beneficial uses. Protecting water bodies that are not already impaired, and helping ensure that impaired water bodies recover, will benefit all people of the State, and the State Board must consider these benefits when conducting the antidegradation analysis. Degradation of groundwater aquifers also presents a serious threat to the long-term sustainability of the State's water resources, and the benefits of maintaining water quality in these aquifers must also be included in the antidegradation analysis. As a result, the State Board must include at least a mass balance-focused analysis to ensure that assimilative capacity of the State's ground waters is not lost.

We agree that reuse water has the potential to alleviate strain on our already over-taxed water resources, reduce the costs associated with transportation of potable waters, and possibly even improve water quality in the source watersheds if potable water is allowed to remain in-stream. However, we caution the State Board not to oversimplify the cost-benefit analysis and fail to account for both the current and long-term impacts of allowing treated municipal wastewater to be spread throughout our entire environment in landscape irrigation projects, with unknown potential impacts. California has learned with experiments such as MTBE that allowing the spread of environmentally-persistent and toxic contaminants without full information and awareness of potential impacts can create enormous overall societal costs. The State Board must give appropriate consideration to the benefit to be gained by keeping these chemicals out of our waters in the first place when considering the maximum benefit to the people of the State of using recycled water for landscape irrigation.

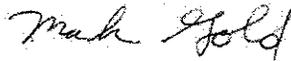
**VII. Conclusion**

We thank the State Board for the opportunity to provide comments on the appropriate scope and elements to consider in developing the General Permit as required by AB 1481. We look forward to engaging with the State Board and other interested parties during the development of this Permit, and would welcome an opportunity for further public participation. Involving the public will be critical if the State Board is to be successful in issuing a General Permit that the public will trust is protective of our waters.

Sincerely yours,



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October 26, 2007

Tam Doduc, Chair and Members  
State Water Resources Control Board  
1001 I Street  
Sacramento, California 95814

VIA EMAIL: [commentletters@waterboards.ca.gov](mailto:commentletters@waterboards.ca.gov)

**Re: Statewide Water Recycling Policy**

Dear Chair Doduc and State Board Members:

On behalf of the California Coastkeeper Alliance and its 12 Waterkeeper members, including Santa Monica Baykeeper, San Diego Coastkeeper, and Russian Riverkeeper, as well as Lawyers for Clean Water, Inc., we thank the State Water Resources Control Board (State Board) and staff for this opportunity to present comments on the Draft Recycled Water Policy (Policy). We present our comments first noting that we stand behind the State Board in its effort to encourage the reuse of California's scarce supply of water. California's booming population and global climate change are increasing pressure on our already overtaxed water supplies. We agree that developing a Policy that will encourage the efficient and effective reuse of these water supplies is an essential step in relieving these pressures. But we urge you to take this step with caution. A decision here will have lasting effects on California's water future. It should therefore not be made in haste, with potential water shortages pushing a Policy that puts future water supplies at risk. That is why we ask that the State Board demand a more robust, clear and comprehensive Policy, one that will encourage the highest and best use of recycled water consistent with guaranteeing the full protection and enhancement of existing water quality. Given the significance of the issue, and the scope of our comments, **we ask that the State Board direct staff to amend the Policy as described below and re-circulate it for an additional round of public review before a final draft Policy is set for Board adoption.**

We first want to thank the State Board and staff for incorporating many of our previous comments into this Policy. For example, we generally support the Policy's discussion of nutrient management plans for irrigation projects<sup>1</sup> and measures to help prevent salts (particularly nitrates) from polluting our soils and aquifers.<sup>2</sup> We also generally support the liability provisions in the Policy, which state that "compliance with requirements based, in whole or in part, on this Policy does not exempt a discharger from liability for contamination of groundwater," even if the liability arises from violations of drinking water standards that became more stringent after the requirements for the project were established.<sup>3</sup>

However, the Policy – the State Board's first significant attempt to provide formal direction on this critical issue – can and must aim higher. Rather than ignoring potential problems, the State Board will encourage the highest and best use of recycled water only if this Policy pays full attention to the quality of recycled water in light of its potential uses and impacts. Recycled water can contain numerous pollutants that pass through the treatment process, including but not limited to metals, salts (including nitrates), pesticides, pharmaceuticals, endocrine disruptors, organic pollutants, chlorine disinfection byproducts, and other contaminants. Some of the contaminants in recycled water, such as chlorine disinfection byproducts and pharmaceuticals, exist only rarely in groundwater, and so would immediately degrade any affected waterways. Conversely, salts such as nitrates already contaminate many groundwater basins and exist in relatively high levels in recycled water, which can then exacerbate existing groundwater pollution problems.

Recycled water is and will continue to be used for crop irrigation, other irrigation (soccer fields, golf courses, landscaping), for recharge of depleted groundwater aquifers, and as a barrier to seawater increasingly drawn into aquifers by inland pumping. Increasingly, water recycling is being explored for indirect potable reuse. Some Regional Water Boards issue permits to these projects containing safeguards to protect adjacent waterways that may be affected. However, other projects go forward with relatively little oversight. In part this happens due to a misconception that because recycled water has been treated to meet certain California Department of Public Health standards, it cannot negatively impact other uses of surface water and groundwater. This is where the Clean Water Act and Porter-Cologne fill the gap and protect the quality of all of California's waters for all uses. Without the additional, and mandatory, safeguards provided by these laws, water intended for habitat, agricultural, industrial and other uses will suffer. The Policy will play a critical role in providing guidance to all Regional Water Boards, the regulated community, and the public on how these water quality laws will be implemented in full to protect these and other beneficial uses of California waters.

Our comments focus on four areas with an emphasis on developing a useful and complete Water Recycling Policy. First, we describe the need for the Policy to address a broader array of clean water issues related to the use of recycled water. Given the connectivity among water

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<sup>1</sup> Resolution ¶ 7(a).

<sup>2</sup> Resolution ¶ 6.

<sup>3</sup> Resolution ¶¶ 17 and 18.

bodies, and between water quality and water supply, we believe that the Policy as drafted will not effect the goal of increased use of recycled water in a manner that protects existing waterways. Second, we explain the inadequacy of the simple assertion that recycled water projects that comply with this Policy and applicable laws will comply with antidegradation requirements, in particular State Board Resolution No. 68-16. Third, we recommend clarifications of the Policy needed to dispel apparent contradictions and ensure consistency in application of the Policy. Fourth, we provide comments on specific issues raised by the Policy as drafted. These specific comments will be presented in the order they arise in the Policy and include suggestions for improving the Policy. The recurring theme throughout these comments, and one that carries over from comments provided in scoping process, is that **using recycled water to increase supply is only effective when the water quality of existing resources is protected.**

**I. The Water Recycling Policy Must Address All Issues Implicated, Including: the Nature of the Water Resource to Be Used, All Surface Water and Groundwater Impacts, and the Need to Protect All Beneficial Uses**

The Policy's stated purpose is to provide "a statewide approach that fosters a consistent application of requirements to the use of recycled water ... in order to encourage and broaden its usage."<sup>4</sup> The Policy's text declares that "uniform interpretation of these requirements is needed to reduce uncertainty in the design requirements for recycled water projects" and that "this uncertainty has created an obstacle to achieving the full potential for water reuse."<sup>5</sup> However, the Policy as written fails to provide the clear direction needed to achieve not only a "reliable local water supply" and "substantial energy savings", but also the consistent protection of all beneficial uses of all affected waterways.

There are three ways in which the Policy, by failing to be comprehensive in its scope and its foundation, fails to provide the clear direction it sets out to achieve. First, to provide the necessary foundation for the nine Regional Water Quality Control Boards (Regional Boards) to regulate recycled water projects consistently and effectively, the Policy must include a complete and candid discussion of what recycled water is, where it comes from, and the pollutants and constituents it may contain. Second, the Policy's scope must be expanded to address the range of surface water and groundwater impacts of recycled water use. Third, the Policy should be more explicit in demanding, in the Resolution section not the Findings, that all beneficial uses, not just domestic and municipal supply, must be taken into consideration and protected by NPDES permits for discharges impacting waters of the U.S., or by waste discharge requirements (WDRs) and waste reclamation requirements (WRRs) for other discharges.

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<sup>4</sup> Finding No. 4. Indeed, given the overarching mandate of the State and Regional Boards, the chief purpose of the Policy should be to encourage recycled water use consistent with protecting the quality of affected waterways pursuant to state and federal law.

<sup>5</sup> *Id.*

**A. The Policy Must Acknowledge Where Recycled Water Comes from and the Constituents It Contains**

The Policy must begin with a clear discussion about what recycled water is – its source water, typical treatment for different uses, and the contaminants that may be present after treatment. Without laying this foundation, the Policy cannot help overcome one of the primary obstacles to recycled water use – community concern that the water is somehow unsafe.<sup>6</sup> Unless and until the Policy is explicit about these issues, the Policy will fall short of providing the public with the assurances needed to embrace its use.

It is our experience that there are different perceptions of what recycled water is and what it can contain; these different perceptions are part of the reason for the difficulty in regulating recycled water use consistently and with the full health of local waterways in mind. It is also perhaps the reason that the Policy somewhat inexplicably is focused on regulating salts.<sup>7</sup> We see little to be gained, and much to be lost, in a Policy that ignores the important issue of providing the Regional Boards and the public with full information about precisely what the Policy regulates. A passing reference in Finding No. 16 that “recycled water has the potential to contain constituents not typically found in surface water or groundwater, because it is usually produced from sewage” is insufficient.

Instead, the Policy should be specific. What are the constituents referenced in Finding No. 16? Where do they come from (*i.e.*, what is the source water)? What pollutants do and do not pass through conventional treatment processes? Why is it important that the Regional Board include regulation of these constituents when issuing NPDES permits, WDRs and/or WRRs for recycled water projects? By failing to include an up-front and thorough discussion of the source and composition of recycled water, the Policy creates the false impression that the only important concerns with recycled water use are protecting groundwater from degradation from salts and nitrates, and making sure that groundwater recharge reuse projects do not negatively impact drinking water supplies.

In fact, recycled water use can implicate a range of beneficial uses not addressed in the Policy. In addition to nitrates, phosphates and other salts, the constituents in recycled water that threaten beneficial uses and overall water quality include:

- Pharmaceuticals, including antibiotics and estrogenic compounds
- Antibiotic-resistant pathogens (including re-growth of pathogens in the environment)
- Metals, including barium, chromium, iron, manganese

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<sup>6</sup> *Water Recycling 2030: Recommendations of California's Recycled Water Task Force*, Executive Summary at xii (June 2003); *Facing the Yuck Factor: How Has the West Embraced Water Recycling? Very (Gulp) Cautiously*, High Country News, Vol. 39, No. 17 (September 17, 2007).

<sup>7</sup> It is our understanding that the intent behind the absence of language on regulation of other pollutants was to allow the Regional Boards latitude in how to address those pollutants. However, without explicit language in the Resolution in this regard, Regional Boards could also interpret the Policy as providing guidance on how to manage pollutants other than salts. Clarity in language is essential to achieving clarity in interpretation, especially in a growing area such as use of recycled water.

- Chlorine disinfection byproducts
- Organic compounds not removed in conventional disinfection process

To protect the water quality of our state, it is the State Board's obligation to work to solve the issues presented by the presence of all contaminants in recycled water head-on.<sup>8</sup> That task begins with a forthright explanation of where recycled water comes from and all the aspects of recycled water that the Regional Boards, the public, and the recycled water purveyors need to be cognizant of when permitting recycled water projects. The Policy discusses the impacts to our groundwater that could be caused by high salinity commonly found in recycled water.<sup>9</sup> The same needs to be done for all the other constituents (or classes of constituents) found in recycled water. In so doing, the State Board will give the Regional Boards the background they need to ensure that the NPDES permits, WDRs and/or WRRs they adopt will be protective of water quality.

#### **B. The Policy Must Address the Inevitable Surface Water and Groundwater Impacts of Recycled Water Use**

In earlier comments on the development of a recycled water policy (see attached for ease of reference), we explained in detail why the Clean Water Act, and the State's obligations under the Porter-Cologne, mandate the State Board and Regional Boards to address runoff from recycled water projects to waters of the United States with NPDES permits.<sup>10</sup> We appreciate that the State Board and staff appear to have set course towards development of an NPDES permit for discharges of runoff from recycled water projects,<sup>11</sup> which would be consistent with AB 1481 (De La Torre), recently signed into law by the Governor. To have greater import, these conclusions should be included in the Policy (*i.e.* the Resolution), as opposed to the Draft Staff Report or the Findings, along with strong direction to the Regional Boards to issue NPDES permits to control polluted discharges from recycled water projects. An even larger concern, however, is that the Policy entirely avoids a central issue raised by the use of recycled water – the impact its use will have on surface water quality – and only addresses some of the potential impacts that recycled water projects could have on groundwater quality.

The Policy's focus appears to be to guide the Regional Boards in issuing WDRs and WRRs for recycled water projects that may impact groundwater quality. However, the Policy itself essentially ignores the protection of surface water quality. We fail to see any logical or practical reason for this failure, and have concerns about the regulation that will fill this void given the limited direction that exists in the Policy. As Porter-Cologne states, "the quality of all the waters of the state shall be protected for use and enjoyment by the people of the state ... [and] the statewide program for water quality control can be most effectively administered

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<sup>8</sup> Cal. Water Code § 13000.

<sup>9</sup> See *e.g.* Findings No. 5, 6, 8, 9, 11-13.

<sup>10</sup> We explained in our previous comments that the Memorandum from State Water Resources Control Board Executive Director Celeste Cantú to Regional Board Executive Officers, Subject: "Incidental Runoff of Recycled Water," (February 24, 2004), establishes an illegal regulatory regime under the Clean Water Act. For an explanation of the illegality the conclusions in this memo, please see our previous comments at pages 2 to 6.

<sup>11</sup> See Draft Staff Report at 1.

regionally, within a framework of statewide coordination and policy.”<sup>12</sup> The Policy – not the Staff Report or Findings – must include specific direction on surface waters.

Our point is not one based on legal technicalities. We are deeply concerned that by not including guidance sufficient to protect surface water quality, the Policy will at best continue the asserted status quo of complex permitting, and at worst send a message that surface water protection is a low priority for the State and Regional Boards. Regional Boards, which still have to comply with their mandate to protect surface water quality, would under the Policy be left with the additional action of having to defend their mandated regulatory actions to a regulated community pointing to the explicit absence of surface water protections in the Policy.<sup>13</sup> To “overcome the uncertainty [that] has created an obstacle to achieving full potential for water reuse,”<sup>14</sup> the Policy must be reworked to address surface water impacts of recycled water projects.

We see three obvious situations where the Policy must provide explicit guidance for protecting surface water quality. The first is when recycled water is used for irrigation and there is a potential for runoff from the areas to which it is applied. The second is when recycled water is stored in surface impoundments<sup>15</sup> with the potential to overflow.<sup>16</sup> The third is when either through irrigation, storage in an impoundment, or in a groundwater recharge project, the recycled water will discharge to groundwater that is hydrologically connected to surface waters. We will explain below how the specific aspects of the Policy should be improved to provide a clear interpretation of requirements the Regional Boards must execute to protect surface water quality consistent with federal and state law. Without addressing surface water impacts, the Policy is incomplete and will not guarantee that water quality is protected as recycled water use becomes an ever more important element of California’s water supply.

The Policy also falls short of effectively ensuring the protection of our groundwater resources. For example, with respect to irrigation projects, the Policy entirely fails to direct the Regional Boards on how to address constituents other than salts.<sup>17</sup> This is particularly problematic when recycled water is used for irrigation above an otherwise pristine aquifer where contamination with any constituent, not just salts, would present a serious and significant decrease in water quality.<sup>18</sup> Groundwater is too precious a resource for the State Board to address in an incomplete manner.

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<sup>12</sup> Cal. Water Code § 13000 (emphasis added).

<sup>13</sup> In addition, Regional Boards also may be pressured to await a general NPDES permit for runoff from recycled water irrigation projects rather than requiring compliance with the law now.

<sup>14</sup> Finding No. 4.

<sup>15</sup> During the workshop in Los Angeles on October 2, 2007, staff explained that the Policy’s express exclusion of surface impoundments was meant to apply to recycled water in impoundments within the wastewater treatment process, before it is discharged and made available for reuse as recycled water. Our comments here are addressed at surface impoundments outside the treatment process, such as landscape features at golf courses and cemeteries.

<sup>16</sup> This is a particular concern in the winter, as recycled water continues to be generated despite the rain that reduces its utility for irrigation and contributes to impoundment overflows.

<sup>17</sup> As discussed below, we have concerns that even the discussion of salt pollution prevention lacks clarity and clear enforceable mechanisms, casting its utility into question.

<sup>18</sup> See *infra*, Section IV(B)(3).

### **C. The Policy Must Stress the Importance of Protecting All Beneficial Uses**

Closely tied to the need for the Policy to address surface water as well as all groundwater impacts is the need for the Policy to make certain that all beneficial uses, not just domestic and municipal supply, will be protected. Currently the only explicit reference to beneficial uses other than domestic and municipal supply in the Policy is in Resolution ¶ 10, which states that “a Regional Water Board may establish a limitation that is more stringent than the MCL, if necessary to protect designated beneficial use other than municipal or domestic use, such as agricultural use.” Otherwise, the Policy only implies protection of beneficial uses by requiring that WDRs and WRRs for “recycled water irrigation projects,” where applicable, include prohibitions on causing or contributing to violations of water quality objectives.<sup>19</sup>

To be effective, and to faithfully interpret both the Clean Water Act and Porter-Cologne, the Policy must be modified to explicitly require the establishment of limitations to protect all designated beneficial uses in NPDES permits, WDRs and WRRs for all recycled water projects, not just groundwater recharge/reuse projects. To start, the “may” must be changed to “shall” in Resolution ¶ 10 cited above, and the command should be made into a stand alone resolution paragraph that applies to all recycled water projects. This will make it clear that the protection of water quality is an essential element in regulating any recycled water project. Additionally, the findings should be expanded to make it clear that the Regional Boards must (a) issue and enforce NPDES permits for discharges to waters of the United States, as defined, and WDRs and WRRs for other discharges, and (b) ensure that such permits/WDRs/WRRs include limitations – including discharge prohibitions as needed – to protect all beneficial uses.

### **II. The Policy’s Blanket Statement Establishing Compliance with State Board Resolution No. 68-16 Is Insufficient**

State Board Resolution No. 68-16 requires the establishment of waste discharge requirements which “will result in best practicable treatment or control of the discharge to assure that (a) a pollution or nuisance will not occur and (b) the highest water quality consistent with the maximum benefit to the people of the State will be maintained.” As drafted, the Policy asserts “water recycling irrigation projects and groundwater recharge reuse projects that comply with this Policy, the Porter-Cologne Water Quality Control Act, and the applicable Basin Plan, shall be considered to have met the requirements of State Water Board Resolution No. 68-16.”<sup>20</sup>

We do not support the Policy’s blanket, unsupported statement that generic compliance with the Policy, state law, and the Basin Plans equates to compliance with State Board Resolution No. 68-16. As a general matter, approval of a blanket conclusion that simply requiring compliance with the law (which is of course required in any event) is equivalent to an antidegradation analysis would create disturbing precedent for all future applications of

<sup>19</sup> Resolution ¶¶ 7(f) and 13, Finding No. 26; *see also* Cal. Water Code §§ 13050(h) and 13241 (identifying WQOs as consisting of beneficial uses and the criteria needed to protect them). As discussed more below, however, even this requirement appears to be of limited utility in the Policy due to the lack of clarity on when WDRs/WRRs must be applied, and to the confusingly limited definition of “recycled water irrigation projects.”

<sup>20</sup> Resolution ¶ 16.

Resolution No. 68-16. More specifically, the “analyses” of what constitutes best practicable treatment or control (BPTC) for irrigation projects or groundwater recharge reuse projects are entirely inadequate to inform the State Board’s decision on this issue. In addition, conditions vary throughout the State, and the analysis that must be completed under State Board Resolution No. 68-16 should not be presumed satisfied with a one-size-fits-all proclamation in this Policy. We address each of these specific points below.

The “analysis” provided does not support the assertion of what constitutes BPTC for irrigation projects and groundwater recharge reuse projects. For irrigation projects, Finding No. 24 establishes BPTC as “a nutrient management plan, applying recycled water in an amount that does not exceed the amount needed for landscape or crops, and controlling salt discharges to collection systems from industrial facilities and self regenerating water softeners.” This suite of requirements as established by the Policy cannot be considered BPTC for the following reasons.

First, the described NMP – when required – does not establish any standards that a recycled water users must meet or even provide any indication of the standards and requirements the Regional Boards must require in a NMP.<sup>21</sup> Without these details, it is impossible to assess whether a naked requirement to develop and implement an NMP will satisfy Resolution No. 68-16’s BPTC requirement.<sup>22</sup>

Second, neither the Draft Staff Report nor the Policy provides any support for the conclusory and incorrect assertion that controlling salt dischargers by requiring that recycled water used for irrigation projects not exceed the source supply’s TDS levels by more than 300 mg/l<sup>23</sup> represents BPTC. Rather, the staff report itself lays out the reason that the 300 mg/l “control measure” by definition cannot be BPTC, stating that it “was selected as being a difference that the majority of recycled water producers can currently meet.”<sup>24</sup> In other words, this at most represents the average of what is practicable – not the “best” practicable control.<sup>25</sup>

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<sup>21</sup> For more detail *see infra*, Section IV(B)(1).

<sup>22</sup> The second requirement for BPTC in irrigation projects, not applying more water than is needed for crops and landscape, makes practical sense. However, putting aside for the moment the significant and unaddressed implementation questions, without citations to any scientific studies or other source material to demonstrate how and why this will protect groundwater resources, it is impossible to assess whether this represents BPTC for an irrigation project.

<sup>23</sup> Resolution ¶ 7(d).

<sup>24</sup> Staff Report at 5.

<sup>25</sup> The catch-all “requirement” (assuming it is applied, *see* Section III) that a project cannot cause or contribute to violations of water quality objectives cannot save the Policy’s reliance on the 300 mg/l increase standard as BPTC. *See* Resolution ¶ 7(f); Draft Staff Report at 4-5. Specifically, alternative (b) for controlling salts, which is set forth at page 4 of Draft Staff Report and establishes that recycled water TDS limitations should be established to ensure the percolate complies with water quality objectives, is the same standard required by the catch-all backstop to the 300 mg/l standard (which also requires that in no case may the use of recycled water cause or contribute to a violation of water quality standards, *see* Draft Staff Report at 4-5). As such, the 300 mg/l standard adds nothing to the standard suggested in alternative (b). We suspect that the only result of the 300 mg/l standard will be significant resistance from the recycled water producers to any requirement that needs to be more stringent than 300 mg/l in order to protect beneficial uses. In any event, we support establishment of an upper limit for TDS increases over the source water supply, regardless of whether the affected groundwater may be capable of assimilating greater TDS levels without exceeding water quality objectives.

Resolution No. 68-16 requires a finding that the technologies or controls established be the “best practicable.” (Emphasis added.) Before the State Board can assess whether an increase in TDS over the source water supply represents BPTC, the State Board must analyze the various levels recycled water purveyors are capable of meeting using the best practicable treatment method. It cannot simply pick the level of treatment that feels acceptable to most people. Until this exercise is completed, the State Board cannot purport to know what the best practicable treatment or control is, or specifically whether a particular increase in salt concentration over the source supply is BPTC. As a result, the State Board cannot declare that the requirements for irrigation projects that the Regional Boards must establish will result in “the best practicable treatment or control of the discharge to ensure that pollution or nuisance will not occur and the highest water quality consistent with maximum benefit to the people of the state will be maintained.”<sup>26</sup> Moreover, the State Board should not necessarily establish such a standard as BPTC applicable to all recycled water irrigation projects in the state.

This same lack of analysis undermines the assertion that the BPTC requirement of Resolution No. 68-16 will be satisfied for groundwater recharge reuse project since “CDPH [California Department of Public Health] provides recommendations for the design and operation of these projects.”<sup>27</sup> Neither the Draft Staff report nor the Policy provides any analysis to give public, the Regional Boards, or the State Board itself the ability to evaluate whether CDPH’s recommendations are BPTC, or even what CDPH’s recommendations might be. What is known is that CDPH recommendations do not assess whether and how the project will impact all beneficial uses of affected surface water and groundwater. Without the required analysis, it is impossible to say that degradation of the impacted water bodies caused by recycled water use will be consistent with the “maximum benefit of the people of the State,” as required by Resolution No. 68-16.

Finally, we have grave concerns about implications of the conclusory assertion that “projects that comply with this Policy, the Porter-Cologne Water Quality Control Act, and the applicable Basin Plan, shall be considered to have met the requirements of State Water Board Resolution No. 68-16.”<sup>28</sup> Such a blanket declaration opens the door for Regional Boards to rubber-stamp any recycled water project – or indeed potentially other types of projects deemed “worthy” – without conducting the required careful examination of whether a specific project will degrade water quality in violation of the letter and intent of the anti-degradation policy. Even if the anti-degradation policy allows for some diminution of water quality, the amount of diminution that reflects the maximum benefit to the people of the state needs to be assessed on a project-specific basis in light of all uses of the particular respective waters, both recycled and impacted.<sup>29</sup> The Policy’s rubber-stamp, “one-size-fits-all” approach is entirely at odds with the

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<sup>26</sup> State Board Resolution No. 68-16.

<sup>27</sup> Finding No. 25.

<sup>28</sup> Resolution ¶ 16.

<sup>29</sup> Requiring a project specific anti-degradation analysis is not only necessary to ensure that State Board Resolution No. 68-16 is complied with, but as a practical matter there is nothing to be gained through a one-size-fits-all approach proposed in the Policy. We imagine that an anti-degradation analysis for a relatively small recycled water project would be correspondingly simple to prepare while a complex or large project would require a more complex analysis.

three-pronged admonition in Resolution No. 68-16 that “existing high quality water will be maintained until it is shown to the state that any changes will be consistent with the maximum benefit to the people of the state, will not unreasonably affect beneficial uses of such water, and will not result in water quality less than prescribed in the policies.” The Policy’s proposed “anti-degradation off-ramp” will create a dangerous precedent of skirting around a mandated and essential analytical path, and in doing so will not serve to relieve the existing public perception that recycled water use should be viewed with concern.

### **III. Additional Clarity and Structure Are Needed to Ensure the Policy Protects Water Quality and Provides Clear Requirements for Recycled Water Use**

Our third general comment is that the Policy would benefit significantly from increased clarification and structural modifications. During the workshop in Los Angeles on October 2, 2007 (October 2 Workshop) there appeared to be consensus that the Policy needed clarification and some restructuring to: (1) ensure that it would be implemented to protect all waters consistently and effectively, and (2) include explicitly those elements of the Policy that had been only implied.

Our concern with the Policy as written and structured is that it leaves the regulators, the regulated community and the public without a clear understanding of the State Board’s priorities and recommendations. As just one example, one significant point of confusion is how and when monitoring of groundwater would be required for recycled water projects. Staff informed those present at the October 2 Workshop that the prohibition on Regional Boards from requiring groundwater monitoring for irrigation projects unless certain conditions are met<sup>30</sup> was only meant to apply until the salt implementation plan contemplated in Resolution ¶ 6 was completed. But from the text of the Policy, this is not clear. Even if this were explained, however, we would have concerns about artificially prohibiting the Regional Boards from requiring monitoring simply because a salt implementation plan had not been written. Given the ambiguity of the Policy, it is almost impossible for the public to raise such critical concerns. The language of the Policy needs to state exactly what is intended and what must be completed to increase the consistency in interpretation that it seeks.

Adding to the confusion is that there is no mention of monitoring requirements for groundwater recharge reuse projects, except when attenuation is expected to occur.<sup>31</sup> Based on the language on groundwater monitoring for irrigation projects (*i.e.*, the Regional Board may only require it in limited circumstances),<sup>32</sup> it would appear that without similar language for recharge reuse projects, the Policy establishes a predisposition against requiring monitoring in those cases. During the October 2 Workshop, however, staff indicated that this was not the intention, and that a Regional Board may in fact impose monitoring requirements on groundwater recharge reuse projects. If the ability to require monitoring was in fact intended (as we would recommend), then again this must be stated clearly. By being silent on an issue, the Policy will likely result in different requirements in different regions.

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<sup>30</sup> Resolution ¶ 8.

<sup>31</sup> See Resolution ¶ 12.

<sup>32</sup> Resolution ¶ 8.

In addition to stating clearly what is and is not intended and recommended, the Policy also would benefit from headings within the Policy (in both the findings and the resolution paragraphs), to avoid confusion about which findings and requirements apply to each category of recycled water project. This simple modification would make the Policy far more user-friendly and more straightforward to apply, and would dispel some of the apparent contradictions that currently exist.<sup>33</sup>

Additional amendments should be made to clarify those elements of the Policy that are stated but are vague or ambiguous. For example, the Policy's definition of "recycled water irrigation project" is unnecessarily ambiguous, which in turn directly impacts the application of WDRs/WRRs, and their required elements (such as the requirement to not cause or contribute to violations of WQOs), in Resolution ¶ 7. There is no explanation of why the definition of "recycled water irrigation project" includes only "those projects that use recycled water primarily to meet a water supply need, instead of a disposal need," or a definition of what is "supply" versus "disposal." The requirement of having to make such a potentially quite subjective finding before issuing WDRs/WRRs will likely lead the Policy away from, not toward, clear and consistent application of the law. Such ambiguities in the Policy must be eliminated for the Policy to be effective.

Given the difficulty with ensuring the State Board's exact intentions and direction under the Policy as written, we urge staff to make the needed clarifications and provide additional needed direction, and then redistribute the Policy for an additional round of public comment before bringing it before the Board. We believe that the significance of this issue calls for thorough public review of the Board's intent and specific guidelines, which would be more likely after the Policy has been clarified and otherwise amended.

#### **IV. Specific Actions Needed to Improve the Water Recycling Policy**

##### **A. The Policy Should Require Revision of Implementation Plans to Address Threats to Water Quality Objectives from Pollutants Other than Salts, and Require It Be Done in Less Than 10 Years**

We applaud the State Board for requiring the Regional Boards to adopt revised implementation plans for those groundwater basins within their regions for which water quality objectives for salts are being, or are threatening to be, violated.<sup>34</sup> However, the focus on addressing issues related to salts, though commendable, is too narrow. A prudent policy, and one that is required by law, would expand this provision to require revision of all implementation

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<sup>33</sup> Compare Finding No. 13 (unreasonable to require groundwater monitoring to judge impacts of irrigation projects on groundwater since the "substantial delay in pollutants reaching groundwater limits the effectiveness of monitoring) with Finding No. 17 (groundwater limitations, along with groundwater monitoring will provide adequate water quality protection when attenuation is expected to occur in groundwater recharge reuse projects).

<sup>34</sup> Resolution ¶ 6. Resolution ¶ 6 needs to be clarified to require the adoption of revised (or new) implementation plans if there are Basin Plans that currently do not have implementation plans for all groundwater basins within the applicable region. As currently written, Resolution ¶ 6 only appears to require revision of existing plans.

plans, or adopt an implementation plan if one does not exist, for all groundwater basins within a region where any water quality objectives are being or are threatened to be violated.<sup>35</sup> For example, industrial contaminants, not salts, represent an equally significant (if not more significant) threat to the San Fernando groundwater basin, and since recycled water also contains numerous industrial contaminants, it would be appropriate to require an implementation plan to protect this groundwater basin from industrial contaminants in addition to salts.<sup>36</sup> We request revision of the Policy to modify Resolution ¶ 6 to require adoption or revision of implementation plans for all groundwater basins within the various regions to protect all beneficial uses from threats from any pollutant or contaminant.

We also see no reasoned basis in the Draft Staff Report, the Findings, or the Policy itself for extending the deadline to develop these implementation plans until January 1, 2018. Indeed, these documents emphasize the already-degraded state of many groundwater basins, which should prompt a far more expedited deadline to prevent further contamination.<sup>37</sup> The Draft Staff Report notes that the Santa Ana Regional Board recently amended its plan to include a program of implementation for achieving water quality objectives for salts.<sup>38</sup> This process took eight years to complete and fund, without an order from the State Board to get it done.<sup>39</sup> We also direct your attention to the Salt Management Plan, prepared by Zone 7 (the local agency responsible for managing groundwater resources in the Livermore-Amador Valley) in response to an order from the Regional Water Quality Control Board, San Francisco Bay Region.<sup>40</sup> Such plans provide ample guidance and experience for the various Regional Boards to draw on when adopting (or revising) future implementation plans. Given the experience with doing these plans already, and given the degraded status of many of our groundwater basins, we see no reason that the Policy should set a deadline longer than three years.<sup>41</sup>

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<sup>35</sup> Cal. Water Code §§ 13240, 13241, and 13242 (requiring establishment of implementation plans to achieve all water quality objectives).

<sup>36</sup> See *Groundwater Assessment Study*, Metropolitan Water District of Southern California, Ch. IV, p. IV-2-13, Table 2-5, and Figures 2-9 through 2-11 (September 2007).

<sup>37</sup> See e.g., Finding No. 8; Draft Staff Report at 2.

<sup>38</sup> Draft Staff Report at 2; *Resolution Amending the Water Quality Control Plan for the Santa Ana River Basin to incorporate an Updated TDS and Nitrogen Management Plan for the Santa Ana Region*, Resolution No. R8-2004-001, Regional Water Quality Control Board, Santa Ana Region.

<sup>39</sup> *Resolution Amending the Water Quality Control Plan for the Santa Ana River Basin to incorporate an Updated TDS and Nitrogen Management Plan for the Santa Ana Region*, Resolution No. R8-2004-001, Regional Water Quality Control Board, Santa Ana Region.

<sup>40</sup> *Salt Management Plan*, Alameda County Flood Control and Water Conservation District, Zone 7 (May 2004) (approved by San Francisco Regional Board by letter dated September 24, 2007) (copies of these documents can be obtained online at [http://www.zone7water.com/index.php?option=com\\_content&task=view&id=79&Itemid=352](http://www.zone7water.com/index.php?option=com_content&task=view&id=79&Itemid=352)).

<sup>41</sup> If the concern here is that some groundwater basins (e.g. San Joaquin Valley) are larger or more complex than others and thus staff or the State Board believes it may take longer than three years to complete a management plan for these basins, then that should be noted and addressed specifically. Using the exception, i.e. the basin that is large and complex, to make the rule for all groundwater basin planning, no matter how complex, is inappropriate and further threatens our limited supply of groundwater.

**B. The Policy Should Be Sufficiently Prescriptive and Take a Precautionary Approach to Regulating Irrigation Projects that Use Recycled Water**

The approach taken by the Policy to address irrigation projects that use recycled water needs improvement not only to ensure that water quality is protected, but also to provide consistency in the interpretation of requirements applicable to recycled water use.

**1. The Nutrient Management Planning Requirement Must Be Fleshed Out**

We support the Policy's requirement to develop nutrient management plans (NMP) for groundwater discharges. However, as currently drafted, it is unclear when or where NMPs would be required, and how they would be implemented and enforced.<sup>42</sup> There are several key procedural and logistical aspects of the NMP development and implementation that need to be addressed. These include:

- Who shall be responsible for development and implementation of the NMP?
- Is it required to be prepared by a certified nutrient management planner?
- Are there any training requirements, technical or otherwise, that the person who develops the nutrient management plan and is responsible for its implementation must meet?
- How will violations be tracked and determined?
- If it is violated, how will it be enforced, and who will be liable for correcting violations and remediating damage caused?
- Will it be incorporated into the WDRs?
- Will it be a public document, subject to public review and later access?

These are all questions that, unless answered, will likely lead to significant disparities in NMP requirements imposed by different Regional Boards throughout the state.

Equally, if not more, problematic is the lack of standards or requirements that an NMP must meet to ensure that water quality is protected according to the law. Specifically, the definition of "nutrient management" in Resolution ¶ 3 provides that it is done to "budget and supply nutrients for plant production, properly use manure or organic by-products as a plant nutrient source, minimize degradation of surface water and groundwater resources, protect air quality ..., and maintain or improve the physical, chemical, and biological condition of soil."<sup>43</sup> These broad generalizations about the purposes of nutrient management do not tell Regional Boards what standards must be met to achieve protection of beneficial uses. Likewise, the bare description of what nutrient management is ("the act of managing the amount, source, placement, form, and timing of the application of plant nutrients and soil amendments")<sup>44</sup> does not provide

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<sup>42</sup> As drafted, the Policy only directs a Regional Board to require an NMP if WDRs or WRRs are issued, but as explained above, the confusion created by the definition of "recycled water irrigation project" and lack of explicit direction to require WDRs or WRRs for all irrigation projects that use recycled water leaves considerable ambiguity about when an NMP must be required.

<sup>43</sup> Resolution ¶ 3.

<sup>44</sup> *Id.*

any better guidance for the Regional Boards on how to assess whether a particular NMP will be acceptable and effective in achieving the stated goals.

The requirement in the Policy that recycled water be applied in an amount that does not exceed the amount needed for the landscape or crops is closer to the type of prescriptive requirement that must be included to direct Regional Boards on what must be required in NMPs. However, details are critical to the success of such a provision and these details are lacking. We encourage the Board to review the NMP requirements established by the Central Valley Regional Board in its recently adopted general WDR Order for Existing Milk Cow Dairies ("Dairy WDR") for the type of standards and elements that a nutrient management planning requirement should prescribe.<sup>45</sup> We do not advocate here for the State Board itself to establish technical standards for nutrient management for all conceivable projects that may use recycled water. Rather, we suggest that the Policy must prescribe the types of technical standards that Regional Boards should establish and the specific protections that those standards must achieve.

In sum, while we are pleased to see that a nutrient management planning requirement is included in the Policy, it must have more detail and be more prescriptive, and enforcement mechanisms must be made more clear, to protect the health of affected waterways and achieve the Policy's goal of permit clarity.

## **2. Compliance with Title 22 Recycling Criteria Is Insufficient to Protect Ecological and Public Health**

The Policy requires that recycled water used for irrigation projects meet the Title 22 Recycling Criteria.<sup>46</sup> Simply requiring compliance with these standards will not necessarily protect public health or water quality. The Title 22 Recycling Criteria are not standards designed to protect terrestrial organisms that may contact the water, nor are they standards that will protect the water resources ultimately impacted, the groundwater beneath or the surface waters downstream from the recycled water irrigation projects. The deficiencies of the Policy in addressing the latter issue are discussed in greater detail in Section IV(B)(3). Here we address the lack of protection Title 22 Recycling Criteria provide to those ecosystems and organisms that use and contact the water before it percolates to groundwater. We also address the important point that compliance with Title 22, Recycling Criteria will be ineffective even to protect public health, as it purports to do.

The Policy should, but does not, address the impacts of recycled water on the ecological communities that will be impacted by its use in irrigation projects. The Title 22 Recycling Criteria are intended to prevent adverse public health impacts of recycled water use. They are designed with the humans in mind. But irrigation projects that use recycled water impact ecological communities, not just humans. The soil biota where recycled water is applied are affected. So too are the animals that will eat the soil biota, bugs, and lower life forms that metabolize the pollutants in the recycled water. Many of the constituents in recycled water

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<sup>45</sup> See *Waste Discharge Requirements General Order for Existing Milk Cow Dairies*, California Regional Water Quality Control Board, Central Valley Region, Order No. R5-2007-0035. Section C and Attachment C.

<sup>46</sup> Resolution ¶ 7(b).

bioaccumulate,<sup>47</sup> or are specifically designed to be effective at very low levels on reproductive, endocrine, nervous, or other physiological systems.<sup>48</sup> In an era when we understand the disastrous effect that introduction of bioaccumulative constituents can have on entire ecosystems, and when it is undeniable that recycled water contains these constituents, it is irresponsible for the State Board to consider issuing a Policy that does not even address this issue.<sup>49</sup>

On a related issue, plants take up many of the metals and other constituents in recycled water, yet the Policy provides no direction to ensure effective control of heavy metals and other potential harmful constituents in recycled water used to grow crops for human consumption. The source of this oversight is the absence of any discussion in the Policy of what recycled water actually is.<sup>50</sup> There is no principled basis for failing to address the plant uptake issue in this Policy by resorting to an unsubstantiated assertion that all water used for irrigation contains pollutants similar to those in recycled water. The question before the State Board is "what is an appropriate Policy for the use of recycled water." An answer to this question requires a rigorous examination of what recycled water is and the development of a Policy that addresses all the issues implicated. An appropriate Policy will demand characterization of the recycled water before it is spread throughout the environment and will require development and implementation of a management plan that will address all constituents and their impacts.

We are similarly concerned that the requirement that irrigation projects comply with Title 22 Recycling Criteria will also fail to protect against even those negative public health impacts these criteria are specifically designed to prevent. Foremost of our concerns is that these criteria still allow for the introduction of some level of pathogens into the environment.<sup>51</sup> Recycled water comes primarily from sewage treatment plants,<sup>52</sup> which in addition to pathogens, also contain all the antibiotics and other agents designed to kill pathogens.<sup>53</sup> As such, it is likely some of the pathogens that make it through the treatment process will be anti-biotic resistant. It is essential to remember here that recycled water is used to irrigate parks and recreation areas where the general public goes to relax and lie in the grass.<sup>54</sup> Thus, in order to ensure that public

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<sup>47</sup> <http://www.epa.gov/ppcp/faq.html>; [http://toxics.usgs.gov/highlights/pharm\\_soils/index.html](http://toxics.usgs.gov/highlights/pharm_soils/index.html)

<sup>48</sup> <http://www.epa.gov/ppcp/faq.html>

<sup>49</sup> Resolution ¶ 11 reserves the right for Regional Boards to issue requirements for groundwater recharge reuse projects that may impact beneficial uses other than domestic and municipal supply. To address the shortcomings of Title 22 Recycling Criteria in protecting water quality from irrigation project impacts, this provision must be adopted into the framework for irrigation projects and it must be made mandatory and strengthened to note the various ecosystems that must be addressed. *See supra*, Section IV(B)(3).

<sup>50</sup> *See supra*, Section I(A).

<sup>51</sup> Title 22 C.C.R. § 60301.230(b) (defines disinfected tertiary recycled water- which is the most stringent level required the Title 22 Recycling Criteria – to be water in which "The median concentration of total coliform bacteria measured in the disinfected effluent does not exceed an MPN of 2.2 per 100 milliliters").

<sup>52</sup> Finding No. 16.

<sup>53</sup> *See Reduction of pathogens, indicator bacteria, and alternative indicators by wastewater treatment and reclamation processes*, Joan B. Rose, et al. WERF paper # 00-PUM-2T, 2004.

<sup>54</sup> One important additional possible pathway for exposure to the various contaminants in water that meets Title 22, Recycling Criteria is through the watering of vineyards and fruit trees to prevent frost. People who live in regions where this occurs relate that when this is taking place, the mist that is generate just sits in the air and effectively acts to aerosol all the contaminants that are in the water. The prospect this presents for exposure to the contaminants in

health and recreation uses are protected,<sup>55</sup> the Policy must require that water used for any purpose where contact with humans is possible should be treated to remove all pathogens, even if that means requiring treatment beyond the levels currently required by Title 22 Recycling Criteria. Currently, neither the Draft Staff Report nor the Policy explain that these issues are implicated or analyze the effectiveness of the chosen method of addressing them.

### **3. The Policy Should Provide Direction on Limitations on All Constituents as Needed to Protect Water Quality**

Perhaps the most glaring omission from the Policy with respect to irrigation projects is the absence of any guidance or requirement to establish limitations for recycled water irrigation projects (or other projects) to address pollutants other than salts that may affect water quality. We acknowledge that the Policy obligates Regional Boards to require “the use of recycled water to not cause or contribute to violations of water quality standards,”<sup>56</sup> and “compliance with the federal Code of Regulations, Chapter 40, Part 122, [NPDES].”<sup>57</sup> However these simple restatements of the law, without more, do not provide the guidance necessary to assure protection of water quality.

Inexplicably, the requirements found in Resolution ¶ 7 that must be included for regulated irrigation projects fail to require protection of either groundwater or surface waters from any pollutant other than salts. By contrast, for groundwater recharge reuse projects, recycled water that may reach a drinking water source must meet the MCLs established by CDPH before it is discharged.<sup>58</sup> The purpose of such a requirement is obvious when addressing a groundwater recharge reuse project – namely, it is necessary to ensure that contaminants that will degrade a drinking water source should not be introduced at levels that will jeopardize that use. Achieving this purpose is just as obvious when the water (and the pollutants it contains) may percolate to groundwater aquifer beneath irrigation projects. We fail to see any reason for excluding such a requirement when recycled water will be used for irrigation, even if, as Finding No. 13 suggests, the constituent’s arrival in the groundwater source is delayed.

The same can be said about the omission of any obligation for the Regional Boards to require, or even consider whether to require, limitations on concentrations of constituents for which CDPH has not established MCLs (sometimes referred to as “emerging contaminants”) in

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Title 22 water, even tertiary treated water (which may not even be required for this particular use) is obvious and should be addressed by this Policy.

<sup>55</sup> See, e.g., “Brentwood soccer fields have fungus,” *Contra Costa Times* (Sept. 30, 2007) (“the decision to water the fields with recycled water, [which] has a higher saline content than potable ... made the grass thirstier [and] ... water pooled on the fields, and the salt bound up with the dense clay soil, further preventing drainage. Standing water plus summer’s heat and humidity fueled a prime breeding ground for the fungus that has turned large swaths of once-lush grass into crisp brown sod,” which has “render[ed] it nearly unusable for sports teams”).

<sup>56</sup> We note that a lack of clarity (fueled in large part by the subjective definition of “recycled water irrigation project”) with respect to application of WDRs/WRRs to irrigation projects adds additional uncertainty about whether and when prohibitions against causing or contributing to water quality objectives will be required. See *supra*, Section I(C).

<sup>57</sup> Resolution ¶ 7(e) and 7(f).

<sup>58</sup> Compare Resolution ¶ 7 with Resolution ¶ 10.

recycled water to be used for irrigation. The effects of these emerging contaminants, many of which are mentioned above, on both human and ecological health are just now being understood.<sup>59</sup> A policy that will guide the use of recycled water in California for years if not decades would be shortsighted if it failed to provide a mechanism for Regional Boards to take protective measures in the face of these unknown problems.

A simple example from the Santa Rosa area, where there is currently a proposal to use wastewater effluent to irrigate wine grapes in the Alexander Valley, illustrates the problem. As it passes through the Alexander Valley, the Russian River crosses alluvial deposits that are excellent for growing grapes. The groundwater beneath these soils is relatively pristine, free for the most part of industrial contaminants, salts, and other problems that plague many other groundwater basins in the state. The population pressures in this area are on par if not greater than in the rest of California, and it is expected that it will not be long before these groundwaters will be an important source of drinking water for this growing population. The passage of water from the surface to the groundwater in this area is quick and, in fact, there is considerable communication between the Russian River itself and the groundwater.

Under the Policy as drafted, when the Regional Board issues the WDRs for a project to irrigate wine grapes in the Alexander Valley, it will be obligated to require: (1) an NMP; (2) that water must not be overapplied; (3) that the Title 22 Recycling Criteria must be followed to protect the public health from contact with the water; and (4) that the TDS concentration in the water applied must be no greater than 300 mg/L greater than the source supply.<sup>60</sup> Putting aside for the moment the limitations of the Policy with regard to these requirements, discussed in detail above, there are no explicit requirements regarding appropriate limitations to protect the groundwater resources from any constituents in the recycled water other than salts. The simple command that the use of recycled water not cause or contribute to violations of water quality objectives is insufficient.<sup>61</sup> Porter-Cologne requires regulation, now, of any discharge that "could affect" the quality of the state's waters.<sup>62</sup> In this example, to be effective the Policy must include requirements that the water used for irrigation meet both MCLs and standards to protect all other beneficial uses. In general, the Policy must demand that the use of recycled water in irrigation projects be subject to requirements to effectively control the discharge of all pollutants, including emerging contaminants, to prevent degradation of impacted waterways. These requirements must include numeric criteria necessary to meet the all beneficial uses.<sup>63</sup>

There is a second issue that the Regional Board will face here and which the Policy as written will be ineffective in guiding. It is almost assured that in the Alexander Valley example the recycled water will reach surface waters, whether as runoff from the irrigated vineyards or through the subsurface hydrological connection between the Russian River and the underlying groundwater. And yet the Policy provides no guidance to guarantee the protection of this water quality. Admittedly the Policy calls for compliance with NPDES permit regulations, but it

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<sup>59</sup> <http://www.epa.gov/ppcp/faq.html>; [http://toxics.usgs.gov/highlights/pharm\\_soils/index.html](http://toxics.usgs.gov/highlights/pharm_soils/index.html)

<sup>60</sup> Resolution ¶ 7.

<sup>61</sup> See Resolution ¶ 7(f).

<sup>62</sup> Cal. Water Code §§ 13260, 13267.

<sup>63</sup> Compare Resolution ¶ 7 with Resolution ¶ 11

pointedly does not require compliance with the Clean Water Act itself, nor does it state that any point source discharge of recycled water that will reach waters within the jurisdictional reach of the Clean Water Act must be permitted with an NPDES permit. The State Board fails to protect water quality or provide clarity with a Policy that does not explicitly state that Regional Boards shall establish effluent limitations to protect all beneficial uses of the receiving waters in an NPDES permit when an irrigation project will result in a discharge to surface waters. Effluent limitations must be established for both the beneficial uses to be protected while the water is used for irrigation, and for the beneficial uses of the water that ultimately receives the discharge, incidental or otherwise. There is nothing to be gained by leaving any ambiguity about when a discharger must comply with state and federal laws designed to protect surface water quality.

**C. The Policy Should Require Monitoring of Groundwater Impacts of Both Irrigation and Groundwater Recharge Reuse Projects That Use Recycled Water**

The Policy as currently drafted does not provide needed direction on groundwater monitoring. First, it unnecessarily restricts groundwater monitoring of irrigation projects.<sup>64</sup> Second, it provides almost no direction regarding monitoring for groundwater recharge and reuse projects. In general, a monitoring program is essential not only to assessing the effectiveness of the requirements imposed on a project to protect water quality, but also to collect data and information so that if a problem is detected, the source of the problem can be more efficiently identified and remedial measures can be quickly implemented. It is also essential to the development of the implementation plans referenced in the Policy. The Policy's unnecessary restrictions and lack of clarity on monitoring undermines both benefits of a monitoring program and the ability of the Regional Boards to protect water quality.

With respect to irrigation projects, the prohibition on imposing monitoring requirements absent the limited conditions identified in Resolution ¶ 8 is misguided and circular.<sup>65</sup> We see no point in tying the hands of a Regional Board if it determines that there is a benefit to requiring monitoring but does not yet have the information needed to determine whether site conditions "could cause an increased potential for the irrigated site to adversely affect public health or surface water quality"<sup>66</sup> - information that monitoring could provide. For example, a Regional Board may determine that it is beneficial to require monitoring to evaluate whether the assumptions made about the project are correct and the controls developed to prevent pollution are working. In addition, if monitoring is allowed (or even better required) for all irrigation projects that use recycled water,<sup>67</sup> and it is later discovered that a persistent organic chemical

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<sup>64</sup> See *supra*, Section III.

<sup>65</sup> The term "shallow groundwater" used in Resolution ¶ 8 is both vague and unnecessarily restrictive. Shallow groundwater is neither defined in the Policy nor is it a term with a common, well understood meaning. Further, if the point is that groundwater monitoring can be required when an irrigation project could cause an impact to public health or surface water quality, then that is all that needs to be said. Inserting the words "shallow groundwater" only confuses the matter.

<sup>66</sup> Resolution ¶ 8.

<sup>67</sup> We see no defensible grounds for the statement in the Policy used to justify not requiring groundwater monitoring for irrigation projects. In particular, it is not "unreasonable" to require monitoring simply because the threat posed to water quality from irrigation projects that use surface water or groundwater is the same as that posed by projects that use recycled water. Finding No. 13. The appropriate conclusion that an agency charged with protecting an

commonly found in recycled water has fouled our aquifers, the Regional Board and the public would already have the data needed to respond to the problem.

Second, with respect to groundwater recharge reuse projects, the Policy provides no direction where direction should be provided. As we stated in our scoping period comments, monitoring recycled water both prior to reuse and prior to discharge, particularly for toxic constituents, should be required. By keeping track of the types and quantities of constituents that have been discharged and where they end up in the groundwater table, decision-makers will be prepared to assess whether a particular project is protective of human health and the environment over time. This is particularly important in the face of constantly changing information about the risks associated with exposure to toxic constituents. If we actually know what is being released into the environment, as opposed to guessing through a mass balance or other rough estimation technique done without monitoring, we will be better prepared to effectively address future discovered problems. Monitoring will also provide an understanding of how the toxic constituents may be interacting with one another and with other discharges in the groundwater table.

As explained above, based on the approach taken towards groundwater monitoring for irrigation projects, the Policy appears to disfavor monitoring altogether, even for groundwater recharge reuse projects. If this is not the case, which is what we heard during the October 2 Workshop, the Policy must be modified to reflect this position. Without clarification, we anticipate that any monitoring requirements later imposed will receive significant pushback from project proponents. If a Regional Board thinks monitoring is important, a statement in the Policy from the State Board that supports this decision would eliminate a great deal of the expected resistance.

#### **D. The Policy Should Be More Precautionary in Its Approach to Groundwater Recharge Reuse Projects**

Though all projects that use recycled water require a precautionary approach, groundwater recharge reuse projects present challenges that demand a heightened level of precaution. The simple fact that a groundwater recharge reuse project has as its express purpose to provide a future supply of water for drinking and bathing, or irrigating our crops and lawns means that we must be extraordinarily careful about the quality of water used for these projects. In essence, these projects raise all the issues posed by the immediate reuse of recycled water for irrigation, plus the additional concern of insuring that we protect quality of this exact water for

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invaluable natural resource should reach when faced with that situation is to require monitoring for all projects that pose a threat to water quality. The rationale provided in the Draft Staff Report is similarly meritless. Draft Staff Report at 5-6. Specifically, the assumption that irrigation projects cover larger areas than recharge projects is unfounded since percolation ponds often cover large areas. Moreover, the suggestion that impacts to groundwater can be estimated by preparing a salt/water balance only confirms the rationale for needing to implement an NMP and other management measures to prevent degradation; it says nothing about whether monitoring is able to provide useful information. The conclusion in points (c) and (d) on page 6 simply assert that because there is the possibility for faulty engineering, we should not require monitoring. Finally, the statement in (e) is just a restatement of the conclusion in Finding No. 13, which as explained above is really just an argument for requiring monitoring anytime there is a threat to water quality.

these uses well into the future. In particular, we need to protect the environment from the threats we understand now and those we are just beginning to understand. The Policy gets us part of the way there, but it provides inadequate flexibility for the Regional Boards to protect against future threats before they become a problem.

We support the requirement that recycled water must meet the applicable MCLs for all constituents prior to discharge into a recharge reuse project. This requirement is a critical step in ensuring that water recycling does not compromise water quality.<sup>68</sup> But the Policy falls short with respect to those constituents for which CDPH has not established an MCL. Resolution ¶ 11, which places significant restraints on a Regional Board's ability to impose limitations for constituents for which there is no MCL, presents two significant barriers to providing a reliable and useful source of water in the future. First, placing the burden on the Regional Board to establish the presence of the constituent and demonstrate its toxicity is improper. The responsible approach, and the only approach that will ensure protection of our groundwater resources, is to burden the discharger with demonstrating that the constituent is safe, or not present if it is not shown to be safe.<sup>69</sup> At the very least, the burden of characterizing the waste stream must lie with the discharger. Second, if the burden is not shifted as suggested, requiring the Regional Board to demonstrate both that a constituent will be persistent in groundwater, and that there is adequate information to characterize the toxicity and establish an effective limitation is to close the barn door after the animals have already escaped. At a minimum, the Policy should be clear that the law requires the Regional Boards to regulate those constituents without MCLs that demonstrate any combination of persistence or toxicity.

#### **V. The Liability Provisions in the Policy Are Important Tools to Protect Water Quality**

We fully support the liability provisions established by the Policy. Resolution ¶ 17 provides that compliance with this Policy does not exempt a discharger from liability for contamination of groundwater, even if water quality standards necessarily become more stringent after requirements for a particular project have been set by a Regional Board.<sup>70</sup> Both components of this provision are essential to ensuring water quality protection, because together they place the ultimate cost of ensuring that the utmost care is taken to prevent pollution and degradation of the environment where it belongs – with the entity granted the privilege of disposing pollutants in a public resource. There is no question that recycled water is a valuable

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<sup>68</sup> We would add that to meet the mandate of ensuring protection of all designated beneficial uses, the language in Resolution ¶ 10 must be modified to state that “a Regional Water Board shall establish a limitation that is more stringent than the MCL, whenever necessary to protect a designated beneficial use.” *See, supra*, Section I(C) (discussing that this language should be made mandatory and it should be included as a stand alone resolution paragraph applicable to all recycled water projects).

<sup>69</sup> This recommendation is distinct from that adopted by the Los Angeles Regional Board for the Los Alamitos Barrier Project to the extent the WDRs for that project imposed effluent limitations on a constituent that was not present in the discharge. Our argument is for requiring the discharger, not the Regional Board, to characterize their waste stream and should they demonstrate that a particular constituent(s) is not present, then an effluent limitation would not be necessary.

<sup>70</sup> We can imagine no reasonable basis, and the Policy provides none, for not expanding this provision to include any fouling of surface waters as well as groundwater (including surface water hydrologically connected to groundwater). This is yet another way in which the Policy fails to protect surface water quality.

commodity. There is no reason why the costs associated with its use, most importantly the potential pollution of our groundwater and surface waters, should be borne by anyone other than the organizations and people who gained the most financially from the pollution.

Further, holding dischargers accountable is fair even if the pollution permitted is only later understood to be harmful. In fact, putting ultimate responsibility on the dischargers is an effective last resort, and in the case of some pollutants the only means, to push them to develop and take necessary measures to protect the resource. For example, we are just coming to understand many of the detrimental impacts associated with spreading pharmaceuticals throughout the environment, but the Policy as drafted ties the hands of the Regional Boards to require effluent limitations for many of these constituents.<sup>71</sup> As such, it is only by placing ultimate liability for spreading these pharmaceuticals (and other unregulated contaminants) into the environment that the State Board can encourage dischargers to study and control their waste discharges to protect public health and the environment.<sup>72</sup>

Overall, though the liability provisions must be expanded to protect surface waters as well, we support placing ultimate responsibility for any harm caused on those granted the privilege of spreading pollutants in the environment.

## **VI. Conclusion**

We again provide our support for the general principle that recycled water use is a useful and important tool for helping California solve some of its water supply issues. However, a solution to California's water supply issues is no solution at all if it puts the quality of our state's waters in jeopardy. Accordingly, we support aspects of the Policy that address certain groundwater issues (such as salt management and protecting municipal and domestic uses in groundwater recharge projects), and we support the Policy's appropriate allocation of liability to the dischargers. However, we think that the lack of attention paid to several essential and closely related issues, as well as the described lack of clarity, will seriously impair the Policy's implementation and effectiveness. In particular, the Policy needs to provide the foundation regarding what recycled water is and the issues raised by its use, address pollutant limitations needed to protect groundwater and surface waters impacted by pollutants other than salts in recycled water, and either address recycled water releases to surface water (whether direct or through hydrologically connected groundwater) or be clear in the Resolution section of the Policy that such releases are subject to NPDES permitting that will be administered by the Regional Boards. The Policy also needs to address antidegradation consistent with State Board Resolution No. 68-16 (*i.e.*, rather than simply provide a conclusion unsupported by analysis).

Rather than ignoring potential problems through a surface glance at recycled water contaminants and regulatory requirements and hoping for the best, the State Board will

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<sup>71</sup> See Resolution ¶ 11 (placing an unnecessarily rigorous burden on the Regional Boards before they may regulate constituents for which CDPH has not established an MCL).

<sup>72</sup> A polluter pays principle is not substitute for a precautionary regulatory approach. However, where the Policy falls short on adopting a precautionary approach, it must establish a polluter pays principle to drive polluters to take measures to protect our resources.

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encourage the highest use of recycled water only if full attention is paid to the quality of recycled water in light of its potential uses and impacts. For example, the East Bay Municipal Utility District sells recycled water to the Chevron Refinery for use in cooling towers. In response to articulated refinery needs, EBMUD has agreed to treat the recycled water past tertiary treatment, which is normally the maximum level of treatment used. In turn, Chevron will significantly increase the amount of recycled water that it uses in its operations. Similar attention to the needs of both recycled water customers and those impacted by use of this resource will ensure the safety and reliability of - and continued market for - recycled water.

As it has led the country on greenhouse gas control, California can and should lead the nation again in developing recycled water as an important, reliable water supply that will both protect and improve the health of California's invaluable natural waters. To achieve this goal and resolve the important issues raised in this letter, we request that the State Board direct staff to amend and re-circulate the Policy for an additional round of public review before a final draft Policy is set for adoption.

Thank you for your attention to these comments. We look forward to working with you to ensuring the use of recycled water a safe, reliable, water source for California.

Sincerely yours,



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*Tom Ford*

Tom Ford  
Interim Executive Director  
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Layne Friedrich  
Drevet Hunt  
Lawyers for Clean Water, Inc.

attachment

# ATTACHMENT 1



March 27, 2007

Tam Doduc, Chair and Members  
State Water Resources Control Board  
1001 I Street  
Sacramento, California 95814

VIA EMAIL: [commentletters@waterboards.ca.gov](mailto:commentletters@waterboards.ca.gov)

Re: March 20, 2007 SWRCB Meeting, Agenda Item #8: Comments on Development of Statewide Water Recycling Policy

Dear Chair Doduc and State Board Members:

California Coastkeeper Alliance, Santa Monica Baykeeper, and Lawyers for Clean Water are pleased to submit these comments in response to the State Water Resources Control Board's ("State Board") request for public input on the development of a statewide Water Recycling Policy. We thank the State Board for taking on the important task of developing a Water Recycling Policy. Developing a statewide policy is a critical component in fostering effective and efficient use of California's scarce and precious water resources. We look forward to working with the State Board to craft a Water Recycling Policy that encourages recycled water use without sacrificing water quality in the process.

A statewide Water Recycling Policy on an issue as significant as the use of recycled water in a state with water demand outpacing supply must be comprehensive to be effective. Over the past few years the State Board and staff, the Recycled Water Task Force,<sup>1</sup> and the various regional boards have identified several issues that a statewide Water Recycling Policy should address. We agree that the issues identified by these groups, and reiterated in the agenda item description and discussion available on the State Board website ("Agenda Description"), are vital to the development of an effective Water Recycling Policy. However, an essential issue is absent – namely how the Recycled Water Policy will ensure protection of water quality and, in particular, address and comply with the Clean Water Act. Inclusion of the mandates of the Clean Water Act in overall statewide Water Recycling Policy is required by state and federal law and will provide the Regional Boards with the guidance they need to make appropriate and consistent decisions on recycled water projects that fulfill their legal mandates.

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<sup>1</sup> The Recycled Water Task Force was established by Assembly Bill 331 (2001) to evaluate, among other things, the framework of State statutes and regulations applicable to recycled water projects.

Our comments first explain the need for the statewide Water Recycling Policy to acknowledge that recycled water projects will impact surface waters and then discuss how Clean Water Act requirements will be met. Next, we explain why modifying the Anti-degradation Policy, or weakening it through the Water Recycling Policy to encourage the use of recycled water, is inappropriate, since the Anti-degradation Policy already establishes an appropriate balance for weighing conflicting needs and uses for water with protecting water quality. We also provide our general comments on the issues identified in the Agenda Description: Irrigation Projects and Salts; Groundwater Recharge Reuse; Impoundments; Agency Coordination; and Aquifer Storage and Recovery Projects. The theme running through each of our comments, and which the statewide Water Recycling Policy must embody, is this: **water recycling helps California meet its water needs only when water quality is protected.**

### **Statewide Water Recycling Policy Must Address Clean Water Act Requirements**

The Agenda Description seems to be limited to providing direction to the regional boards on how to interpret state statutes and regulations. We are confused as to why the Agenda Description only focuses on state law issues implicated by a Recycled Water Policy that, as explained below, will address discharges to surface water as well as to groundwater. Adopting an approach that limits the discussion to state law relegates federal law requirements regarding water quality, particularly those established by the Clean Water Act, to the background and thus ignores essential issues that must be addressed in a policy designed to guide regional board decision making. Unless the statewide Water Recycling Policy includes guidance regarding federal requirements that the regional boards must follow when permitting recycled water projects, the policy will not generate the consistent and appropriate application of legal requirements, which is the primary purpose of adopting the Water Recycling Policy in the first place. Further, a statewide Water Recycling Policy that does not address federal law will not help ensure that the regional boards are complying with their mandate under the Clean Water Act to regulate discharges to surface waters with National Pollution Discharge Elimination System ("NPDES") permits.<sup>2</sup>

When the State Board sought and was granted approval to administer the Clean Water Act's NPDES program in California, it made assurances to the U.S. Environmental Protection Agency ("EPA") that it would do so consistent with the requirements of the Clean Water Act. Central to the implementation of an effective NPDES program is requiring that discharges to waterways be regulated in compliance with NPDES permits.<sup>3</sup> In fact, the Clean Water Act provides that "each State desiring to administer its own permit program for discharges into navigable waters" must establish a program to "issue permits which apply, and insure compliance with, any applicable requirements of sections 1311, 1312, 1316, 1317, and 1343 of

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<sup>2</sup> We recognize that the NPDES program is administered under Sections 13770-13777 of the Porter-Cologne Act. However, these provisions of state law require that the State Board and regional boards act in conformance with federal law. More to the point for these comments, the Agenda Description fails to raise for discussion those issues related to discharge of recycled water to surface water under either federal law or its Porter-Cologne counterpart.

<sup>3</sup> 33 U.S.C. § 1342(b).

the [Clean Water Act].”<sup>4</sup> Section 1311(a) mandates that discharges to waters of the United States are prohibited unless authorized by, and in compliance with, an NPDES permit.<sup>5</sup>

Even under state law, the requirements related to recycled water projects require consideration of the Clean Water Act’s mandate. In pertinent part, the Porter-Cologne Act states the Regional Board “shall ... issue waste discharge requirements ... which apply and ensure compliance with all applicable provisions of the [Clean Water Act].”<sup>6</sup> As explained above, the Clean Water Act requires the permitting authority to issue NPDES permits when regulating discharges to waters of the United States. It follows that the Regional Boards’ obligation under the Porter-Cologne Act is to regulate discharges to waters of the United States with NPDES permits.

With this legal framework in mind, the question becomes whether recycled water projects have the potential to result in discharges to waters under the jurisdiction of the Clean Water Act. If the answer to this question is yes, then the statewide Recycled Water Policy must ensure that these discharges are regulated in compliance with the Clean Water Act’s mandates.

To answer the central question, there is no doubt that the owners and/or operators of certain recycled water projects will release discharges of recycled water to waters within the jurisdiction of the Clean Water Act. For example, the Recycled Water Task Force acknowledges this at Section 4.2 of *Water Recycling 2030* when discussing the use of recycled water for irrigation and as landscaping features:

Incidental runoff or overspray of minor amounts of irrigated water at the edges of irrigated areas is difficult to prevent. It is also difficult to prevent runoff of rainwater from areas irrigated with recycled water or from aesthetic ponds on golf courses filled with recycled water, especially during major storm events.<sup>7</sup>

The State Board similarly acknowledged the unavoidable discharge of recycled water from recycled water projects in a memo released to the regional board executive officers in 2004 entitled “Incidental Runoff of Recycled Water” (“2004 Memo”).<sup>8</sup> Specifically, the 2004 Memo states:

While incidental runoff or over-spray of minor amounts of recycled water can be minimized, it cannot be completely prevented. Similarly, it is not possible to entirely prevent the runoff of rainwater from areas irrigated with recycled

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<sup>4</sup> See *id.*

<sup>5</sup> 33 U.S.C. § 1311(a).

<sup>6</sup> Cal. Water Code § 13377

<sup>7</sup> *Water Recycling 2030: Recommendations of California’s Recycled Water Task Force*, California Department of Water Resources at 42 (June 2003).

<sup>8</sup> Memorandum from State Water Resources Control Board Executive Director Celeste Cantú to Regional Board Executive Officers, Subject: “Incidental Runoff of Recycled Water,” (February 24, 2004).

water or from decorative or storage ponds filled with recycled water, particularly during major storm events.<sup>9</sup>

We agree with both the Recycled Water Task Force and the State Board in their assessment that many types of recycled water projects will result in the discharge of recycled water to surface waters. We do not, however, agree that using clever terminology to describe these discharges as “incidental” does anyone, especially the public and the environment, any good. As acknowledged, many irrigation and landscaping projects that involve the use of recycled water will require regulation under federal law. We add to this list of recycled water projects that discharge to Clean Water Act regulated water bodies, those discharges to groundwater aquifers that are hydrologically connected to surface waters.<sup>10</sup>

Both state and federal law require that the discharge of pollutants from a point source to a water of the United States must be regulated by an NPDES permit.<sup>11</sup> Despite this mandate, and the State Board’s acknowledgement that recycled water will discharge to surface waters, the Agenda Description follows the Task Force and 2004 Memo’s desire of avoiding federal law. In fact, the 2004 Memo states that compliance with the Clean Water Act’s NPDES permitting requirements are “undesirable” and should be avoided. Since many water recycling projects will result in discharges to water bodies within the jurisdictional reach of the Clean Water Act, the statewide Water Recycling Policy must address this issue if it is to provide useful guidance and mandates to the regional boards.

The statement in the 2004 Memo that undefined “incidental runoff” can somehow avoid NPDES permitting requirements runs contrary to the State Board’s mandate to protect water quality in the state. In the 2004 Memo, it was suggested that including a safe harbor for discharges of “incidental runoff” in water recycling requirements would remove the discharge of recycled water from the purview of the NPDES program. Specifically the 2004 Memo directed regional boards to include the following provision:

the incidental discharge of recycled water to waters of the State is not a violation of these requirements if the incidental discharge does not unreasonably affect the beneficial uses of the water, and does not result in exceeding an applicable water quality objective in the receiving water.<sup>12</sup>

The problem with this statement is that there is no Clean Water Act safe harbor for “incidental runoff,” even if it does not “unreasonably affect” beneficial uses or cause an exceedence of water quality objectives. This directive to the regional boards from the State Board’s Executive Director, as well as the absence of permitting considerations in the Agenda Description, is troublesome and a major concern. As set forth by state and federal law and recited herein, the

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<sup>9</sup> 2004 Memo at 2.

<sup>10</sup> See e.g. *N. Cal. River Watch v. City of Healdsburg*, 457 F.3d 1023 (9th Cir. 2006).

<sup>11</sup> 33 U.S.C. §§ 1311(a), 1342; Cal. Water Code §§ 13770-13777.

<sup>12</sup> 2004 Memo at 3.

discharge of pollutants from a point source to navigable waters must be regulated by an NPDES permit.<sup>13</sup>

It also has been stated by some stakeholders that the water used for recycling projects is already regulated by the waste water treatment plants' (WWTP) NPDES permit, is treated pursuant to the NPDES permit to meet drinking water standards, and is thus "clean" and need no additional permitting. As explained below, the WWTP's NPDES permit, however, typically regulates neither the use of the effluent for recycled water projects, nor the discharge of the recycled water at a location different than that for the WWTP. Additionally, a WWTP permit is unlikely to have effluent limitations for all pollutants present in the effluent, and may not require treatment to remove pollutants for which the permit does set limits. Thus, a WWTP NPDES permit typically does not regulate the effluent for recycled water uses and does not include limitations to ensure that the effluent is protective of the environment when used for such projects.

First, prior to discharge, the effluent from WWTPs is supposed to meet certain numeric and narrative criteria regarding the level of pollutants allowable in the discharge. These effluent limitations are based, at least in part, on the beneficial uses of water body into which they are discharged, and accordingly depend upon the specific water body receiving the discharge. However, when that effluent is transported for use in a recycled water project, the discharge location will most likely be different than that designated in the WWTP permit. Since each water body has its own specific characteristics, and so often different beneficial uses, the WWTP cannot be said to be protective of or regulate the recycled water discharge to the new receiving water.

The following example clarifies this point. A WWTP may discharge effluent with levels of copper that are appropriate to that treatment plant's receiving water. That same effluent, when used in a recycled water project, may either be discharged to a different receiving water that is impaired for copper or, during the recycled water use, may pick up additional copper. In the first situation, since copper is a bioaccumulative pollutant, the discharge of copper would be prohibited. In the second situation the discharge from the recycled water project could have copper levels above protective water quality standards even if the receiving water is not impaired. In both instances, the effluent limitations on the original WWTP discharge would be insufficient to protect water quality as required by the Clean Water Act.

In addition, some WWTP permits that incorporate California Toxics Rule- ("CTR") based effluent limitations have compliance schedules, and thus even if the permit contains CTR limitations, the effluent is currently discharged containing pollutants at levels above these protective limits (making additional discharges even more problematic). There are numerous other examples of problems with relying on the existing WWTP permit to address all uses of recycled water. Relying on the NPDES permit for the WWTP (or other source of the recycled

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<sup>13</sup> 33 U.S.C. §§ 1311(a) and 1342 (requiring permits for the discharge of pollutants without qualification as to the quantity of pollutants discharged).

water) to protect water quality for recycled water uses is insufficient. There is no end-run around the requirement that discharges of pollutants from point sources to waters of the United States require NPDES permits.

To help guide the development of the Water Recycling Policy, we recommend that the statewide policy should require that discharges to waters of the United States be permitted with NPDES permits, or with WDRs if the discharge is to groundwater not hydrologically connected to surface waters.<sup>14</sup> As the agency delegated to implement the NPDES program in California, the State Board must issue permits that will ensure compliance the Clean Water Act's prohibition on discharges of pollutants to waters of the United States. An NPDES permit is required even in cases where the permit terms prohibit discharges to surface waters. The Water Recycling Policy needs to be consistent with the Clean Water Act's goal of eliminating the discharge of pollutants to waters of the United States.<sup>15</sup>

A State Board Water Recycling Policy that encourages regional boards to regulate these discharges without NPDES permits must be avoided. In instances where a discharge to surface water is regulated, the responsibility lies with the regulating agency to regulate this discharge with an NPDES permit. Failing to do so jeopardizes the authority delegated to the state to implement the NPDES. It also leaves the discharger exposed to Clean Water Act liability for discharging pollutants to waters of the United States without an NPDES permit.

Overall, we are concerned that a statewide Water Recycling Policy that fails to require NPDES permits when appropriate will be a policy that encourages the use of recycled water at the expense of water quality. Not only is this inconsistent with the mandates of the Clean Water Act and the Porter-Cologne Act, it is shortsighted. Trading the short-term benefit of increased water supply for possible long-term degradation of water quality jeopardizes the availability of clean, useful water in the future. An appropriate statewide Recycled Water Policy will protect water quality and water supply in the long-term by requiring NPDES permits for those projects that need them.

### **Anti-degradation Policy**

Perhaps the issue identified in the Agenda Description that should be of most concern for the public is the suggestion that the state Anti-degradation Policy could potentially itself be modified, or be weakened by the Water Recycling Policy, to encourage water recycling at the expense of water quality. The Anti-degradation Policy already establishes the appropriate balance between the legitimate need to develop and use water resources with the need to maintain water quality. Specifically, the Anti-degradation Policy insists on the maintenance of water quality now and into the future. When complied with, this mechanism has been largely

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<sup>14</sup> The appropriate method to permit these projects may well be with general NPDES permits that apply to specific sub-classes of recycled water projects such as landscape irrigation, agricultural irrigation, or groundwater recharge to hydrologically connected aquifers.

<sup>15</sup> 33 U.S.C. § 1251(a)(1) (establishing the goal of eliminating the discharge of pollutants to waters of the United States by 1985).

effective in guiding decisions related to projects for almost 40 years. The Anti-degradation Policy has never been modified before, and the desire to encourage water recycling does not create the need to do so now.

The Agenda Description poses the question of whether the statewide Water Recycling Policy itself should define two terms in the Anti-degradation Policy – “maximum benefit to the people of the State” and “best practical treatment or control.” There are two issues raised by this question that we find troubling and which cut against using this statewide Water Recycling Policy as a venue for defining terms in the Anti-degradation Policy.

First, defining terms in the statewide Anti-degradation Policy, which applies to all decisions made by the State Board and regional boards, in a document that only applies to certain types of decisions by these entities, could result in further confusion, rather than clarity, regarding the meaning of these terms. It could also lead to situation where these terms have different meanings in different contexts, when the purpose of the Anti-degradation Policy is to foster uniformity in decision making.

Second, to the extent the Water Recycling Policy does try to define these terms, it should only do so if the definition incorporates the appropriate references to already applicable legal standards. For example, any definition of “best practical treatment or control” with respect to recycled water must reference and be consistent with the technology-forcing standards already applicable to the treatment of wastewater.<sup>16</sup> Similarly, reference to also-applicable legal standards such as BAT and BCT will necessarily limit the definition of terms such as “maximum benefit to the people of the State,” since the foundation for these standards already prescribes the extent of consideration of economic and social costs and benefits.<sup>17</sup>

Finally, entertaining the idea that modifying the Anti-degradation Policy or its application may be necessary to encourage water recycling projects runs contrary to the purpose of the Anti-degradation Policy itself. The Anti-degradation Policy already provides adequate opportunity to weigh potential benefits of certain projects against potential costs to water quality. This policy has withstood almost 40 years of decision making on a wide variety of projects, and modification of it – or its intent – at this point would create confusion rather than clarity, and potentially lead to other situations involving further whittling of the Policy’s goal of protecting the waters of the state now and in the future. Most significantly, the need to modify the Anti-degradation Policy in the context of recycled water projects is illusory, since water recycling today is only sensible if it does not degrade water quality for the future. Our recommendation therefore is to not modify or otherwise weaken California’s Anti-degradation Policy, including through the Water Recycling Policy.

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<sup>16</sup> We also note that the applicable technology-based standards are designed to change over time as better technologies are developed to control pollutants in discharges. Any attempt to define these terms must embrace this concept and provide requirements for improved standards as technology improves.

<sup>17</sup> For example, BAT does not allow for comparison of costs against effluent reduction benefits, but rather only allows for consideration of costs to the extent these costs are economically achievable. See 33 U.S.C. §§ 1311(b)(2)(A) and 1314(b)(2)(B).

### Irrigation Projects and Salts

The Agenda Description asks what the State Water Board should do “to protect groundwater basins in the state from the accumulation of salt, including nitrate.” This is an important question that transcends the issue of recycled water management. The Porter-Cologne Act at Water Code § 13260 requires reports of waste discharge, and waste discharge requirements as appropriate, for any discharge of waste “that could affect the quality of the waters of the state.” Section 13050 defines “waters of the state” to include “any surface water or groundwater, including saline waters, within the boundaries of the state.” (Emphasis added.)

Despite the clarity of this directive, little if anything has been done to implement Porter-Cologne with respect to any discharges that could affect groundwater from pollutants, including discharges of salts (including nitrates) associated with recycled water. Instead, the practice to date has generally been to allow the discharges (often unquestioned and unexamined), hope for the best, and pay extremely high sums of money to clean up the pollution later (if attempts are made to clean up the pollution at all). Our recommendation is that the State Board comply with Porter-Cologne and protect groundwater contamination from salts/nitrates associated with recycled water through waste discharge requirements, either general or individual, and associated groundwater monitoring.<sup>18</sup> This recommendation is consistent not only with the law but also with the above-stated theme of these comments, which is that water recycling helps California meet its water needs only when water quality is maintained.<sup>19</sup>

The Agenda Description also asks in particular whether the State Board should require recycled water users to prepare nutrient management plans to control the discharge of nitrates to groundwater. Nutrient management plans for projects that propose to irrigate with recycled water are critical to preventing further degradation of groundwater resources and should be required in a statewide Water Recycling Policy. A nutrient management plan requirement would be consistent with the strategy employed by the Santa Ana Regional Board, and proposed by the Central Valley Regional Board, to address the reuse of wastewater by dairy farmers to grow crops for their herds.<sup>20</sup> It also would equalize the playing field by requiring all irrigators who use recycled water to take responsibility for properly managing the impact their practices have on nitrate levels (and other pollutant loadings) in groundwater. A failure to require nutrient management planning will leave the public to foot the bill for continued nitrate contamination, as is the case in Orange County, where the county estimates it will end up paying \$2.6 million

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<sup>18</sup> Note that we suggest use of WDRs here rather than NPDES permits only when the discharge is to groundwater that is not hydrologically connected to waters of the U.S.

<sup>19</sup> We also request that the State Board take on the overall task of rectifying the state's historic and ongoing failure to implement Porter-Cologne's clear requirements on discharges of all other pollutants that could affect the quality of the state's groundwater.

<sup>20</sup> See *General Waste Discharge Requirements for Concentrated Animal Feeding Operations (Diaries and related Facilities) Within the Santa Ana Region, Order No. 99-11, NPDES No. CAG018001*, California Regional Water Quality Control Board, Santa Ana Region (August 20, 1999); *Tentative Waste Discharge Requirements General Order No. \_\_\_ for Existing Milk Cow Dairies*, California Regional Water Quality Control Board, Central Valley Region (November 22, 2006).

dollars per year to remove nitrates and salts from groundwater contaminated by nitrates. See Orange County Water District, *Issue Paper on Impacts of the Chino Dairy Industry on Local Water Supplies*. With proper nutrient management, including groundwater monitoring, costs like this can be avoided.

### **Groundwater Recharge Reuse**

The Agenda Description poses the question "what requirements should be placed on groundwater recharge reuse projects to protect the public from toxic constituents." From our perspective, there are a handful of general measures that the statewide Water Recycling Policy should require to achieve this goal. First, recycled water discharged for the purpose of recharging groundwater for ultimate reuse should have to meet both drinking water standards and any other water quality criteria applicable to the ultimate use of the water prior to being discharged, for all constituents. A precautionary approach that does not introduce chemicals and pollutants into the groundwater in the first place is the surest way to avoid exposure of the public and the ecosystem to these constituents and prevent extremely costly cleanups later.

Second, monitoring recycled water both prior to reuse and prior to discharge, particularly for toxic constituents, should be required. By keeping track of the types and quantities of constituents that have been discharged, decision-makers will be prepared to assess whether a particular reuse project is protective of human health and the environment over time. This is particularly important in the face of constantly changing information about the risks associated with exposure to toxic constituents. If we actually know what is being released into the environment, as opposed to guessing through a mass balance or other rough estimation technique done without monitoring, we will be better prepared to effectively address future discovered problems. Monitoring will provide an understanding of how the toxic constituents may be interacting with one another and with other discharges in the groundwater table.

Third, the statewide Water Recycling Policy should require that the regional board staff work closely with the Department of Health Services ("DHS") to develop appropriate effluent limits for various toxic constituents. Many toxic constituents have Maximum Contamination Limits ("MCLs") already established and set forth in Title 22 of the California Code of Regulations. However, those that do not may still represent a significant threat to public health, and the presence of these toxic pollutants in recycled water must be appropriately addressed. For these pollutants, the statewide Water Recycling Policy should require regional board staff to work closely with DHS to develop appropriate effluent limitations that would apply to both the discharge of the recycled water into the project and to any subsequent use or release of the water from the project. Finally, the MCL's in Title 22 are not based on and are not necessarily protective of the environment; the Water Recycling Policy should ensure that the state and regional boards implement their ultimate responsibility to protect all beneficial uses through all appropriate standards and permit limits.

### **Impoundments**

The Agenda Description acknowledges that impoundment of recycled water can degrade underlying groundwater and asks what requirements should be placed on these impoundments to protect groundwater quality. We agree that this is an important issue that the statewide Water Recycling Policy must address. We expect that the appropriate requirements will vary depending on the quality of the water being stored as well as the soil permeability of where the water is being stored. With that general principle in mind, we have the following comments on how the statewide Water Recycling Policy should direct regional boards to act.

Requiring monitoring of the discharges to the impoundments as well as monitoring to ensure the effectiveness of impoundment is necessary. Because the concern is that impounded water will cause pollutants to leach into groundwater, the recycled water impoundments must be monitored to know the potential to degrade underlying groundwater. Monitoring and limitations must also ensure that possible public use of the water while it is impounded (*e.g.* contact by members of the public) will not create a public health risk. Additionally, since many of these impoundments will become habitat for aquatic and riparian organisms and species, limitations and monitoring should be required that will protect the use of these impoundments by these species.

We also recommend that the statewide Water Recycling Policy recognize that impoundments containing recycled water are storage/disposal facilities for the various pollutants, including heavy metals, pharmaceuticals, nitrogen-based compounds, and salts, in the recycled water. The lining requirements for storage/disposal of solid waste impoundments, set forth in Title 27 of the CCR, should be considered by the regional board with respect to surface impoundments of recycled water. In areas where soils are particularly porous, more stringent lining of impoundments should be required. Further, when the impounded recycled water has high levels of salts and the underlying groundwater is already degraded by the presence of salts, leachate collection systems and related monitoring should be required to prevent any further degradation of groundwater.

Monitoring of groundwater beneath these surface impoundments is the only way to ensure that the underlying groundwater is not being degraded. We recognize there are costs associated with groundwater monitoring, but it is inappropriate to shift these costs onto future generations of groundwater users by not monitoring and thus not preventing further and sometimes unexpected or unforeseen (and generally costly) degradation before it becomes a significant problem. This is yet another example of the requirements that the statewide Water Recycling Policy must include to ensure that the use of recycled water does not shift the costs of, and pollution associated with, its use onto future generations.

We also have an additional comment on impoundments that the Agenda Description fails to raise. Namely, the statewide Water Recycling Policy should address issues related to overflows of impoundments that are used for storage of water to be recycled. In many regions, treated wastewater is stored during the wet season for later reuse in the dry season for irrigation

and other projects when other water supplies are low. However, these impoundments often overflow and/or leak and thus discharge the pollutants in the water they contained. The statewide Water Recycling Policy should therefore require permit effluent limitations applicable to any overflow and/or leaks from these facilities. The statewide Water Recycling Policy should also require appropriate design and engineering of these storage facilities to ensure that overflow and/or leakage is minimized if not totally prevented.

### **Agency Coordination**

The issue presented by the Agenda Description is whether the statewide Water Recycling Policy should leave some issues related to groundwater recharge with recycled water to DHS, since DHS is preparing regulations for groundwater recharge reuse projects. We agree that coordination with DHS should be encouraged in the statewide Water Recycling Policy. However, the mandates of DHS and the State Board are quite different, and as such the State Board should not relinquish or delegate its responsibility for addressing all issues related to groundwater recharge reuse projects. Similarly, the State Board cannot rely on DHS requirements alone as adequate to protect the environment and comply with state and federal laws.

DHS's mandate is to create water quality requirements protective of human health while the State Board's (and regional boards') mandate is to protect water quality for all beneficial uses. For example, copper, which is relatively benign to humans, is extremely toxic to many aquatic organisms. As such, regulations from DHS related to copper in recharge/reuse projects may place little or no restriction on the levels of copper. If the State Board were to fail to address this issue on the assumption that DHS had it taken care of, then the State Board would fail to comply with its mandate. Specifically, if it were foreseeable that there would be subsequent contact with the recharge/reuse water by aquatic organisms, then the State Board's failure to insure compliance with water quality standards for copper would allow for an unacceptable degradation of water quality.

It is the State Board's obligation to set a statewide Water Recycling Policy that requires it and the regional boards to fulfill all aspects of their mandate to protect water quality. We've seen examples of the State Board and regional boards failing to achieve this mandate in other contexts,<sup>21</sup> and we do not want to see that failure repeated here. The hypothetical example we provided above explains why deferring to another agencies' determinations regarding water quality is inappropriate.

### **Aquifer Storage and Recovery**

Recycled water used for irrigation or direct recharge impacts aquifers throughout California. Just as increased use of recycled water is important to help some of the offset the

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<sup>21</sup> For example, the regional boards routinely fail to evaluate the effect of timber operations on water quality, despite the fact that these operations clearly implicate the regional boards' responsibilities. This failure leads to unnecessary and sometimes severe degradation of water quality associated with timber harvesting.

enormous costs of moving water from one area of the State to another, it also can be important to the health of aquifers, which are critical to reducing California's dependence on the Colorado River and State Water Project. In other words, a clean and dependable water supply relies not only on the increased use of recycled water but also on clean and usable aquifers. Accordingly, a state policy regarding recycled water should fully protect existing water quality objectives for groundwater aquifers.

As an example, in January of 2007, the Los Angeles Regional Water Quality Control Board adopted two Water Recycling Requirements (WRR) permits for the Los Angeles Department of Water and Power's (DWP) Los Angeles Glendale and Donald C. Tillman Plants. These Plants discharge to the San Fernando groundwater basin, which is the part of the San Fernando Aquifer that supplies 15% of Los Angeles' drinking water. Chloride levels in the San Fernando Basin where the Tillman Plant discharges are currently 31 mg/l, and the water quality objective is 100 mg/l. The Glendale Plant discharges to the San Fernando Basin Narrows Area, currently at chloride levels of 31 mg/l with a groundwater chloride objective of 150 mg/l. In response to a request by the City of Los Angeles, and in a highly irregular move by the Los Angeles Regional Board, the LADWP was granted a permit renewal with effluent limits in excess of the water quality objectives (190 mg/l). In exchange for this permit irregularity, the regional board's proposed permit in January had requirements of a mass balance analysis and monitoring of groundwater, in a nod to ensuring that the chloride levels do not increase further in the groundwater. Because of this two-pronged approach, the staff did not pursue an anti-degradation analysis, although it was clearly warranted in this instance, particularly since there currently are no other WRR permits that have elevated effluent limits in Los Angeles. (Los Angeles County Sanitation District, another WRR permit holder in the Basin, meets its effluent limits end-of-pipe and does not discharge effluent that does not meet water quality objectives.) Unfortunately, the LADWP vigorously opposed the regional board's January proposed permit requirements for monitoring, advocating instead for solely a mass balance risk analysis, despite the almost pristine state of this critical aquifer. The final adopted permit eliminated the much-needed monitoring.

It is a generally accepted fact that contaminated ground water is very difficult and costly to clean up. The particularly discouraging example of the San Gabriel Aquifer in Los Angeles is a bellwether for current decision-making regarding effluent limits in permits that impact groundwater. In 1991, the U.S. Environmental Protection Agency estimated that if a cleanup of the San Gabriel Aquifer was technologically possible, it would take thirty to fifty years at a cost of \$200,000,000 to \$400,000,000. Ultimately, an agreement to begin clean-up was established in 2002 and efforts are ongoing. Another closely watched example of groundwater management is the Chino Basin, where it has been general practice to replenish the groundwater with *de-salted* water in order to protect the aquifer, and years of extensive monitoring have guided various uses and recharge projects throughout the Basin.

The juxtaposition of uses and water quality objectives or effluent guidelines throughout the state illustrates the importance of aquifer protection and monitoring. A one-size-fits-all effluent limitation is not advisable when various groundwater aquifers may have differing

abilities to assimilate pollutants depending on the region and method of recycled water application. For example, in the above-cited example of the San Fernando Basin, effluent limits based on the existing water quality objective of 100 mg/l for chloride may be reasonable; however, with a current level of 31 mg/l in the aquifer, it certainly is not advisable to jump to 190 mg/l. Effluent limitations should be established such that groundwater quality is protected, and attenuation/assimilation of pollutants must be closely monitored to avoid unintended consequences that may result in costly and perhaps irreversible contamination. It is simply not clear that a paper exercise risk analysis in exchange for an extensive monitoring program will sufficiently protect the drinking water source for millions of California residents.

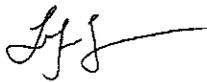
**Conclusion**

We would again like to thank the State Board for bringing the long overdue and important development of a statewide Recycled Water Policy to the public for comment. The development of such a policy is essential, not only to provide guidance to regional boards and create more consistent and predictable permitting of recycled water projects, but also to ensure that encouragement of recycled water projects is properly balanced with protection of existing and future water quality. There is no doubt that reuse and recycling of California's limited water resources will be essential to meet the ever-growing demand for water in the state. Nonetheless, the laudable goal of encouraging reuse and recycling must be tempered by a vigorous commitment to protect and enhance water quality in the process.

Sincerely yours,



Linda Sheehan  
Executive Director  
California Coastkeeper Alliance



Tracy Egoscue  
Executive Director  
Santa Monica Baykeeper



Layne Friedrich  
Drevet Hunt  
Lawyers for Clean Water, Inc.

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# Ludwigia Control Project

## Final Report

Laguna de Santa Rosa, Sonoma County, California



February 2008



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Prepared by Julian Meisler,  
Restoration Program Director

# Final Report: Ludwigia Control Project Laguna de Santa Rosa, Sonoma County, CA

Date of Report: February 2008

## Executive Summary

*Ludwigia* sp. is a non-native invasive aquatic plant from South America that has invaded the Laguna de Santa Rosa watershed. The scale of the invasion threatens water quality, biodiversity and channel capacity and hampers efforts to control mosquitoes. The Ludwigia Control Project (LCP) was a three-year effort to reduce the extent and density of the *Ludwigia* sp. in two of the worst affected areas of the Laguna de Santa Rosa. Spearheaded by the Laguna de Santa Rosa Foundation, the general approach included application of aquatic herbicide followed by mechanical removal of biomass. The total project area comprised 5.3 miles of channel and 99 acres of floodplain.

The results of the effort varied considerably by site and were strongly influenced by water depth and the ability to remove treated vegetation. Deeper channels treated with herbicide and subsequently cleared retained excellent control for two seasons. However, the dry winter of 2007 resulted in low water levels and some of these areas experienced strong late season regrowth as a result. Shallow channels experienced strong regrowth despite successive years of herbicide application and mechanical removal. Shallowly inundated floodplain areas did not have sufficient water during the project season to enable access for mechanical removal equipment. These sites could only be sprayed. Although the herbicide-only treatments reduced the biomass considerably each season, cover remained high throughout the project duration.

Although removal of dense *Ludwigia* mats can improve water quality, spraying plants without removing subsequent decaying biomass further reduces dissolved oxygen and should be avoided except under special conditions.

*Ludwigia* is symptomatic of underlying problems in the Laguna. These problems will be solved only through watershed-level efforts including reduction of nutrient, sediment and summer water inputs, as well as physical changes to the problem areas including large-scale restoration. Because these actions take considerable time, efforts should be taken to ensure that ground gained through the project period is not lost.

## Introduction

The Ludwigia Control Project (LCP) was a three-year effort to reduce the extent and density of the non-native aquatic plant *Ludwigia* sp. in two of the worst infested areas of Sonoma County's Laguna de Santa Rosa (Figure 1). The aggressive growth exhibited by *Ludwigia* negatively impacts the Laguna in numerous ways. As a strong competitor forming large dense mats over open water, *Ludwigia* contributes to a loss of biodiversity and may drive changes in ecological community dynamics including food webs. Its biomass reduces water holding capacity within the Laguna's channels and may contribute to more frequent and longer duration flooding. Decomposition of accumulated biomass can further depress already low dissolved oxygen levels. Finally, the presence of the thick vegetation mats hampers efforts to control mosquitoes in the Laguna. With the spread of West Nile Virus to Sonoma County, barriers to mosquito control are perceived as a public health threat.

The plan of action included treating *Ludwigia* with herbicide followed by mechanical removal of dead vegetation where feasible. The two field sites included 41 acres of Sonoma County Water Agency (SCWA) maintained channels and 111 acres of the Laguna Wildlife Area owned by the California Department of Fish & Game (CDFG).

The LCP was carried out by the Laguna de Santa Rosa Foundation (Laguna Foundation) and followed the recommendations of the Invasive *Ludwigia* Management Plan for the Laguna de Santa Rosa, Sonoma County, California 2005-2010. The plan was developed by the Laguna Foundation in consultation with the Ludwigia Task Force, a multi-agency group focused on *Ludwigia* issues in the Laguna. Funding for the project was provided by SCWA, California Wildlife Conservation Board, the Marin Sonoma Mosquito & Vector Control District, and the Santa Rosa Subregional Wastewater Treatment Plant. The term of the LCP was 2005-2007.

## Target Invasive Species

Appendix 1 provides a summary of the taxonomic status of the invasive *Ludwigia* species targeted for control as well as information on the *Ludwigia* genus. The summary was prepared by botanical expert Dr. Brenda Grewell of the USDA-ARS.



## Project Location

The first project site, owned by SCWA, is located west of Rohnert Park in unincorporated Sonoma County near the intersection of Stony Point Road and Rohnert Park Expressway. It includes a 4,000-foot section of the main Laguna channel (referred to hereafter as Laguna Main), the 11,000-foot Bellevue Wilfred flood control channel (referred to hereafter as BW channel), and a 1,600-foot section of Gossage Creek (Figure 1).

Laguna Main is part of the primary Laguna de Santa Rosa Channel but has been severely altered over the decades. The channel was straightened in the 1960s and widened in 1994. A narrow band of thirty-foot tall willows lines most of the 120-foot wide channel and provides some shading to the channel margins. The channel is fed by numerous tributaries. Although most of the tributaries contain water year-round, only one, Copeland Creek, is naturally perennial. The others are fed by urban and agricultural runoff during the dry season. The substrate is primarily silt with some areas of sand.

BW channel is a straight trapezoidal flood control channel that flows into Laguna Main. BW channel contains water year-round and is fed by urban and agricultural runoff in the dry season. During this time it averages 75 feet in width and 1-3 feet in depth. Some woody riparian vegetation has been planted but the channel is largely unshaded.

Gossage Creek is a tributary to Laguna Main. It retains water year round but is not naturally perennial. There is a well established but narrow riparian strip that provides significant shading to portions of the 40-foot wide channel. The substrate is silt and sand underneath an average depth of 2 feet.

All of the channels are characterized by low energy flow that increases substantially in depth during winter and stands virtually stagnant in summer. Taken together the site spans roughly 41 acres and is bordered by agricultural and rural residential properties. Approximately 90% of the site was covered with *Ludwigia* prior to project activities.

The second site, the CDFG-owned Laguna Wildlife Area, is located north of Sebastopol between Occidental Road and Guerneville Road in unincorporated Sonoma County (Figure 1). Included are 2.1 miles (11,300 feet) of Laguna channel and 99 acres of floodplain which together comprise a total of 111 acres. The channel was created in the 1960s to convey floodwater and to enable reclamation of the floodplain for agriculture. It was dredged regularly until the early 1980s. In 1994 SCWA sold the property to CDFG.

During the dry season the channel averages 46 feet in width and 2 feet in depth. The floodplain is divided by the channel into north and south sections. Previous reports refer to the floodplain area as "flooded fields" because of the former agricultural use and the current state of perennial inundation.

Aerial photos from 1942 depict the site as heavily forested with small ponded areas, channels and possibly emergent marsh. Today the riparian forest is limited to the western edge of the site. Whereas until recently the floodplain would drain each summer, it currently retains up to ½ - 3 feet of water during the dry season. Approximately 15% of the floodplain and 80% of the channel was covered with *Ludwigia* prior to project activities.

The Laguna Wildlife Area is bordered by private lands in the north, south and west. Substantial acreages of the private lands are also infested with *Ludwigia* but were not part of the project area. Landowners were generally interested in seeing the results of the project before including their own properties.

#### *Permitting*

The project operated under the following permits:

- *Statewide General NPDES Permit for the Discharge of Aquatic Pesticides for Aquatic Weed Control in Waters of the United States.* This permit is issued by the North Coast Regional Water Quality Control Board (RWQCB). A separate permit was required for each site in each of the three years. Each year the Laguna Foundation prepared Aquatic Pesticide Application Plans (APAP) on behalf of SCWA and CDFG. The APAP formed the basis of the NPDES permit.
- *Waiver of Waste Discharge Requirements for Minor Dredging and Fill Activities.* Also known as a 401 permit this RWQCB issued permit was required each year that vegetation removal occurred.
- *County of Sonoma 3836R roiling permit.* This was required at the CDFG Laguna Wildlife Area during years with mechanical removal. SCWA maintenance activities are exempt from this permit.
- *California Environmental Quality Act (CEQA).* The SCWA project site was administered under a Class 1 Categorical Exemption, pursuant to the California Environmental Quality Act, as a maintenance activity on an existing facility. The CDFG project site was also administered under a categorical exemption under Class 4(d), Section 15304 of the CEQA guidelines.

#### *Public Notification*

Prior to commencement of project activities each year, the Laguna Foundation mailed letters to 55 surrounding households, and issued press releases to the *Santa Rosa Press Democrat*, *West County Times* and the *Rohnert Park Community Voice*. Paid public notices were posted in the *Press Democrat*. During the active season, the Laguna Foundation emailed regular progress updates to over 100 individuals including members of the public, grantors, regulatory agency staff and local officials. Numerous interviews were given to local newspapers and local radio stations throughout the project.

## Methods

### *Herbicide Application*

The first step of the two-step process intended to control *Ludwigia* was application of aquatic herbicide to all *Ludwigia* plants within the project area. To avoid any potential take of federally listed salmonids that may pass through the project area during winter and spring months, herbicide application was limited to the period between June 15 and September 30 of each year.

Two herbicides were used, glyphosate and triclopyr. Glyphosate is the active ingredient in several terrestrial and aquatic herbicides and was applied at a rate of 3 quarts per acre.<sup>1</sup> Limited efficacy of this herbicide prompted a switch to triclopyr in the latter half of the 2006 field season.<sup>2</sup> Triclopyr was applied at a rate of 1 quart per acre. Adjuvants included surfactant (Cygnet Plus), drift control agent (Sta-Put), blue dye and water. Herbicides were applied either by truck, airboat or Marshmog.<sup>3</sup> Because the density of the plant prevented the airboat from traveling at controlled speeds, a path had to be cleared using a machine called a cookie cutter. Appropriate best management practices were followed including cessation of application if wind speeds exceeded 10 miles per hour and spraying from downstream to upstream to avoid accumulation of herbicide.

### *Vegetation Removal*

Three to five weeks following herbicide application, vegetation was mechanically removed from the sites where feasible. Wide channels were cleared using the cookie cutter and aquatic harvesters. Narrow channels with good access roads were cleared using a long-reach excavator. To reduce the amount of sediment removed by the excavator, a custom "skeleton" bucket was built by the contractor which allowed water and sediment to drain out before loading plant biomass into trucks for disposal.

A floating boom with a silt screen was erected downstream of the removal operations to prevent fragments from floating downstream and to reduce movement of turbid waters offsite. The most effective management practice for reducing turbidity during removal was to operate in an upstream to downstream direction. In this manner, standing *Ludwigia* biomass downstream helped filter sediment moving downstream.

Agreements were made to dispose of the materials in nearby farm fields where it was left to dry before being bulldozed and ultimately disked into the soil. Because significant amounts of trash were intermingled with the biomass, crews pulled out trash once the piles were bulldozed.

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<sup>1</sup> The product used was Glypro, a glyphosate-based herbicide registered for aquatic use. The U.S. Environmental Protection Agency rates glyphosate in its least toxic category for herbicides. Glyphosate is a broad spectrum herbicide and can kill both monocots and dicots.

<sup>2</sup> The product used was Renovate 3, a triclopyr-based herbicide registered for aquatic use. The U.S. Environmental Protection Agency rates triclopyr in its least toxic category for herbicides. Triclopyr is marketed as dicot-specific, it does not kill monocots.

<sup>3</sup> The Marshmog is similar to a snow cat used at ski areas but is designed to operate in up to 3 feet of water.

### *Vegetation Monitoring*

Photo monitoring was used to provide a qualitative assessment of the project. A total of 48 photo points were established at the two sites. Photos were taken before herbicide application, after herbicide application and after mechanical removal in each of the three field seasons. An annotated subset of these photos is provided in Appendix 2.

The quantitative assessment was limited to the floodplain of the CDFG site. Four east-west bearing transects (43 plots) were established in the floodplain treatment area.<sup>4</sup> In 2006 one quasi-control transect (5 plots) was established in an adjacent untreated area of privately owned floodplain. Although the untreated area was hydrologically connected to the treatment area, particularly during winter high water, it was chosen because of the absence of physically similar sites upstream. Stagnant conditions in the floodplain helped ensure minimal water exchange between the treated and untreated control site. Transect plots were 4m x 5m and were established every 10-15m. The southwest corner of each plot was marked using a Garmin Vista GPS.<sup>5</sup> Within each plot the cover of each species observed was estimated and assigned a cover class (1: 1-5%, 2: 6-25%, 3: 26-50%, 4: 51-75%, 5: 76-95%, 6: 96-100%).

### *Water Quality Monitoring*

Water quality monitoring was an integral part of the LCP as a condition of the NPDES permit and the Waiver of Waste Discharge permit. In response to public concerns about the use of herbicides and to a lesser extent mechanical removal, the RWQCB required substantial water quality monitoring, the intensity of which well exceeded that required by the general permit.

Grab sampling was carried out over the course of the field seasons to analyze multiple water quality parameters. Residual herbicide monitoring, a standard requirement under the NPDES permit, entailed taking grab samples upstream, within, and downstream of the treatment area before, immediately following and 3-7 days post-herbicide application. Samples were shipped on ice to a lab to analyze for residuals of the herbicides, metabolites, and water hardness. Grab samples were also taken at the same locations on a weekly basis and analyzed in the field for dissolved oxygen, temperature, specific conductivity and pH. Equipment included a handheld YSI 85 and a YSI Ecosense pH10 meter. Grab samples were also taken to monitor turbidity during mechanical removal. Turbidity data was collected using a Hach 2100P turbidimeter.

To capture diurnal patterns a continuous monitoring data sonde was deployed downstream of the SCWA project site and upstream and downstream of the CDFG project site. Sondes were deployed 2 weeks prior to herbicide and mechanical removal activities and continued for 2 weeks following completion of activities, though the timing varied from year to year. Sondes collected data every 15 minutes and were typically

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<sup>4</sup> In 2006 and 2007 three additional transects were sampled to better characterize the site. However, it was determined that because the transects had not been sampled prior to herbicide treatments in 2005, the data could not be used.

<sup>5</sup> Because the accuracy of the Garmin Vista GPS is limited to 15 feet, the plots may not overlap entirely in all cases.

deployed for 12-15 days at a time. Data parameters collected included dissolved oxygen, temperature, specific conductivity and pH. Figure 1 shows the sampling locations at each site.

## Results

### *Herbicide Application*

At the SCWA site the total project increased in area by 21% from 2005-2007 while the total acreage sprayed with herbicide decreased by 9%. While this suggests herbicide effectiveness, it is likely more complicated. Deeper areas where mechanical removal was possible exhibited little regrowth, particularly in the Laguna Main, and these areas required limited herbicide application in later years. In contrast, the shallow BW channel experienced intense regrowth every year despite repeated herbicide application and mechanical removal. The relationship between regrowth and water depth was reinforced in late 2007 after an exceptionally dry winter left much of the Laguna Main at one third of its normal depth. Despite triclopyr applications, regrowth began at the margins and quickly spread to mid-channel where seeds and new sprouts were exposed to sunlight. By October 2007 much of the Laguna Main was covered with *Ludwigia* (see photo sequence Appendix 2).

At the CDFG site the total project area increased 4% in 2006 with no additional area added in 2007. The acreage treated over the same period decreased by 57%. Again, this appeared to be due largely to factors other than herbicide efficacy. Areas where mechanical removal was possible experienced very minor regrowth in both 2006 and 2007. Removal areas included the entire channel and roughly 5 acres of the floodplain where depth was sufficient to allow access for equipment. However, the rest of the floodplain where removal was impossible experienced strong regrowth after the herbicide application in 2006. In 2007 intense regrowth in this area prompted the Laguna Foundation and CDFG to call off herbicide application in the floodplain except where temporary biomass reductions were beneficial to mosquito control. The channel was treated where necessary.

The switch from glyphosate to triclopyr at both sites was prompted by a visual determination that the glyphosate was not working. Three weeks following the 2006 glyphosate application the majority of the plants showed little sign of impact and many began to flower. Potential reasons for the limited efficacy may have been the high density of *Ludwigia*, which could limit foliar coverage, timing of application, or, in the case of the Marshmug and airboat, the unavoidable coating of the plants in muddy water during application. Glyphosate binds readily to sediment and becomes inactive. It has also been suggested that the rate of application may have limited the efficacy of glyphosate but this is not verified.

Table 1. Summary of volume of herbicide applied, acreage treated, annual changes, and cost per acre, SCWA field site, 2005-2007.

	Volume of glyphosate applied (gallons) <sup>1</sup>	Volume of triclopyr applied (gallons) <sup>1</sup>	Total acreage of project site	Acreage sprayed <sup>1</sup>	Percentage of site sprayed	% change in acreage of project site since 2005	% change in acreage sprayed since 2005	Cost per acre
Initial treatment	17	0	34	23	68%			
Follow-up treatment	10.4	0	34	14	41%			
Initial treatment	25	0	38	33	87%			
Follow-up treatment	0	2.5	38	10	26%			
Initial treatment	0	5.3	41	21	51%			
Follow-up treatment	0	2.1	41	8	20%			

<sup>1</sup>Values derived from herbicide use reports submitted by Clean Lakes, Inc.

Table 2. Summary of volume of herbicide applied, acreage treated, annual changes, and cost per acre. CDFG Laguna Wildlife Area, 2005-2007.

	glyphosate used (gallons) <sup>1</sup>	Volume of triclopyr used (gallons) <sup>1</sup>	Total acreage of project site	Acreage treated <sup>1</sup>	Percentage of site sprayed	% change in acreage of project site since 2005	% change in acreage sprayed since 2005	Cost per acre
Initial treatment	64.88	0	107	87	81%			
Follow-up treatment	26.25	0	107	35	33%			
Initial treatment	18.19	16.59	111	63	57%			
Follow-up treatment	0	11.63	111	47	42%			
Initial treatment	0	9.25	111	37	33%			
Follow-up treatment	0	0.75	111	3	3%			

In sharp contrast, the triclopyr, even at the low application rate, impacted the plants almost immediately with leaves wilting and stem strength deteriorating within 24 hours. This raised concerns that the herbicide would fail to act systemically. Systemic herbicides should act more slowly to enable translocation to the roots before the plant completely shuts down.

The average cost of herbicide treatment during the 3-year project period was \$1,470 per acre at the SCWA site and \$722 per acre at the CDFG site. Cost included the sum total of equipment mobilization, herbicide application, and materials, divided by the number of acres in the initial treatment. Touchup applications were not included because they are considered a re-treatment of the same initial acreage. While these figures can be used to calculate the cost of treating these sites in the future, they do not include the substantial associated costs of project management, reporting, water quality monitoring, and lab analysis. When extrapolating to other areas, local conditions such as access, water depth, vegetation density, economy of scale, and other factors should be considered.

#### *Vegetation Removal*

Over 12,000 cubic yards of biomass were removed from the SCWA site by the close of the 2005 field season (Table 3). Laguna Main remained virtually free of *Ludwigia* in 2006 and early summer 2007 with most regrowth limited to the channel margins. However, as described above, the shallow conditions prevailing in 2007 resulted in significant regrowth in Laguna Main by the close of the 2007 season.

Regrowth was strong each year in the BW Channel where shallow stagnant water enabled *Ludwigia* to root across the entire channel rather than just the margins. Dredging restrictions largely prohibited removal of sediment; therefore any roots not killed by the herbicide remained intact each year.

In 2007 a new and densely infested section of Gossage Creek was added to the project area bringing the total volume of biomass removed to 24,546 cubic yards.

The bulk of the mechanical removal in the CDFG Laguna Wildlife Area occurred in 2005 when 3,875 cubic yards removed from the channel and a 5-acre section of the floodplain (Table 4). This was the only portion of the floodplain accessible to floating equipment and, as a result, biomass in the rest of the floodplain was left to decompose in place. The cleared areas remained virtually free of *Ludwigia* in 2006 and the project area was extended downstream where another 1,401 cubic yards were removed. By early summer 2007 minor regrowth occurred in the shallower parts of the channel but not enough to justify the cost of removal. As in the SCWA site, shallow conditions prevailed by late 2007 and *Ludwigia* began to regrow in sections of the channel.

Table 3. Summary of mechanical removal in each year, SCWA field site, 2005-2007.

	Method	Biomass removed (cubic yards)	Acres cleared (acres)	Avg biomass per acre (cubic yards)	Cost per acre of removal <sup>1</sup>
BW Channel: Millbrae Road to confluence with Laguna	Long reach excavator	12,126	22.7	534	\$11,835
Laguna Main from confluence of BW Channel to west end of project area	Cookie cutter and aquatic harvester				
Laguna Main from confluence of BW Channel to east end of project area (north half only)	Long reach excavator				
BW Channel: Millbrae Road to Rohnert Park Expressway	Long reach excavator	3,840	14.6	263	4,462
BW Channel: Millbrae Road to Rohnert Park Expressway	Long reach excavator	8,580	17	505	\$6,054
Gossage Creek: From confluence with Laguna Main extending 1,600 feet upstream	Excavator				

<sup>1</sup>The cost per acre in 2007 is based on 14.6 acres only. The additional 2.4 acres of Gossage Creek removal was carried out by the Sonoma County Water Agency under Laguna Foundation direction. Therefore the project budget was not charged.

Table 4. Summary of mechanical removal in each year, CDFG Laguna Wildlife Area, 2005-2007.

	Method	Volume of biomass removed (cubic yards)	Acres cleared	Avg biomass per acre (cubic yards)	Cost per acre of removal
Main Channel: From Occidental Road to north end of north field	Cookie cutter and aquatic harvester	3,875	13.9	292	\$17,187
North field: 5-acre pond					
Main Channel: From north field to Gallo ponds	Cookie cutter and aquatic harvester	1,401	3.4	350	\$30,627

The average cost of mechanical removal was \$7,450 per acre at the SCWA site. When using only the long-reach excavator, as in 2006, the average cost dropped to \$5,360 per acre. By comparison the \$23,907 average cost of removal at the CDFG site was three times higher. The disparity is related to project size and conditions. A loaded aquatic harvester carries 4 cubic yards of biomass. The marshy conditions throughout most of the project area limited the number of haul out sites available to two. As a result, slow moving harvesters had to travel as much as ½ mile each way from the removal area to the haul out area. This contrasts with the much smaller SCWA site where travel distances were shorter and a substantial portion of the removal work was done with a long-reach excavator working from access roads.

Cost estimates include mobilization of machinery, removal, hauling and disposal of biomass. The cost may be higher or lower depending on vegetation density and access. As with the herbicide application, the cost does not include associated project management and monitoring costs.

#### *Vegetation Monitoring*

In June 2005, prior to the onset of management efforts at the CDFG site, the cover of *Ludwigia* was extremely high with 79% of all plots sampled (n=43) having 96-100% cover and 91% of plots with greater than 50% cover. No plots were absent of *Ludwigia* in 2005 (Figure 2). By June 2007, following two years of herbicide treatment<sup>6</sup>, only 12% of plots had 96-100% cover, 34% had greater than 50% cover and 14% of plots were absent of *Ludwigia*. Untreated control plots (n=5) showed nearly complete coverage by *Ludwigia* in 2006 and 2007 (Figure 3). Although biomass data is not provided, the observed density, stature, and height of *Ludwigia* in the control plots was markedly higher than in the treatment area.

Because *Ludwigia* tends to occupy all available space, the cover of open water was also monitored to help elucidate changes over the project period. In June 2005, only 9% of the sampled area had >50% open water cover (Figure 4). The majority of plots (77%) had 1-5% cover and there were no plots without open water. By 2007, 26% of plots had >50% cover of open water but the majority of plots (57%) had no open water. However, two factors besides the management actions may account for this change. First, the drought conditions of 2007 enabled some areas of the floodplain to dry out. Second, the cover of *Azolla filliculoides* (water fern) in otherwise open water areas increased dramatically. Whereas *A. filliculoides* was not recorded in 2005, it was present in 88% of plots sampled in 2007 (Figure 4). Of these plots, 33% had 96-100% cover of *A. filliculoides*. Whether the rise in *A. filliculoides* was a response to management actions, the low water levels, or some other factor is unknown but there were reports of large outbreaks elsewhere in California.

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<sup>6</sup> In the floodplain, mechanical removal was limited to a small area so the results presented here are primarily from herbicide application only.

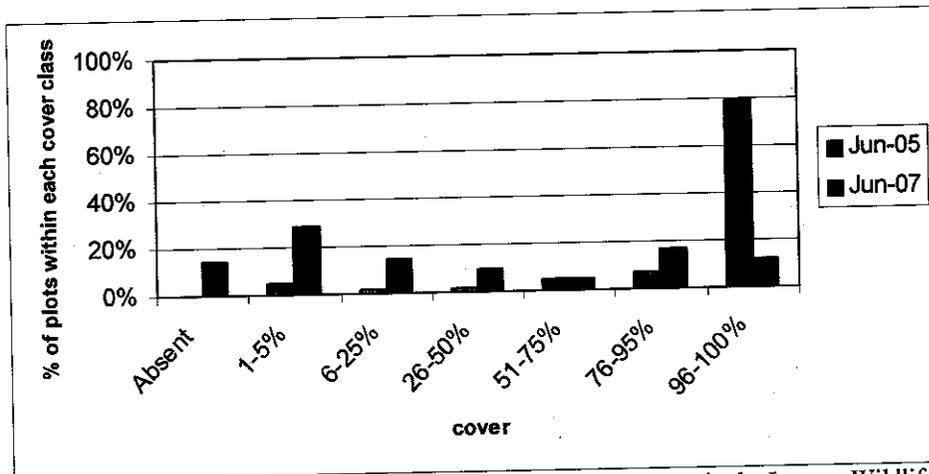


Figure 2. Comparison of the frequency of *Ludwigia* cover classes in the Laguna Wildlife Area floodplain in 2005 and 2007. The floodplain was treated with herbicide twice between the two sampling events. (n=43)

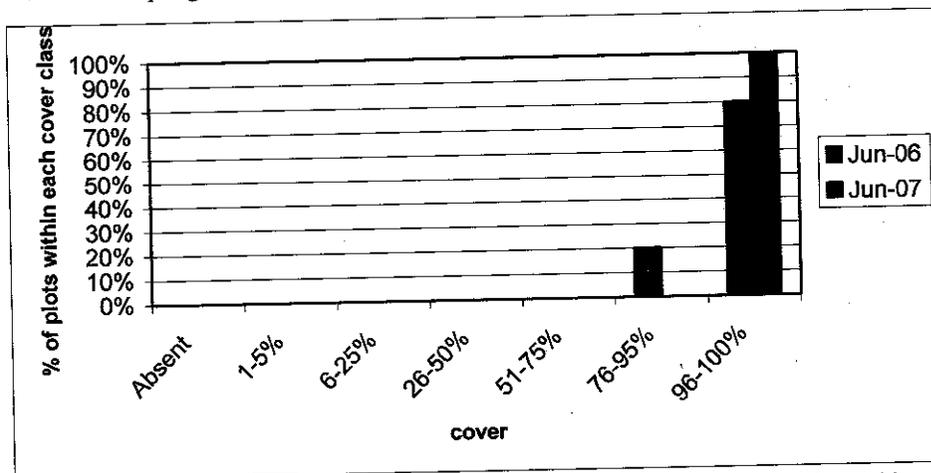


Figure 3. Comparison of the frequency of *Ludwigia* cover classes in the non-herbicide treatment area of the floodplain located adjacent to the Laguna Wildlife Area. (n=5)

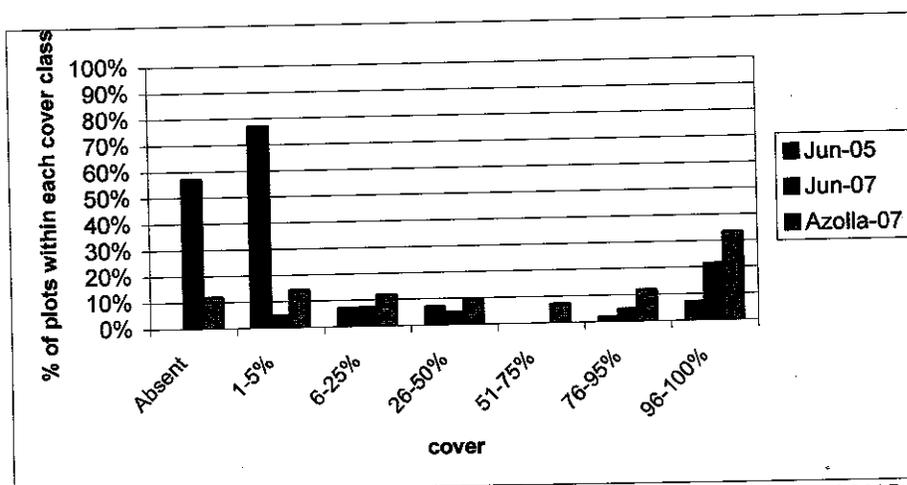


Figure 4. Comparison of the frequency of open water cover classes in 2005 and 2007 and *Azolla filliculoides* in 2007 in the Laguna Wildlife Area floodplain area. (n=43)

Although not reported here, numerous other species were present in the floodplain including *Alisma* sp., *Paspalum distichum*, *Cyperus eragrostis*, *Schoenoplectus americanus*, *Typha latifolia*, *Xanthium strumarium*, *Calystegia subacaulis*, *Lotus* sp., *Myriophyllum aquaticum*, *Lythrum hyssopifolia*, *Polygonum* spp., *Rumex crispus*, *Salix* spp., and several unknown graminoids. All of these species were present in low numbers.

#### *Water Quality Monitoring*

Residual herbicide monitoring throughout the three-year project period revealed traces of herbicide residue at sampling sites within and downstream of the project areas (Table 5 and 6). Concentrations detected were low in all cases. A summary of the results is presented here.

- **Glyphosate:** This is the active ingredient in the herbicide Glypro. The highest detection at the SCWA site was 59µg/L. The sample was taken at the downstream end of the BW Channel 3-7 days after herbicide application in 2006. The highest detection at the CDFG site was 27µg/L. The water sample was taken downstream of the treatment area 3-7 days after herbicide application in 2005. Glyphosate was also detected at the downstream sampling location prior to herbicide application indicating use by a neighboring landowner. The NPDES General Permit states that the water quality objective (WQO) is 700µg/L. The 96-hour LC50 (concentration lethal to 50% of test organisms) is 120,000 µg/L in bluegill sunfish and 86,000 µg/L in rainbow trout.<sup>7</sup> Glyphosate was not used in 2007.
- **Aminomethyl-phosphonic acid (AMPA):** This is the principal metabolite of glyphosate after it has broken down. Because glyphosate degrades rapidly in the environment, AMPA is an important measure of chemical persistence. The highest detected concentration of AMPA at the SCWA site was 54µg/L. The sample was taken at the downstream end of the BW Channel 3-7 days after herbicide application in 2006. AMPA was not detected in any of the sampling events at the CDFG site. No WQO has been established for AMPA.
- **Limonene:** This is the active ingredient in the surfactant Cygnet Plus. There were no detections of limonene in any sampling events.
- **Triclopyr:** This is the active ingredient in the herbicide Renovate 3. Triclopyr was applied in 2006 and 2007. The highest detection at the SCWA site was 100µg/L. The sample was taken at the downstream end of the BW Channel within 24 hours after application in 2007. The highest detection at the CDFG site was 17µg/L. The sample was taken downstream of the treatment area within 24 hours after the application in 2007. While the NPDES permit does not provide a WQO for triclopyr, the LC50 for this chemical is 117,000 µg/L for rainbow trout and 148,000 µg/L for bluegill sunfish.<sup>8</sup>
- **Oxamic acid:** This is a primary metabolite of triclopyr after breakdown and is an important measure of the persistence of the herbicide. There were no detectable levels of oxamic acid.

<sup>7</sup> <http://extoxnet.orst.edu/pips/glyphosa.htm>

<sup>8</sup> <http://extoxnet.orst.edu/pips/triclopyr.htm>

Table 5. Summary of residual herbicide and metabolites, surfactant and water hardness in upstream, within and downstream project locations taken before, immediately following and 3-7 days following herbicide application at the SCWA field site, 2005-2007.

	glyphosate (µg/L)		aminomethyl phosphonic acid (µg/L)		triclopyr (µg/L)		oxamic acid (µg/L)		limonene (µg/L)		Hardness (mg/L)		
	2005	2006	2005	2006	2005	2006	2005	2006	2005	2006	2005	2006	2007
<b>Before herbicide application</b>													
WQ1 (upstream)	ND	ND	-	ND	-	ND	ND	-	ND	ND	330	340	380
WQ2 (upstream)	ND	ND	-	ND	-	ND	ND	-	ND	ND	300	300	280
WQ3 (within)	-	ND	-	ND	-	ND	ND	-	ND	-	-	400	410
WQ4 (downstream)	-	ND	-	ND	-	ND	ND	-	ND	-	-	330	320
<b>Within 24 hrs following herbicide application</b>													
WQ3 (within)	-	-	-	-	-	-	100	-	ND	-	-	-	430
WQ4 (downstream)	ND	6.7	-	ND	-	4	29	-	ND	ND	240	260	370
<b>3-7 days post herbicide application</b>													
WQ1 (upstream)	-	-	-	-	-	-	-	-	-	-	-	-	-
WQ2 (upstream)	-	-	-	-	-	-	-	-	-	-	-	-	-
WQ3 (within)	28	59	-	54	-	-	80	-	ND	ND	310	400	430
WQ4 (downstream)	ND	9.2	-	10	-	7.6	14	-	ND	ND	330	290	350

ND indicates no detection  
 - indicates that no analyte was submitted for the given date or parameter, per the NPDES monitoring requirements

Table 6. Summary of residual herbicide and metabolites, surfactant and water hardness in upstream, within and downstream project locations taken before, immediately following and 3-7 days following herbicide application at the CDFG Laguna Wildlife Area, 2005-2007.

	glyphosate (µg/L)			aminomethyl phosphonic acid (µg/L)			triclopyr (µg/L)			oxamic acid (µg/L)			limonene (µg/L)			Hardness (mg/L)		
	2005	2006	2007	2005	2006	2007	2005	2006	2007	2005	2006	2007	2005	2006	2007	2005	2006	2007
<b>Before herbicide application</b>																		
WQ1 (upstream)	ND	ND	-	ND	ND	-	-	ND	ND	ND	ND	ND	-	ND	ND	-	230	230
WQ2 (within)	ND	ND	-	ND	ND	-	-	ND	ND	ND	ND	ND	-	ND	ND	-	190	190
WQ3 (downstream)	6.4	ND	-	ND	ND	-	-	ND	ND	ND	ND	ND	-	ND	ND	-	210	73
<b>Within 24 hrs following herbicide application</b>																		
WQ3 (downstream)	ND	ND	-	ND	ND	-	-	ND	17	ND	ND	ND	-	ND	ND	140	190	240
<b>3-7 days post herbicide application</b>																		
WQ1 (upstream)	-	ND	-	-	ND	-	-	ND	-	ND	-	ND	-	ND	ND	-	220	210
WQ2 (within)	-	ND	-	-	ND	-	-	ND	1.6	ND	-	ND	-	ND	ND	-	150	74
WQ3 (downstream)	27	ND	-	ND	ND	-	-	ND	13	ND	-	ND	-	ND	ND	240	190	160

ND indicates no detection

- indicates that no analyte was submitted for the given date or parameter

The physical characteristics of the grab sample locations within and between project sites were vastly different in terms of depth, width, flow, and canopy cover making it difficult to draw meaningful comparisons between them or to relate the data to project activities. Furthermore, grab samples were only taken during daylight hours so the strong diurnal fluctuations common to the Laguna were not captured.

In its Basin Plan, the RWQCB set numeric water quality objectives for dissolved oxygen (DO) and pH in the North Coast Region.<sup>9</sup> In 2007 the dissolved oxygen levels were frequently well below the minimum water quality objective, even at the upstream monitoring sites (Table 7). Minimum values typically occurred in the morning before photosynthesis caused the concentration to rise. Maximum DO concentrations often coincided with supersaturated conditions in the late afternoon when photosynthesis was at its peak. DO values at the downstream end of the CDFG site (WQ3) never rose above the minimum water quality objective of 7.0 mg/L. This held true even before management activities began for the season. However, continuous monitoring sondes did record values above the WQO at night. The extremely low 0.3 mg/L DO value at this site was recorded on October 26, 2007 following the flooding of a nearby field that had recently been disked. The field contained high *Ludwigia* cover but was not part of the project area. Water pH was mostly within the water quality objective at all locations.

Turbidity was the biggest water quality issue directly attributable to management activities in all years. Specifically, mechanical removal was responsible for temporary spikes in turbidity. Figure 5 compares turbidity levels at upstream and downstream sampling locations of the SCWA field site during the 2007 field season and identifies when removal operations occurred. At the downstream sampling location the average turbidity increased 39% during the Gossage Creek removal operations and 127% during the BW Channel removal operations. Background turbidity levels resumed within a week.

Although no mechanical removal took place at the CDFG site in 2007, Figure 6 provides a sense of background conditions upstream, within and downstream of the site based on a limited number of grab samples. The upstream sampling site, characterized by its 150-foot wide channel and 15-foot depth, averaged higher turbidity than the narrow and shallow downstream location. Turbidity values taken within the project site were highest. This was also the shallowest sampling location. Downstream values were, on average, lower than upstream turbidity values. Figure 7 provides a more detailed look at turbidity at the downstream location. The data sonde at this location was equipped with a turbidity probe. Figure 7a spans June 30-July 26, 2007. Turbidity values are concentrated between 25 and 55 NTU. The same concentration is evident during the period September 8-20 (Figure 7b). Outlying values occur frequently but are not correlated to any particular management actions or time of day. The largest outliers were eliminated from the data set.

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<sup>9</sup> <http://www.waterboards.ca.gov/northcoast/programs/basinplan/basin.html>

The most effective measure taken to reduce turbidity was to work from upstream to downstream thus allowing the existing vegetation to filter turbid water moving downstream. Installation of a silt curtain also helped contain turbid waters.

Table 7. Maximum, minimum, and average values for daytime grab samples taken at monitoring stations WQ1-WQ4, June-October 2007, SCWA field site.

	DO%	DO (mg/L)	Temp (C)	pH
<i>Basin plan water quality objective</i>	<i>none</i>	<i>7.0 minimum</i>	<i>none</i>	<i>6.5-8.5</i>
max	127.6	11.3	28.9	8.5
min	26.6	2.5	15.9	7.0
avg	90.0	7.6	22.7	8.0
max	132.1	10.9	25.0	8.2
min	32.1	3.1	15.2	0.0
avg	58.9	5.4	19.5	7.8
max	138.0	10.4	30.4	8.5
min	28.4	2.5	16.0	0.0
avg	84.4	6.8	24.9	7.8
max	219.9	17.3	29.3	8.2
min	17.2	1.5	16.1	7.1
avg	78.4	6.5	23.0	7.7

Table 8. Maximum, minimum, and average values for daytime grab samples taken at monitoring stations WQ1-WQ3 June-October 2007, CDFG Laguna Wildlife Area.

	DO%	DO (mg/L)	Temp (c)	pH
<i>Basin plan water quality objective</i>	<i>none</i>	<i>7.0 minimum</i>	<i>none</i>	<i>6.5-8.5</i>
max	171.5	14.0	28.9	8.7
min	34.0	2.9	18.4	7.0
avg	83.0	6.8	24.8	7.9
max	105.4	8.5	30.8	7.8
min	9.5	0.9	14.3	6.6
avg	51.9	4.3	23.3	7.4
max	76.8	6.3	34.9	8.3
min	2.6	0.3	16.0	6.9
avg	33.5	2.8	22.9	7.6

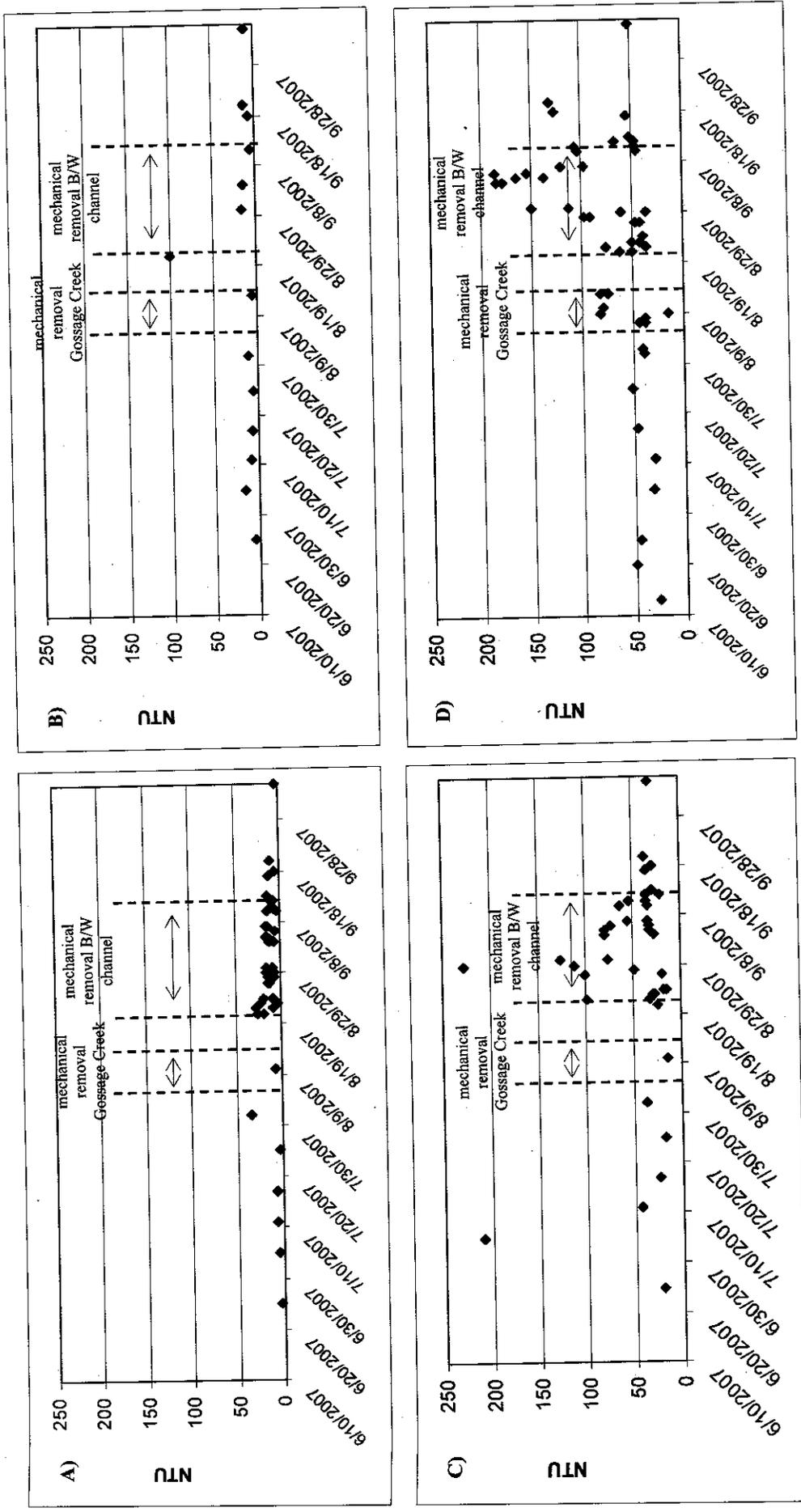


Figure 5. Turbidity grab sample monitoring at upstream and downstream locations at the SCWA field site, June-Sept, 2007. A) Sampling point WQ1 located upstream of project site in Laguna Main channel. B) Sampling point WQ2 located at the upstream end of the Bellevue Wilfred Channel. C) Sampling point WQ3 located at downstream end of Bellevue Wilfred Channel. D) Sampling point WQ4 located downstream of project site in Laguna Main channel. Mechanical removal activity occurred from August 6-13 in Gossage Creek and August 21-September 12 in Bellevue Wilfred Channel.

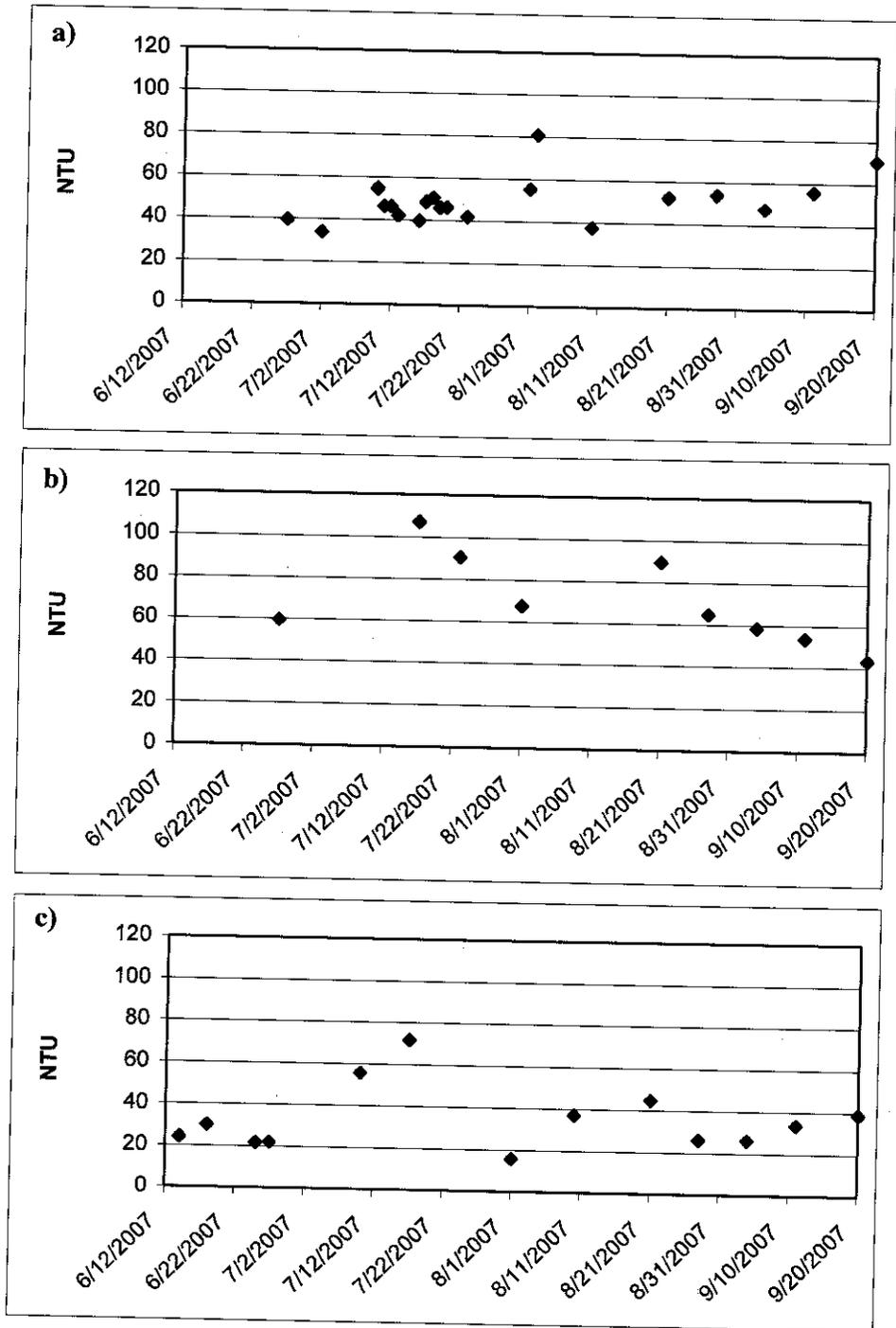


Figure 6. Turbidity grab sample monitoring, CDFG Laguna Wildlife Area, June-September, 2007. A) Sampling point WQ1 located upstream of the treatment area. B) Sampling point WQ2 located within the treatment area. C) Sampling point WQ3 located downstream of the treatment area.

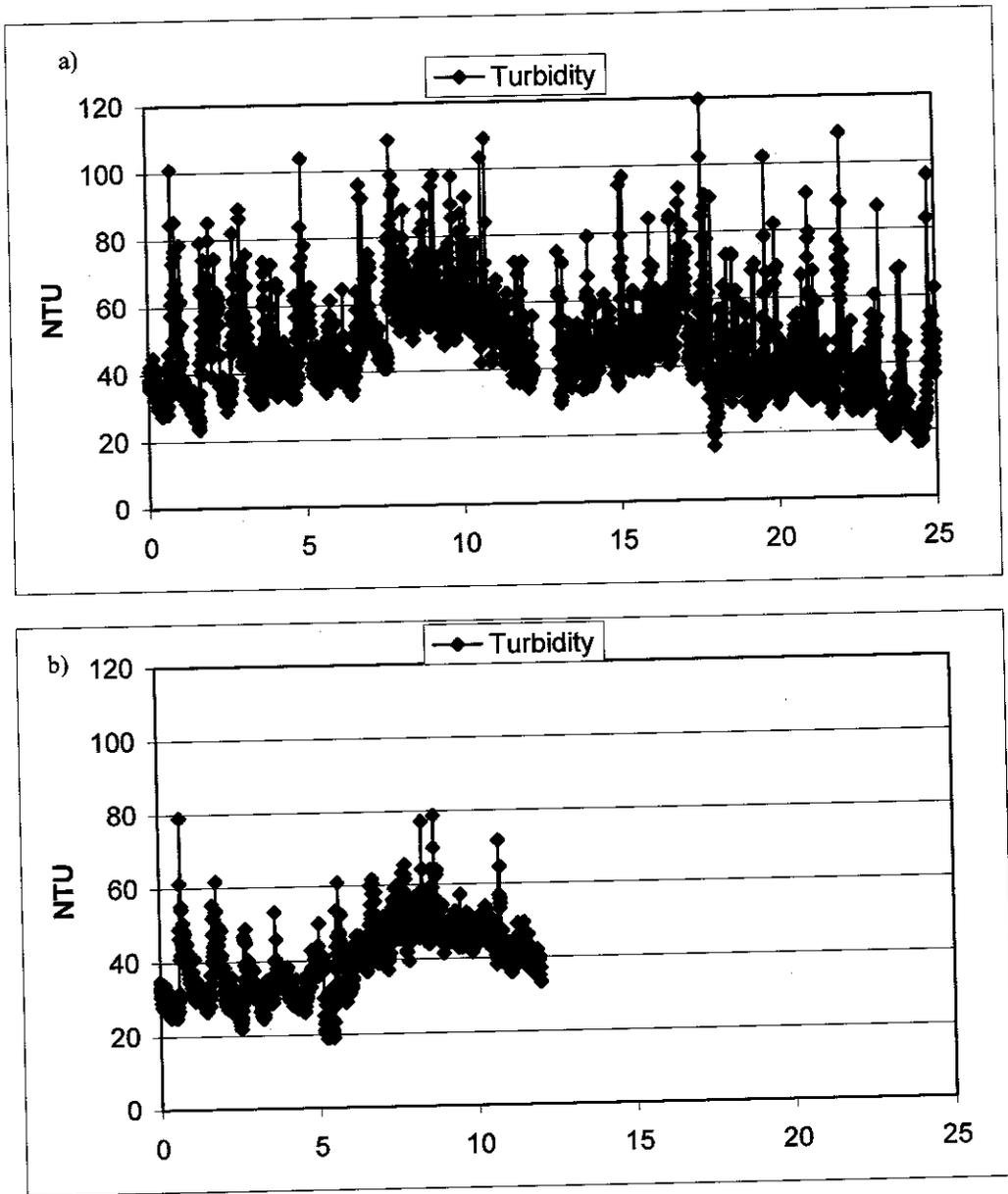


Figure 7. Turbidity monitoring data collected using data sonde at downstream sampling site (WQ3), CDFG Laguna Wildlife Area from a) June 30-July 26, 2007 and b) September 8-20, 2007.

As with turbidity, continuous monitoring sondes provided the largest data set for other water quality parameters and captured important diurnal fluctuations at the project sites. However, a combination of user error and frequent equipment malfunction during data sonde operations reduced the amount of usable data through the project period. For example, during much of the 2005 field season the sonde was deployed at a location downstream of the SCWA site that was not properly connected to the project site during low flow periods (i.e. summer). The site, chosen jointly by the Foundation, its consultants, and RWQCB staff, was relocated late in the season after the site dried. The 2005 data would have been the most informative year because it represented the before and after effects of herbicide and mechanical removal during the year in which the cover of *Ludwigia* was by far the largest.

Nonetheless, available data from 2007 reveals important patterns at both sites and provides a picture of the water quality response to herbicide application. Generally speaking, the Laguna exhibits typical diurnal patterns with regard to dissolved oxygen (DO) and temperature. However, the range between the high and low DO values is wide and lows are well below the Basin Plan objectives. Figure 8 illustrates continuous daily temperature and DO (% saturation and concentration) data collected by the data sonde at the downstream end of the SCWA site from June 26-July 3. The dissolved oxygen level rises from roughly 11 am to 10 pm and is consumed from 10 pm to 11 am. Peak concentrations occur from 6-9 pm while minimum concentrations occur from 8-10 am. Super saturation, a condition in which the dissolved oxygen level is greater than 100% of the water's oxygen holding capacity at a given temperature, occurs between 4 and 10 pm. Super saturation occurs in water bodies where water is agitated, as in a cascade, or water bodies in which algal production is high.

Herbicide applications made on June 27, June 29 and July 2 did not appear to disrupt the diurnal patterns. This suggests that two years after the removal of the large quantity of biomass in Laguna Main, *Ludwigia* was no longer the principal driver of photosynthetic oxygen production or the primary consumer of oxygen through respiration or decomposition. Although this seems likely given the low cover of *Ludwigia* and other aquatic vegetation in Laguna Main during the application period, the data is unavailable for the week following the herbicide application due to equipment failure. It is possible that a delayed impact would have been apparent. DO values later in the season were lower on average but this trend was observed in all monitoring locations including areas upstream of the project.

Downstream of the CDFG site the data sonde revealed a decline in both the high and low dissolved oxygen values beginning 3-5 days after herbicide application (Figure 9). The greater cover of *Ludwigia* in the channel at this site suggests that spraying *Ludwigia* and leaving the biomass in the water does lead to a measurable decline in DO and the downward trend continues through the season.

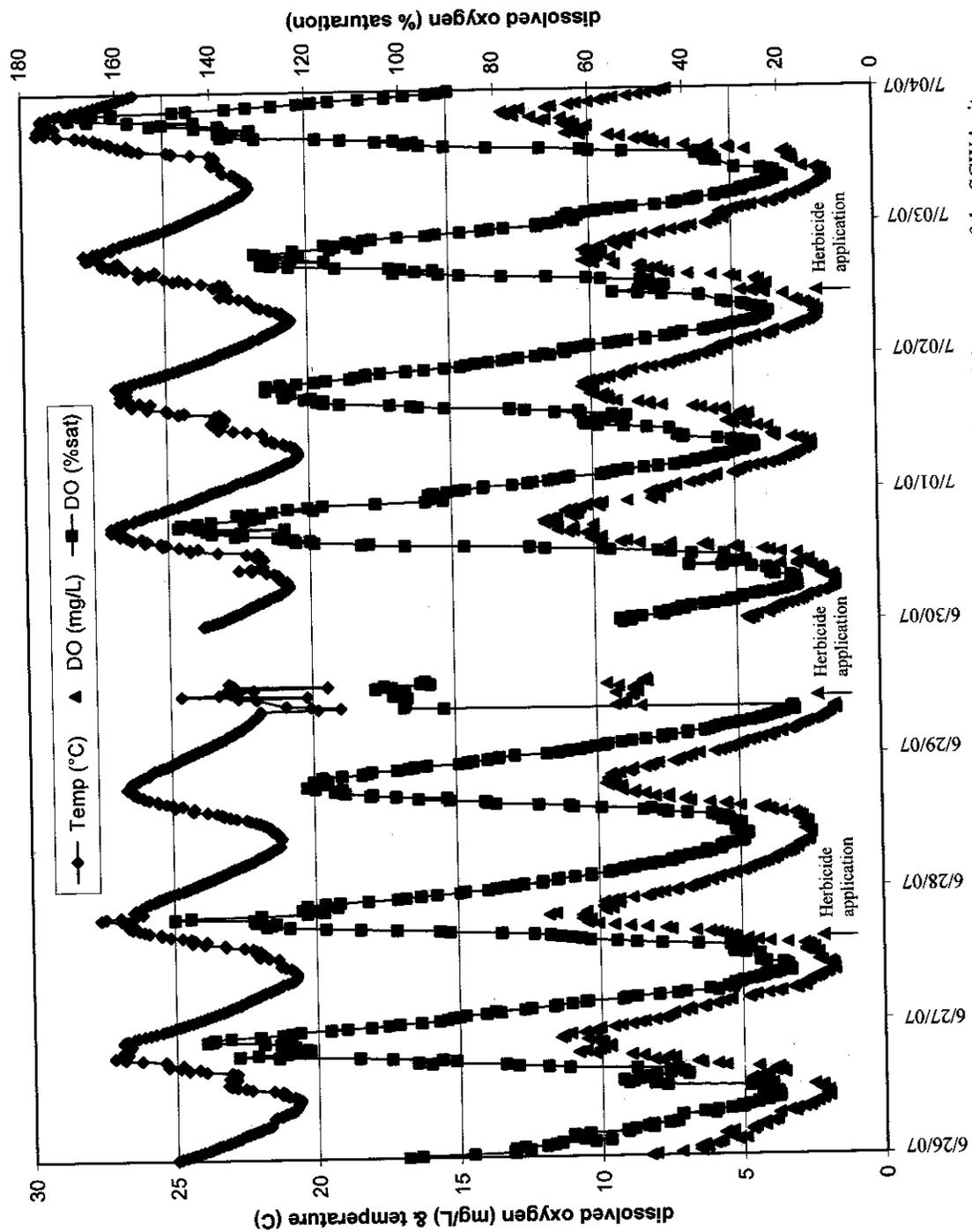


Figure 8. Continuous monitoring sonde data for the period June 26-July 3, 2007 located downstream of the SCWA site (WQ4). Three herbicide applications occurred during this period. The data sonde was pulled from the water for cleaning and calibration on June 29 resulting in a data gap.

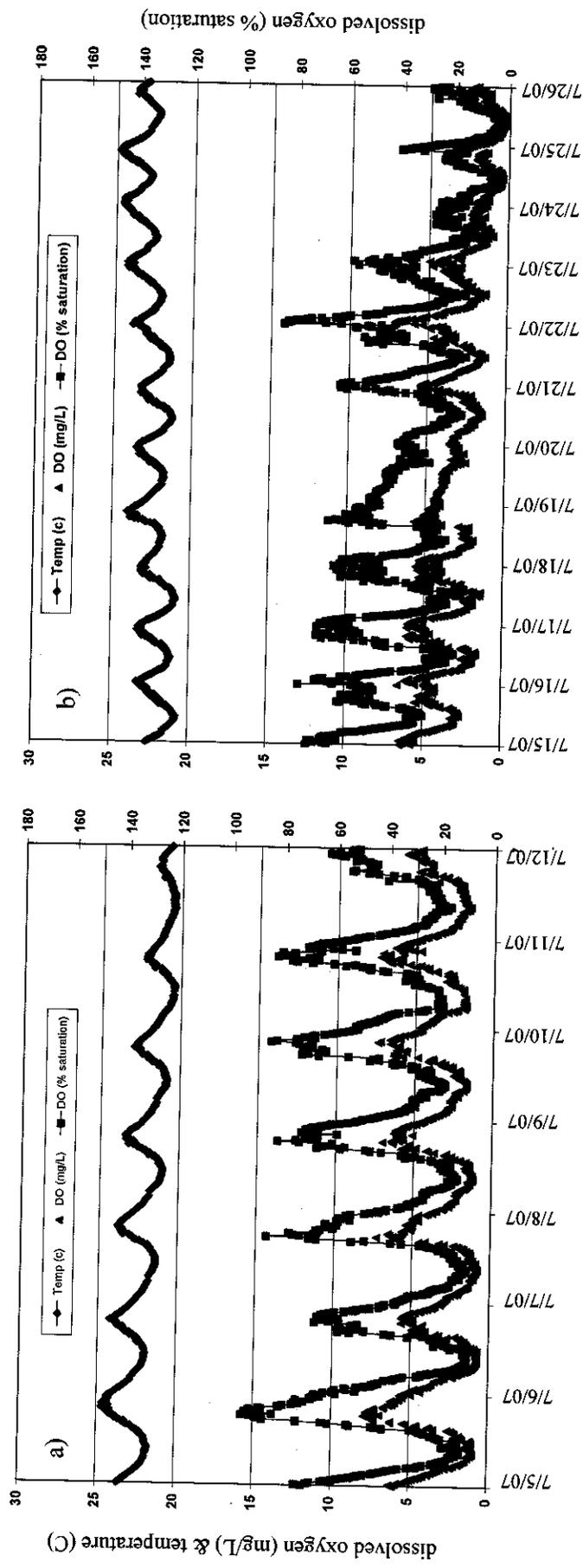


Figure 9. Continuous monitoring sonde data for the period a) July 5-12, 2007 and b) July 15-25, 2007. The sonde was located downstream of the CDFG site (WQ3). Herbicide application occurred on July 11 and July 12.

## Mosquito Control

A primary driver of this project was mosquito control. In 2002 the Marin Sonoma Mosquito & Vector Control District expressed concerns about the cost and difficulty of controlling mosquitoes in densely infested *Ludwigia* areas and the related public health threat posed by West Nile Virus, a mosquito borne disease. Although the issues of biodiversity, water quality, and channel capacity were equally important, the mosquito issue provided the most urgent call to action. Some community members even postulated that the presence of *Ludwigia* increased mosquito production though this has not been accurately tested or verified. It is more likely that *Ludwigia* areas appeared to have higher production because mosquito control operations were less effective there.

Table 9 summarizes data on adult mosquito abundance and larvicide operations from 2005-2007 at *Ludwigia* control sites. It is recognized that presence or lack of adult mosquitoes does not prove or disprove elevated or reduced larval levels; it is impossible to know the origin of the adults. What is clear, however, is that the acreage requiring larvicide treatments declined substantially over the project period. Although this may have been due to the LCP, other factors such as rainfall and temperature may also have contributed to decline.

Table 9. Summary of mosquito trapping and larvicide application at Ludwigia project sites, 2005-2007. Data submitted by Marin/Sonoma Mosquito & Vector Control District.

	Number of adults trapped	Number of larvicide applications applied	Total number of acres treated
2005	3,819	unknown	19.5
2006	314	unknown	10.8
2007	641	0	0
2005	4,022	unknown	14.3
2006	195	0	0
2007	1,200	1	0.2
2005	731	5	326.5
2006	1191	16	221.5
2007	531	4	15.2

## Discussion

Herbicide application provided mixed results, many of which are difficult to disentangle from other contributing factors including annual precipitation, spring air temperature, channel size and depth, herbicide application rate, and whether biomass was removed after spraying. However, in general, the pattern from the two sites is clear. Areas in which *Ludwigia* was sprayed and then removed provided control for 2 years if the water was deep, though minor touchup spraying was required. Under shallow water conditions these methods appear unable to provide effective control for even a single season. Application of herbicide to densely infested areas where biomass cannot be removed is not effective and contributes to poor water quality. Application of herbicide to small patches along channel margins may provide sustained control as long as applications occur every year.

Although both glyphosate and triclopyr are systemic herbicides, neither seemed to act systemically. The fact that glyphosate adsorbs readily to soil particles and becomes inactive makes it a poor choice of herbicide if conditions require the use of airboats or Marshmogs to drive over plants. This equipment causes plants to become coated with muddy water. However, this is not sufficient to explain its failure to provide control because large areas, such as the BW channel, were treated from the bank and therefore were not coated by muddy water during the application.

The label for Renovate 3, the triclopyr-based herbicide, recommends an application rate of 2-8 quarts per acre for aquatic and emergent weeds including water primrose (*Ludwigia*). Even at the greatly reduced rate of 1 quart per acre triclopyr acted too quickly on *Ludwigia* and generally failed to work systemically as a result. Therefore under shallow water conditions Renovate 3 also seems like a poor choice for control of *Ludwigia*, particularly if the biomass cannot be removed following the application.

It is important to repeat that the herbicides used may have been more effective at different application rates. For instance, glyphosate has been used effectively in other parts of California but there is little data reporting on the duration of control.

Each year herbicide applications occurred between June 15 and September 30 in compliance with NOAA Fisheries regulations. Yet in a typical year *Ludwigia* has already experienced significant growth and gained competitive advantage by June 15. This prompted discussion of an earlier application to young plants as soon as they emerge. This might work if the *Ludwigia* plants are directing more photosynthetic energy to root development at this time and if the herbicide truly works systemically. However, in areas where *Ludwigia* is well established, observations suggest that an early application might kill the early growth but as water levels drop through the growing season newly exposed banks will be open to a second wave of growth. This would require an additional application. If the water level dropped enough, as it did in 2007, *Ludwigia* could then begin to grow from the middle of the channel and require yet another application. Nonetheless, this approach may be worthy of a test. But if spraying occurs prior to June 15, a salmonid take permit would be required.

Although this discussion of herbicide use suggests that it is ineffective against *Ludwigia*, it should be acknowledged that different site conditions can yield very different results. For example, one area within the SCWA site dried out following the droughty winter of 2007. This was an area where mechanical removal had never been possible (southeast section of Laguna Main channel). Following one season of glyphosate treatment and two seasons of triclopyr treatment the site was nearly free of *Ludwigia*. Numerous other species quickly colonized the available mudflat including *Polygonum* spp. and various graminoids. This suggests that in addition to deep water, the absence of water can control or limit the growth of *Ludwigia*, particularly if it is sprayed with herbicide.

However, because most of the problem areas in the Laguna do not dry out, the continued use of herbicide (triclopyr), if any, should be limited to areas where biomass is low, areas where immediate control is needed (e.g. for mosquito control), or areas where it is part of an active restoration plan. Herbicide should not be applied to large patches unless it can be removed. In all cases herbicide should be considered a temporary fix while more effective solutions are planned. Efficacy trials using the herbicide Habitat (active ingredient imazapyr) to control *Ludwigia* are underway elsewhere in California and may yield better results.

As mentioned, herbicide application followed by mechanical removal provides longer lasting control in areas where the water is deeper. Although *Ludwigia* produces adventitious roots from its floating nodes, it must ultimately root in sediment. In deeper water the available rooting surface is limited to the channel margin. The plant must then "creep" across the surface. Although the minimum water depth required is unknown, observations over the three years suggest a minimum of 3 feet of water. Given time, however, *Ludwigia* will easily cover the water surface at this depth. Areas that had remained open prior to the onset of project activities were more on the order of 5 or more feet deep.

It is unclear whether spraying herbicide prior to mechanical removal increases control. The practice of spraying first is intended to reduce the threat of spreading fragments downstream. However, floating booms erected to prevent turbid waters from moving downstream should also serve to collect floating fragments. If so, it may be more effective to remove the vegetation first and then spray regrowth. This would also result in less volume of herbicide being used. Regardless of the order of operations, however, lasting control is unlikely with either spraying or mechanical removal alone though these actions may be an important component in larger restoration plans.

It is important to understand how water quality is affected by both the presence of *Ludwigia* and by efforts to control it. As a photosynthesizing macrophyte, *Ludwigia* helps boost dissolved oxygen levels each day just as it consumes oxygen each evening during respiration. As a dense mat it may even help mediate extreme temperature fluctuations in shallow water. But the effect of the decomposition on dissolved oxygen probably outweighs any benefits. Spraying *Ludwigia* without removing it amounts to a speeding up of this process and is detrimental to the system. Additionally, allowing the

biomass to decompose in place releases all the stored nutrients back into the system, a process that may boost further *Ludwigia* growth. In all of this it is important to remember that although *Ludwigia* can affect water quality in both negative and positive ways, its presence is a response to poor water quality and ecosystem perturbation, not a cause.

### Conclusion

The three-year effort to control *Ludwigia* through herbicide application and mechanical removal has yielded mixed results at considerable cost. The degree and duration of control are closely linked to physical conditions at the site and annual variations in temperature and precipitation. Clearly there continues to be a need to address the underlying conditions that promote *Ludwigia* growth in the watershed. Long-term *Ludwigia* control will require systemic approaches that address the primary stressors in the Laguna. Reducing inputs of nutrients and sediment is paramount. This process will begin when the Regional Water Quality Control Board completes its TMDL pollution plan, sometime around 2011. Although measurable differences may be more than a decade away, it is a positive step.

The focus in the shorter term should shift to manipulation of physical conditions as part of larger restoration plans. Perhaps the most effective action will be water level manipulation. This entails creating conditions that promote either deep water or the absence of water during summer months. Methods may include targeted sediment removal, creation of low flow channels, and reduction of summer irrigation runoff. Because accumulated sediment is very likely enriched with nutrients, its removal in key areas will also serve to remove accumulated nutrients from the system. Because sediment removal will create considerable disturbance, it should always be accompanied by restorative actions such as establishment of riparian forest.

## Recommendations

Management of *Ludwigia* within the Laguna watershed and within the current project sites will require sustained attention over the long term. This section begins with an update and recommendations for strategies to improve conditions and to prevent further introductions in the watershed. Following this are short and long term recommendations for both the SCWA field site and the CDFG Laguna Wildlife Area. Because some of the ideas presented here are under development and have not been approved by stakeholders, only general descriptions are provided.

### Watershed-level strategies

#### *TMDL*

The Laguna provides ideal conditions for rampant growth of *Ludwigia* and other invasive aquatic species. Abating this threat will require reduction of future inputs of sediment and nutrients. This is the purpose of the TMDL pollution plan recently initiated by the RWQCB and expected to be completed by 2011. RWQCB will set numeric objectives for nitrogen, phosphorous, sediment, dissolved oxygen, temperature, and mercury and increase awareness of the specific actions needed to meet these objectives.

#### *Coordinated restoration and management*

Many agencies and organizations that work within the watershed are involved in restoration and management projects. There is a growing awareness of each other's work and increasing desire to collaborate. The Laguna Foundation convened its first Laguna Watershed Stakeholder Council meeting in October 2007 in which several agencies and organizations shared the work they were doing in the watershed. These meetings will continue to be held and it is hoped that smaller committee meetings on special topics will evolve out of this process.

#### *Public education*

The threat of new introductions of *Ludwigia* and other highly invasive species is omnipresent. Public education through interpretive signage can serve as a strong preventative measure at likely introduction points such as Spring Lake and Lake Raphine as well as at already invaded sites like Riverside Park. Outreach to local aquatic plant nurseries will also be important.

### Strategies for the SCWA field site – Short Term

#### *Channel Maintenance*

It is important not to lose ground gained during the project period. This will require ongoing maintenance until physical conditions at the site are no longer conducive to *Ludwigia* growth. Recommended actions include mechanical removal followed by herbicide application to regrowth if needed. This reversal of the order of operations is derived from lessons learned and is intended to reduce the volume of herbicide used. Mechanical removal also serves to remove stored nutrients from the system. Because

live fragments will be created during removal, floating booms must be erected downstream to capture these potential propagules.

Channel maintenance is proposed every 2-5 years until longer term actions are accomplished. The frequency will be dictated by conditions. A long-reach excavator is recommended for removal in the BW channel and Gossage Creek and an aquatic harvester in the Laguna Main. Because the cost of contracting aquatic harvesters is very high, purchase of the equipment is strongly recommended. The most logical owner of the harvester would be SCWA or the Marin/Sonoma Mosquito and Vector Control District.

#### Strategies for the SCWA field site – Long Term

##### *Reduction or elimination of summer water inputs*

The only perennial stream entering Laguna Main is Copeland Creek yet summer flows occur in many local tributaries including Hinebaugh Creek and Gossage Creek. There is no perennial water source entering the BW channel yet it retains flow year-round. The likely sources are irrigation runoff into storm drains from agriculture, private lawns, golf courses, and car washing. This runoff is almost certainly rich in nutrients from fertilizers. Adding nutrient rich water to accumulated sediments in the infested areas perpetuates the ideal growing conditions for *Ludwigia* and other aquatic invasives in the Laguna. The first step in reducing or eliminating this input will be identification of sources through monitoring. This should begin immediately in summer 2008. Once major contributors of water are identified, essential efforts can be made to reduce or eliminate the input.

##### *Low flow channels and targeted sediment removal*

Although the elimination of *Ludwigia* is unlikely, containing its extent is possible by reducing the amount of channel available for colonization. Low flow channels can be created within the pre-existing channels to confine summer flow to a smaller area. In concept a low flow channel can be made deep enough to limit *Ludwigia* to its margins and the remainder of the channel would then dry out creating the two conditions that suppress *Ludwigia* growth, deep water and absence of water. Laguna Main is an excellent example of where a low flow channel is urgently needed. The roughly 120-foot wide channel is inundated by shallow water in the summertime. Excavation of a 15-foot wide by 8-foot deep channel would reduce the wetted area by 85%. Not only would the deeper water be more resistant to *Ludwigia* growth, but it would have lower water temperature and higher dissolved oxygen as well.

Although the idea of a low flow channel is conceptually simple, implementation is not. Design, permitting, and maintenance costs could be high particularly if sedimentation is rapid or channel sides unstable. These issues are being studied by SCWA. Potential locations for low flow channels include the BW channel from Millbrae Avenue to the confluence with the Laguna, Laguna Main from the confluence of Gossage Creek and Hinebaugh Creek to the constriction point west of Stony Point Road, and Laguna Main from the constriction point and Llano Road. The process of constructing low flow channels would cause considerable disturbance and would necessarily be part of an active restoration project.

### Strategies for CDFG field site – Short Term

#### *Mechanical Removal*

As described above and throughout this document, mechanical removal can provide effective short-term control of *Ludwigia*, particularly in deeper channels. In the coming years the channel through the CDFG Laguna Wildlife Area will gradually fill in with *Ludwigia* again. Mechanical removal should be used to clear the channel every 2-5 years until large-scale restoration begins. Herbicide may be used to stem regrowth along the channel margins following the removal if needed. As described above, it will be far more cost effective if a local agency purchases an aquatic harvester for the mechanical removal efforts.

*Ludwigia* will become worse in the floodplain without herbicide application but continued spraying without removal is not justified except under exceptional conditions such as emergency efforts to stem mosquito production following unusually high larval detection rates.

### Strategies for CDFG field site – Long Term

The Laguna Wildlife Area is a highly disturbed site. The forested floodplain shown in the 1942 aerial photo was reclaimed for agriculture decades ago and the pilot channel that dissects the site is entirely artificial. Lack of drainage in the last decade has resulted in flooded conditions year round. Suppressing *Ludwigia* at this site will require large-sale, multi-objective restoration that includes participation by surrounding landowners. This process will be initiated in spring 2008. An expert team will be assembled to assess potential restoration options which will then be weighed against relevant ecological, social, and financial factors. A preferred alternative will be chosen with the participation of surrounding landowners. Implementation will follow.

## Appendix 1

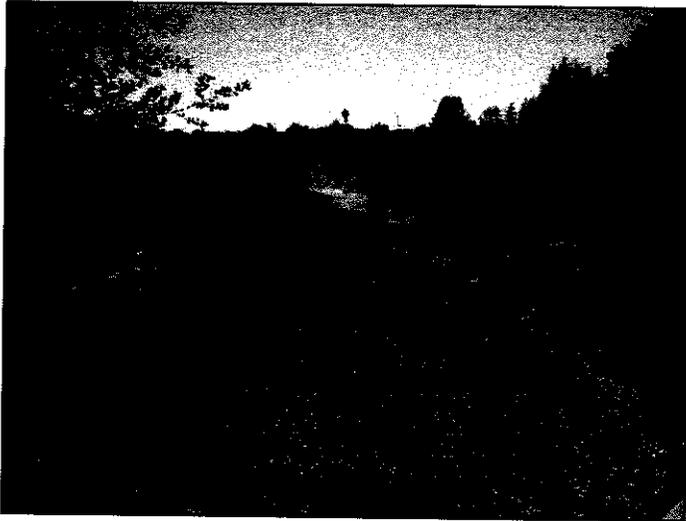
### Target Invasive Weed

Prepared by Dr. Brenda Grewell, Ecologist, USDA-ARS

During project planning, the invasive *Ludwigia* species invading extensive areas of the Laguna was thought to be *Ludwigia hexapetala*, which is taxonomically described and considered a native California species in the Jepson Manual: Higher Plants of California (Hickman et al. 1993). Early in the project, botanical experts (Dr. Brenda Grewell and Dr. Cristina Hernandez USDA-ARS, and Keenan Foster, SCWA) carefully examined these plants in the field and determined that the primary invader in the Laguna consistently did not key to the taxonomic description of *Ludwigia hexapetala* in the Jepson Manual and did not key to the description of *Ludwigia hexapetala* by Zardini, the South American expert for the *Ludwigia* genus. However, the invasive *Ludwigia* species in the Laguna did fit the less-detailed description of *L. hexapetala* in the Flora of Sonoma County (Best et al. 1996). Chromosome counts can be used to differentiate among confusing *Ludwigia* species, and have been the basis for accurate taxonomic determinations elsewhere. Because precise identification of invasive weeds can be critical for the development of effective management strategies, USDA-ARS and UC Davis scientists launched a comprehensive cytological and morphometric evaluation of invasive *Ludwigia* taxa throughout the Laguna, the greater Russian River Basin, and the Pacific west states. Chromosome counts and morphometric analyses (Grewell et al. manuscript in review) confirm four *Ludwigia* taxa in the Laguna de Santa Rosa watershed, and companion molecular studies (Okada et al. manuscript in preparation) indicate hybrids are also present. All of these taxa co-occur in the project areas. Independent of this research, a global phylogenetic re-evaluation of the genus is underway. As results become available, nomenclature for taxa may change and taxonomic keys including the Jepson Manual will be revised. For now, as determined by ploidy levels, we can refer to the two primary invasive weeds in the Laguna as *Ludwigia hexapetala* and *Ludwigia peploides* ssp. *montevidensis*, and *L. hexapetala* is currently the more abundant of the two in both project locations. Both taxa will be treated as exotic invasive species from South America in taxonomic key revisions (Grewell, personal communication), and corrections to the taxonomic keys are in progress. The native *Ludwigia peploides* spp. *peploides* and *Ludwigia palustris* are also present, co-occur with the exotic species in the Laguna, and all four taxa are present in the management project areas. In addition, *Ludwigia peploides* hybrids have been confirmed in the Laguna.

**Appendix 2:**  
**Select Photo Monitoring Series from the SCWA and CDFG**  
**Treatment Areas**  
**2005-2007**

Bellevue Wilfred Channel, SCWA Field Site: Photo Point A-01



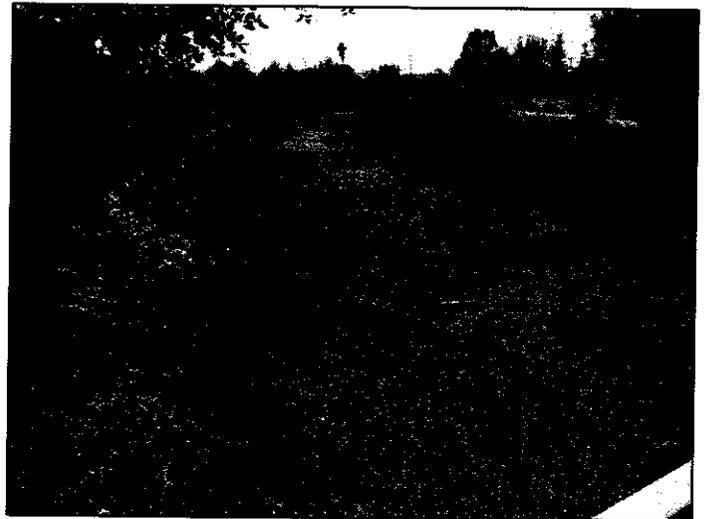
Pre-spray  
July 2005



Post-removal  
October 2005



Pre-spray  
June 2006



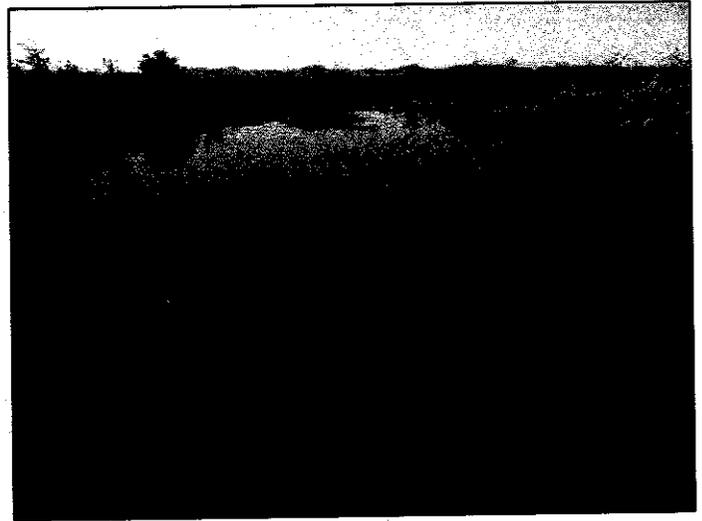
Pre-spray  
June 2007

Bellevue Wilfred channel looking southwest off the Millbrae Road Bridge. Prior to project activities *Ludwigia* covered roughly 75% of the channel. Following 2005 spray/removal activities the channel was clear. In spring 2006 regrowth was moderate. Following another season of spray/removal, regrowth was strong in 2007 and *Ludwigia* reoccupied at least 75% of the channel though the density was reduced from pre-project levels. Note that much of the growth is occurring from the east (left) side of the channel where a mudflat provides ideal medium for germination, growth from fragments, and sprouting from existing roots. Removal of this sediment during the creation of a low flow channel could stem the regrowth in this section.

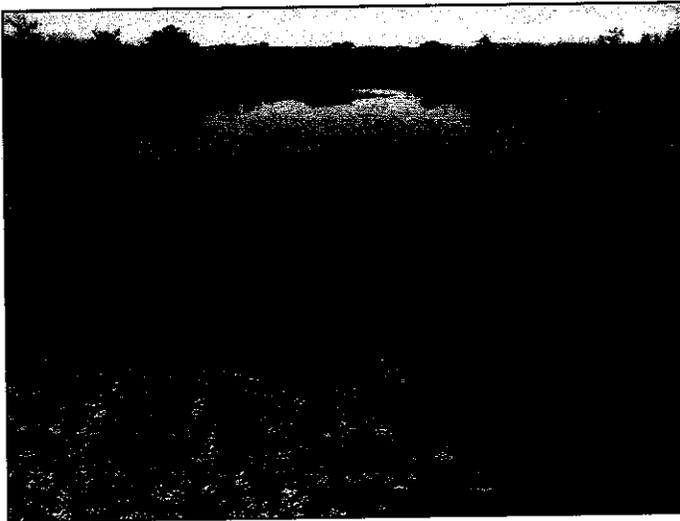
Bellevue Wilfred Channel, SCWA Field Site: Photo Point D-07



Pre-spray  
July 2005



Post-removal  
October 2005



Pre-spray  
June 2006



Pre-spray  
June 2007

Bellevue Wilfred channel looking north toward the Wilfred Bridge. Photo taken from cross bridge within channel. Note the open water in the foreground following the first year. Although *Ludwigia* can easily creep across this deeper water (~36 inches), the time required to reoccupy it is greater than in uniformly shallow areas. The important point is that deeper water will limit *Ludwigia* growth for a period of time but not indefinitely as is obvious from the pre-spray July 2005 photo. Following the 2007 spray/removal activities, this section was once again clear.

Bellevue Wilfred Channel, SCWA Field Site: Photo Point E-08



Pre-spray  
July 2005



Post-removal  
October 2005



Pre-spray  
June 2006



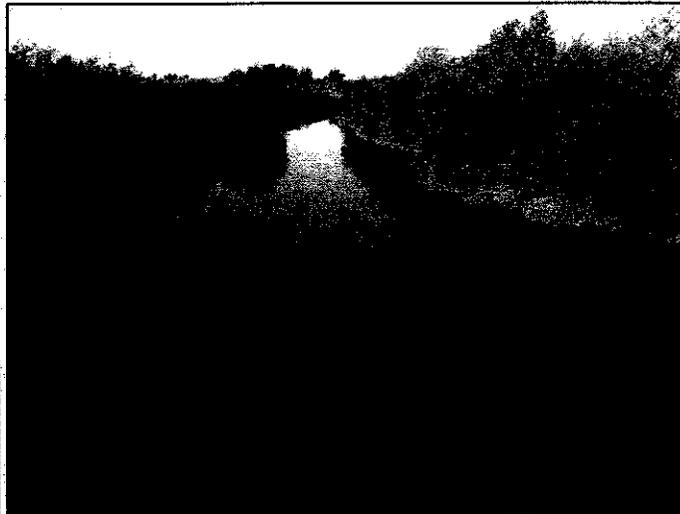
Pre-spray  
June 2007

Bellevue Wilfred channel looking north from cross bridge within channel (just north of Rohnert Park Expressway). Dense infestation in July 2005 was growing on shallowly inundated mudflat. Regrowth in June 2006 was limited partly from cool wet spring. By mid-summer regrowth was more pronounced. Regrowth in June 2007 was stronger following a warm spring and drought winter. Note the natural low-flow channel in June 2007. If this were made deeper it is possible the soil on the adjacent mudflats would not be saturated and would be less conducive to *Ludwigia* growth.

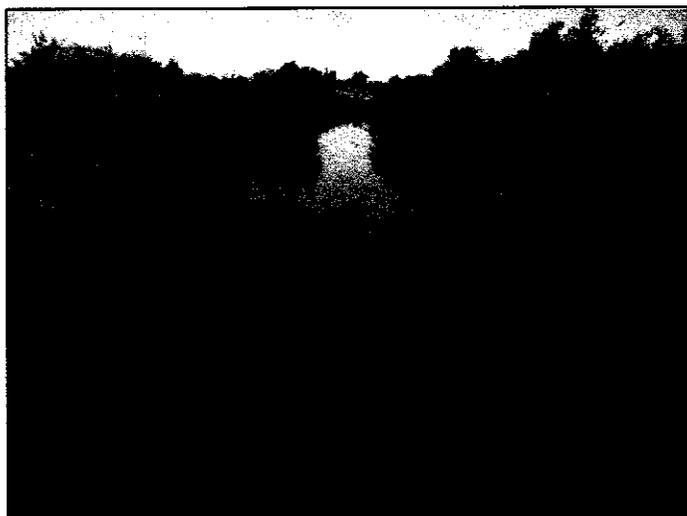
Laguna Main Channel, SCWA Field Site: Photo Point I-13



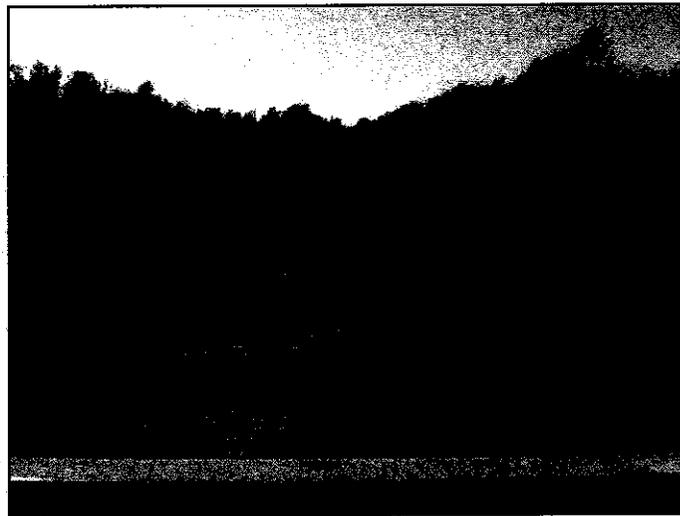
Pre-spray  
July 2005



Post-removal  
October 2005



Pre-spray  
June 2006



Post-spray  
September 2007

Main Laguna channel looking west from the Stony Point Road Bridge. Prior to project activities this relatively deep section was heavily infested. Following the first year of spray/removal the channel was largely clear and remained so in June 2006. No removal occurred in 2006. The drought of 2006/2007 resulted in shallow conditions in spring/summer 2007 allowing *Ludwigia* to root mid-channel. Despite two herbicide applications, the channel experienced significant regrowth in 2007 as well as large algal blooms. A low flow channel to contain summer flow would limit the area of the channel available for colonization.

Laguna Main Channel, SCWA Field Site: Photo Point O-22



Post-removal  
October 2005



Pre-spray  
June 2006



Post-spray  
October 2006



Post-spray  
September 2007

Main Laguna channel looking east of confluence with Bellevue Wilfred Channel. No photo available for June 2005. This section was treated with herbicide each year. Mechanical removal occurred only in 2005. Note that in September 2007 *Ludwigia* only occurs in the wetted channel and even here it is low density. The vegetation on the sides is not *Ludwigia* and the soil underneath is largely dry. This is the goal of a low flow channel, to contain water to a small area where *Ludwigia* can easily be contained and to keep the remainder of the channel dry during summer. Although water levels would be higher outside of a drought year, a constructed low flow channel would be deeper and the net result would likely be the same.

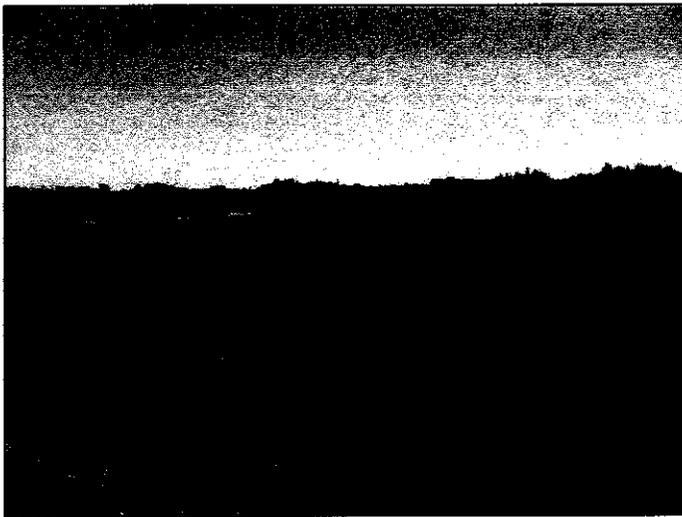
**Floodplain, CDFG Laguna Wildlife Area: Photo Point C-11**



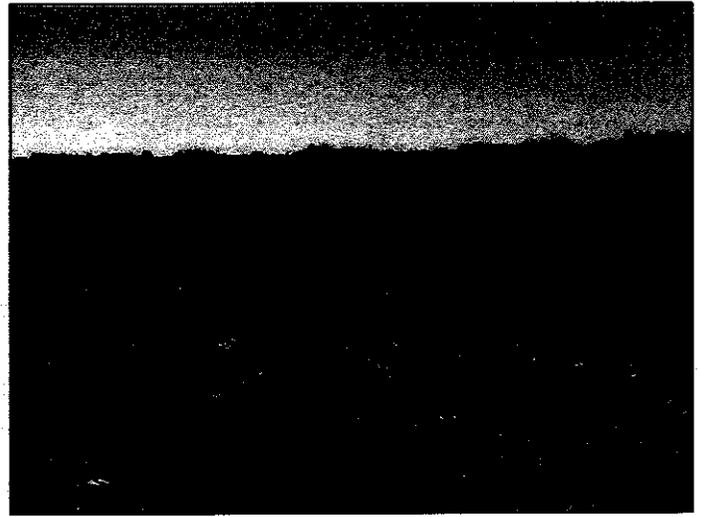
Pre-spray  
July 2005



Pre-spray  
June 2006



Post-spray  
October 2006



Pre-spray  
August 2007

Looking south over the northern floodplain of the CDFG Laguna Wildlife Area. Because mechanical removal was not feasible in the floodplain, herbicide was the only management method used. Despite a promising appearance following spraying in 2005 and 2006, regrowth was strong by the following spring of each year. Although this portion of the floodplain was sprayed again in 2007, much of the floodplain was not sprayed in 2007 due to the limited efficacy of previous efforts. Decaying biomass left in place following spraying also degrades water quality by consuming dissolved oxygen and releasing stored nutrients.

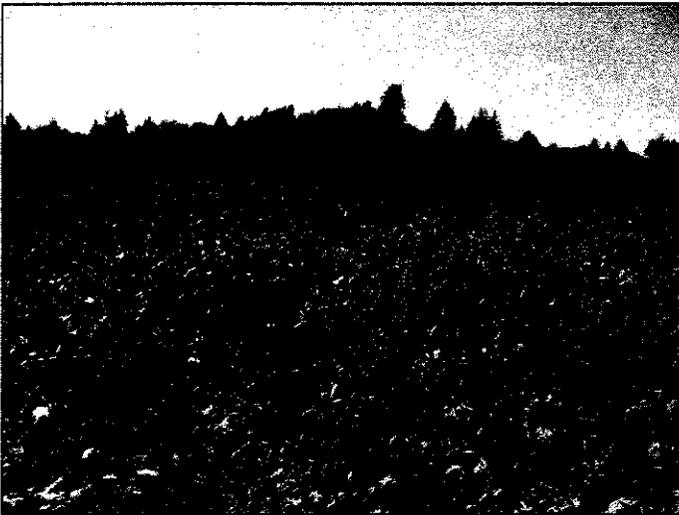
Floodplain, CDFG Laguna Wildlife Area: Photo Point Q-46



Pre-spray  
July 2005



Pre-spray  
June 2006



Post-spray  
October 2006



August 2007

Looking west over the southern section of the Laguna Wildlife Area floodplain. As in the previous photo series, limited efficacy was achieved through spraying. Although the October 2006 photograph shows a strong component of non-*Ludwigia* species including *Polygonum* sp. and *Xanthium strumarium*, *Ludwigia* quickly regained a competitive edge by the following spring. This area was not sprayed in 2007.

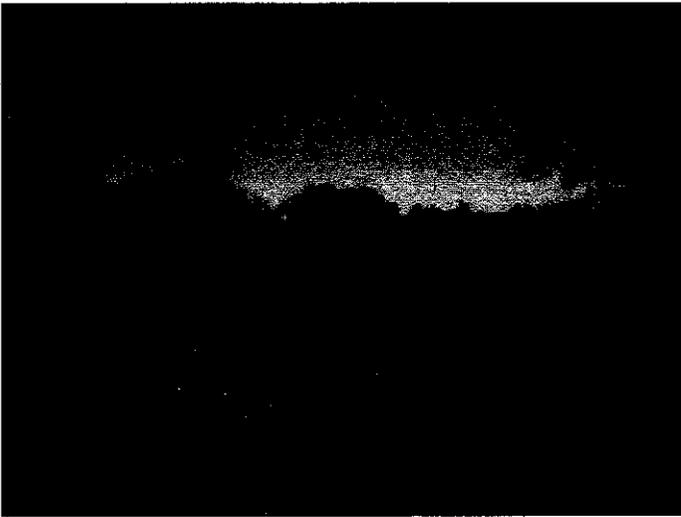
Channel, CDFG Laguna Wildlife Area: Photo Point L-38



Pre-spray  
July 2005



Pre-spray  
June 2006



Post-spray  
October 2006



Post spray  
August 2007

Channel through CDFG Laguna Wildlife Area. Spraying occurred each year. Mechanical removal occurred only in 2005. The channel remained quite clear until late 2007 when shallow water conditions prevailed following a low rainfall winter. Ongoing maintenance will be required to keep the channel clear. Mechanical removal is the preferred method and will need to occur every 2-5 years depending on the rate of regrowth. Maintenance will continue until the underlying issues that encourage rapid growth of *Ludwigia* are addressed. Planning efforts to restore the site will begin in spring 2008.

**Channel, CDFG Laguna Wildlife Area: Photo Point K-35**



Pre-spray  
July 2005



Pre-spray  
June 2006



Post spray  
August 2007

Channel through Laguna Wildlife Area. Spraying occurred each year. Mechanical removal occurred only in 2005. This deeper section of channel retained excellent control throughout the project period.

## **ENFORCEMENT**

### **'Water cops' tag homes, threatening \$500 fines**

By BOB NORBERG  
THE PRESS DEMOCRAT

Published: Tuesday, July 17, 2007 at 4:30 a.m.

Last Modified: Monday, July 16, 2007 at 9:00 p.m.

The water pooled on the sidewalk Monday morning, soaking the newspaper lying in the driveway and flowing into the gutter of the neatly kept house in northwest Santa Rosa.

#### **TIPS TO REDUCE WATER USE**

Reduce irrigation by 20%.

Find and repair leaks.

Inspect and tune-up irrigation system monthly.

Irrigate between midnight and 6 a.m. to reduce water loss from evaporation and wind.

Use a broom, not a hose, to clean driveways, decks or patios.

Use a bucket and a hose with an automatic shut-off nozzle when you wash the car, or take your car to a car wash that recycles water.

Cover pools and hot tubs to reduce evaporation.

Use front-load washing machines.

Run the dishwasher and clothes washer with full loads only.

Prevent and report water waste.

Source: City of Santa Rosa

"This is a pretty good indication, when the lawn is this uniformly green, that there is overwatering," said Dan Muelrath, Santa Rosa's water conservation coordinator and one of its "water cops."

Muelrath checked "Excess irrigation, water on sidewalk and in gutter" on a card, walked through the shallow puddles and left the card at the front door of the Piner Crest Drive home.

A woman at the house, who was retrieving her soggy newspaper, said they already had reduced the irrigation run time to eight minutes from 10 and still were trying to figure out their new controller.

"We've been trying to key it in and not get overspray," said the woman, who declined to give her name. "The controller is new for me; our gardener knows how to run it."

It was one of four houses Muelrath tagged within an hour during his morning patrol. In each case, sprinklers were running and water was flowing freely over sidewalks. He made a note to alert his staff to check three other houses and a business that had water covering the sidewalk.

They will be given 30 days to fix the problems or will face the possibility of \$500 a day in fines -- or even have water turned off.

It is all part of the city's stepped-up water conservation program that includes patrols by Muelrath and three full-time "water cops" during the day and at night. They look for homes and businesses where there is overwatering or signs of broken irrigation or plumbing systems.

The city has also set up a hot line, 543-3985, for water waste reports.

It is all in response to a call for conservation by the Sonoma County Water Agency, which was ordered by the state in mid-June to cut the amount of water it takes from the Russian River between July 1 and Oct. 28 by 15 percent from the same period in 2004. The water is to be kept in Lake Mendocino, which is historically low, to be released for the fall run of chinook salmon.

After the first 15 days, the Water Agency is well behind its goal. Use has dropped just 9.9 percent below the 2004 level.

If the Santa Rosa doesn't meet its goal or if the Water Agency calls for an even higher conservation level, the city has an emergency program prepared.

The program has several levels that include rationing, no water for irrigation, pools and fountains and rules that water for new construction must be offset by savings elsewhere.

Santa Rosa is the largest contractor of the Water Agency, serving 48,700 homes and businesses and accounting for 40 percent of the agency's Russian River diversions.

The other major contractors are Rohnert Park, Windsor, Cotati, Petaluma and Sonoma and the Valley of the Moon and two Marin water districts.

Muelrath said Santa Rosa has had a voluntary conservation program in place since the late 1970s, when severe water restrictions were put into place because of a drought.

The city has allocated \$500,000 for its current, three-year conservation program, primarily for a rebate system that gives \$150 for low-flow toilets, \$100 to \$150 for front-loading washing machines, up to \$350 for irrigation systems and 50 cents a square foot to replace lawns.

As part of the patrols, the city employees are particularly looking at homes that records show have high monthly water use, Muelrath said.

He said the city will provide advice and even send workers to houses and businesses tagged by the city's crews to help.

"We know that we can't get 15 percent from everyone, but we know that there are some people that we can get 50 percent from just because they are overwatering," Muelrath said.

He said preventing water waste in irrigation will meet the overall 15 percent goal.

You can reach Staff Writer

Bob Norberg at 521-5206 or [bob.norberg@pressdemocrat.com](mailto:bob.norberg@pressdemocrat.com).

## **WATER SHORTAGE LOOKING TO CONSERVE**

**County steps up water efforts**

**Next: Officials want state to help limit usage, feds to free more water from Lake Sonoma**

By BLEYS W. ROSE  
THE PRESS DEMOCRAT

Published: Tuesday, July 17, 2007 at 4:30 a.m.

Last Modified: Tuesday, July 17, 2007 at 2:56 a.m.

Freaked out and flummoxed that public pleas for water conservation aren't proving effective, the Sonoma County Water Agency is asking local grape growers and water customers, state and federal agencies for help in constricting the tap.

Photos by JOHN BURGESS / The Press Democrat

Dan Mulrath, water conservation program coordinator for the City of Santa Rosa, writes a door tag noting excess sprinkler water flowing onto sidewalks and the street at a Santa Rosa home Monday. The county Water Agency is seeking a 15 percent water usage reduction, but usage has dropped just 9.9 percent in two weeks.

Water Agency officials said late Monday that two weeks' worth of water conservation has produced a meager 9.9 percent decrease in water consumption, far short of the 15 percent decrease ordered by the state Water Resources Control Board.

"Our agency is having a difficult time operating the Russian River system due to regulations and diversions outside the agency's control and service area," said county supervisor Tim Smith, who also serves as a Water Agency board director.

The Water Agency says it lacks regulatory authority to do much more than cajole conservation out of private agriculture or the municipalities that supply water to about 600,000 residents in Sonoma and northern Marin counties.

So it wants the state Water Resources Control Board to help bring government and agriculture in line. Last week, state water board officials said they were prepared to take measures to enforce the order, even ordering the shutdown of water pumps.

Because the Water Agency's call for help was not released until late Monday, state officials did not have the opportunity to review it.

Here's what the Water Agency wants:

Grape growers in the Russian River, Alexander Valley and Dry Creek Valley to band together and cooperate on water diversions from the river.

Agency officials concede they are releasing water from the dam at Lake Mendocino with nothing but a guess as to how much agriculture – mostly vineyards – is sucking out downstream.

"No one benefits if stored water is lost to the ocean," said Bob Anderson, executive director of United Winegrowers of Sonoma County. "Hopefully we can find a way to cooperatively succeed in threading the needle."

The National Marine Fisheries Service not to interfere with the release of more water from Lake Sonoma.

Flow along the Dry Creek tributary into the Russian River is a focus of the federal agency, which is considering restrictions because too much water in summer harms coho salmon, an endangered species. A creek restoration plan from Marine Fisheries would help, Water Agency officials said.

Federal officials had not yet had the opportunity to review the request.

Cities – like Healdsburg and Cloverdale – that draw water from the Russian River, but don't get it from the Water Agency, to increase conservation efforts.

Cities that do get water from the Water Agency – like Santa Rosa and Rohnert Park – to undertake greater conservation that aims at the 15 percent reduction.

Agency officials said they are working with their contractors to develop accurate measures of water allocations so that cities and districts will know precisely how they are faring individually.

Smith said the Water Agency "is facing difficulties implementing the state-mandated 15 percent decrease in water use since 2004." He and other county officials have complained that the lack of water is, in part, a "regulatory drought" caused by restrictions imposed by federal agency rules on endangered species and by state-mandated reductions in water releases from Lake Mendocino.

All 116 pages of the Water Agency's "work plan" for dealing with the state-mandated 15 percent water-use decrease can be reviewed at [www.sonomacountywater.org](http://www.sonomacountywater.org).

You can reach Staff Writer Bleys W. Rose at 521-5431 or [bleys.rose@pressdemocrat.com](mailto:bleys.rose@pressdemocrat.com).

## **Tipping off excess use**

**As part of conservation effort, cities, districts follow up on anonymous reports of overuse**

By BOB NORBERG  
THE PRESS DEMOCRAT

Published: Thursday, July 19, 2007 at 4:30 a.m.  
Last Modified: Wednesday, July 18, 2007 at 9:00 p.m.

The water flowing across Farmers Lane in Santa Rosa from a restaurant overwatering its lawn irked Kevin Howe, who is letting his lawn go toward shades of brown.

### **WHO TO CALL**

Water waste hot lines:

Santa Rosa 543-3985

Petaluma 778-4507

Rohnert Park 547-1968

Windsor 838-1006

Sonoma 933-2247

Cotati 523-1010

Valley of the Moon Water District 996-1037

Sonoma County Water Agency 547-1933

Marin Municipal Water District (415) 945-1520

North Marin Water District (415) 897-4133

"They water the grass so much there, in the strip in the parking lot, the water comes across the road. It is like a lake; it is totally out of control," said Howe, a Santa Rosa resident.

So Howe became one of the dozens of Sonoma County residents who each day are tipping off cities and water districts to water waste.

"We are up to 30 calls a day," said Dan Muelrath, Santa Rosa's water conservation director. "They are calling in everything from commercial sites to homes. A lot is just excess water use, watering too long or not watering at the appropriate time."

Howe wouldn't identify the restaurant but said the city had been in contact and believed the problem was being solved.

Reports from the public are an important part of the Sonoma County Water Agency's program to cut the amount of water it takes from the Russian River.

"It is one of our top 10 conservation tips, to report water waste," Brad Sherwood, a Water Agency spokesman, said Wednesday. "When you have the city of Santa Rosa, which has staff that will go out and investigate, it helps tremendously."

The Water Agency, the cities and water districts have set up hot lines for anonymous tips, and the Water Agency also is planning to put a tip form on its Web site, Sherwood said.

"It puts people on notice that everyone is paying attention, it is a community effort, so water wisely," Sherwood said, who called the tip program "very helpful, very helpful."

The Water Agency has been ordered by the state Water Resources Control Board to reduce the amount of water it takes from the Russian River by 15 percent from July 1 to Oct. 28, compared with the same period of 2004.

The savings will be pooled in Lake Mendocino for release in the fall for the chinook salmon run.

In response to the state order, the Water Agency has called for conservation efforts by its major water buyers, which include the cities of Windsor, Santa Rosa, Petaluma, Rohnert Park, Cotati and Sonoma and the Valley of the Moon and North Marin water districts.

In the first two weeks of the mandatory program, however, the savings have only amounted to 9.9 percent.

Outdoor watering is one of the primary areas for conservation.

"That is where a lot of the inefficiencies lay," Muelrath said. "Irrigation systems and outdoor water systems is where we can get the additional savings."

Muelrath said city workers try to follow up on tips and investigate as soon as possible to get the owner to fix the problem.

Windsor officials said tips are followed up by the public works department, but the program only got under way last week.

"It is very helpful for us; we don't always see what happens next door to you," said Cheryl Godwin, a Windsor senior analyst. "It is helpful to know where the problems are to educate people. It really will take us all working together to get the savings we need and reduce waste."

For the tipsters themselves, like Howe, who have front-loading washers and are cutting the amount of water they are using on their lawns, there is a matter of fairness.

"It irritated me," Howe said. "We are all trying to save water, and they are not paying attention at all."

You can reach Staff Writer Bob Norberg at 521-5206 or [bob.norberg@pressdemocrat.com](mailto:bob.norberg@pressdemocrat.com).

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