Appendix 8C

# Screening Analysis

# Appendix 8C
# Screening Analysis

## 8C.1 Constituent Screening Analysis

A constituent "screening analysis" was performed as the first portion of the overall analysis of water quality effects of implementing the Alternatives. As with all analyses of water quality effects, this screening analysis was conducted relative to the effect thresholds of significance for implementation of the Alternatives. First, the screening analysis determined which constituents had no potential to exceed the thresholds of significance and, thus, did not warrant further assessment to satisfy CEQA and NEPA. Then, this analysis identified a list of "constituents of concern" that were further analyzed as part of assessing their potential water quality related impacts under the Alternatives. For these constituents, it was further determined which ones could be assessed quantitatively, based on data availability and the behavior of the constituent in the aquatic environment, and which ones, based on these same considerations, needed to be assessed qualitatively.

Constituents assessed were identified based on the following considerations:

- Availability of historical monitoring data
- Constituents having adopted Federal water quality criteria or State water quality objectives
- Constituents on State's U.S. EPA approved 2010 Clean Water Act Section 303(d) list in the Delta
- Constituents identified in public scoping comments
- Constituents deserving assessment based on professional judgment

This screening analysis evaluated 182 water quality constituents/parameters. This appendix describes the sequence of steps used to conduct the screening analysis. The initial steps included data acquisition, site selection, naming consistency and data cleanup. These initial steps were taken to characterize the water quality of the three major source waters to the Delta (i.e., Sacramento River (SAC), San Joaquin River (SJR), and San Francisco Bay (BAY)); (see Data Locations). A screening algorithm was developed to assess water quality constituents present in source waters according to the criteria listed above to determine "constituents of concern" via a series of decision steps. This appendix concludes with an identification of the constituents among the initial 182 assessed that received adequate analysis, for the purposes of the EIS/EIR, via this screening analysis vs. those that were carried forward for more detailed alternative-by-alternative analyses because of the potential for adverse changes for those constituents/parameters under various alternatives, relative to Existing Conditions and the No Action Alternative. A description of the QA/QC procedures utilized is also provided.

### 8C.1.1 Data Sources

This section describes sources for data used in the screening analysis. Water quality data in the Delta has been collected by a myriad of public and private organizations. However, for consistency and due to data availability concerns, the input data for the screening analysis was limited to two data sets that were publically available via the web and managed by a public agency (i.e., data from the DWR Water Data Library and the Bay Delta and Tributaries Project [BDAT]).

#### 8C.1.1.1 Data Locations

Location naming conventions varied by data source. Therefore, standardized source water locations and sample locations were assigned; referred to as BDCP Source Water and BDCP Location, respectively. These locations are shown in Table SA-1.

**Table SA-1. BDCP Source Water Locations and Original Dataset Location Names**

| Original Sample Location | Station Code | Data Source | BDCP Location | BDCP Source Water |
|---|---|---|---|---|
| Sacramento River at Chipps Island | D10 | BDAT | Chipps | |
| Sacramento River at Mallard Island | E0B80261551 | DWR | SacR-Mallard | BAY |
| Suisun Bay at Bulls Head nr. Martinez | D6 | BDAT | Suisun-Bulls Head | |
| Sacramento River at Greenes Landing | C3 | BDAT | Greenes | |
| Sacramento River at Greenes Landing | B9D82071327 | DWR | Greenes | |
| Sacramento River at Hood | B9D82211312 | DWR | Hood | |
| Sacramento River at Hood | C3A | BDAT | Hood | SAC |
| Sacramento River at Hood | B9178000 | DWR | Hood | |
| San Joaquin R. near Vernalis | B0702000 | DWR | Vernalis | SJR |
| San Joaquin River near Vernalis | C10 | BDAT | Vernalis | |

Because water quality data for eastside tributaries (EST) (i.e., Mokelumne, Cosumnes, and Calaveras rivers) and within-Delta agricultural return water (AGR) were very limited, and because these source waters generally make up a small (i.e., < 10%) fraction of the water at most interior Delta locations, the screening analysis focused on data compiled for the three major source water locations (SAC, SJR, and BAY). Interior Delta sites were not considered, because modeling performed in support of the Environmental Consequences impact assessments assumed no new sources of water quality constituents and, therefore, water quality concerns are assumed to arise primarily through altered mixing of Delta source waters.

#### 8C.1.1.2 Data QA/Aggregation

Several actions were taken to ensure accurate and consistent treatment of the data between databases.

- Ensured consistent analyte naming
  - Excluded analytes that were not water quality constituents
- Defined whether analyte was total, dissolved, etc.
- Distinguished between detects and non-detects. Used reporting limit for non-detect values. Ensured accurate analyte naming and consistent measurement units
- When both field and lab measurements were made on the same sample (e.g., for conductance), then averaged such measurements later in the screening process

Duplicate data may exist in the aggregated dataset. If the number of data points for a given constituent was close to the qualitative/quantitative threshold, then those data points were examined to identify and remove duplicates, when present.

## 8C.1.2 Data Query

Because modeling performed in support of the Environmental Consequences impact assessments assumed no new sources of water quality constituents, water quality concerns arise primarily through altered mixing of Delta source waters. Thus, the purpose of this section is to analyze the aggregated data by individual source water locations. Therefore, the BDCP versions of the DWR and BDAT databases were queried by major source water locations (i.e., BAY, SAC, and SJR)to analyze and summarize water quality characteristics by source water. These analyses provide a convenient means to review data quality and trends and consist of three major elements: data review, summary statistics, and summary statistics for total criteria. Based on the initial public comments received on the Draft EIR/EIS released in October 2013, further query and evaluation of available data for aluminum and hexavalent chromium was performed. Dissolved and total aluminum data were identified in DWR's data collected during the period of September 2013 through July 2014. No comprehensive source water data from the Sacramento River, San Joaquin River, or Delta were identified for hexavalent chromium.

### 8C.1.2.1 Source Water Summary Data

For each source water, a summary was developed to aggregate fundamental statistical characteristics for each constituent measured at any of the source water locations. In addition, statistical, graphical, and raw data review were employed, as needed, for individual constituents. The source water summary statistics were used as inputs to the Screening Table spreadsheet and included the following items:

- Number of detects
- Number of non-detects
- Number of measurements
- Non-Detect minimum reporting limit
- Maximum detected value
- Overall average of detects
- Overall standard deviation of detects
- Maximum of source water average values

### 8C.1.2.2 Summary for Constituents Based on Sum Totals

Some applicable criteria are for the sum of individual constituents from an entire class of compounds(e.g., polyaromatic hydrocarbons, polychlorinated biphenyls, xylenes, trihalomethanes, and haloaceticacids), Thus, for each source water, a "Summary for Totals" analysis was performed. The Summary for Totals analysis aggregates fundamental statistical characteristics for criteria that represent constituent classes from the individual constituent measurements. These summary statistics are then to be carried forward to the Screening Table spreadsheet and included the following items:

- Number of detects
- Number of non-detects

- Number of measurements
- Non-Detect minimum reporting limit
- Maximum detected value
- Overall average of detects and reporting limit (if non-detect)
- Overall standard deviation of detects and reporting limit (if non-detect)
- Maximum of source water averages

Note that several analysis steps were taken in order to convert the raw data into the statistical summary bulleted above.

- For each sampling event:
  - A detect for any individual constituent counted as a detect for the class
  - All detected values were added together for the total class sum
  - Non-detect for all individual constituents was a non-detect for the class
  - The class minimum reporting was the minimum of the individual constituent reporting limits

## 8C.1.3 Screening Tables

### 8C.1.3.1.1 Overview of Screening Procedures

Constituents of concern that were carried forward for detailed assessment fell into three categories:

- Constituents that were measured in the representative data set and were detected at least once,
- Constituents that were monitored but were never detected in the representative data set, and
- Constituents that were never measured in the representative data set but were, nevertheless, considered for assessment because of public interest.

The procedures for determining whether a constituent in each of these categories was carried forward for detailed assessment are outlined in Table SA-2, Table SA-3, and Table SA-4.

**Table SA-2. Constituents Measured in the Representative Data Set and Detected at Least Once**

| Analysis Question | Answer | Next Step |
|---|---|---|
| 1. Does maximum concentration exceed State or Federal Water Quality Objectives/Water Quality Criteria? | Yes | Quantitative or Qualitative Assessment |
| | No | Continue to Question 2 |
| 2. Is it on State's U.S. EPA approved 2010 Section 303(d) list? | Yes | Quantitative or Qualitative Assessment |
| | No | Continue to Question 3 |
| 3. Is it bioaccumulative? | Yes | Quantitative or Qualitative Assessment |
| | No | Continue to Question 4 |
| 4. Is it of concern based on public scoping? | Yes | Quantitative or Qualitative Assessment |
| | No | Continue to Question 5 |
| 5. Is it of concern based on professional judgment? | Yes | Quantitative or Qualitative Assessment |
| | No | Continue to Question 6 |
| 6. Is it of concern because water quality varies substantially among sources and, thus, the potential for water quality degradation exists as source-fractions change? | Yes | Quantitative or Qualitative Assessment |
| | No | No Further Action |

**Table SA-3. Constituents Analyzed in the Representative Data Set, but Never Detected**

| Analysis Question | Answer | Next Step |
|---|---|---|
| 1. Are data all non-detects and minimum reporting limit is below criteria? | Yes | Not of Concern: No Further Action |
| | No | Continue Screening in Table SA-2 at Question 2 |

**Table SA-4. Constituents Never Measured in the Representative Data Set but Considered for Assessment**

| Analysis Question | Answer | Next Step |
|---|---|---|
| 1. Is there knowledge about potential, relative source contributions for constituent (e.g., endocrine disrupting chemicals from wastewater treatment plant discharges)? | Yes | Qualitative Assessment |
| | No | Continue to Question 2 |
| 2. Is it of concern based on public scoping? | Yes | Qualitative Assessment |
| | No | Continue to Question 3 |
| 3. Is it of concern based on professional judgment? | Yes | Qualitative Assessment |
| | No | No Further Action |

#### 8C.1.3.1.2 Overview of Qualitative versus Quantitative Assessment Determination

For many constituents, lack of adequate, representative data precluded a quantitative assessment. Table SA-2 and Table SA-3 identify the types of constituents that were carried forward for detailed analysis and Table SA-4 identifies which constituents were automatically determined to be assessed qualitatively. For constituents for which at least one data point in the representative data set was a detected value (see Table SA-2), the assessment was either quantitative or qualitative, depending on three factors:

1. Adequacy of data to perform a quantitative assessment,
2. Adequacy of modeling tools, relative to the physical/chemical properties of the constituent, to perform a quantitative assessment, and
3. Professional judgment on the necessity of a quantitative assessment to determine the potential environmental impact.

Available tools were considered appropriate for modeling only those constituents that could be assumed to be conservative (i.e., not transformed into a new constituent or lost as water flows through the system). Constituents of concern that could not be analyzed through quantitative modeling, or for which it was determined that quantitative modeling was not necessary for an environmental impacts determination, were carried forward for qualitative analysis.

The following sub-sections provide greater detail on the steps performed in each table of constituent screening process.

### 8C.1.3.2 Summary of Source Water Data (Step 1)

Screening analysis Step 1 performs three functions: 1) presents summary data for all constituents at each of the three major source water locations; 2) screens constituents with detected values versus all non-detects; and 3) provides the data evaluation to determine whether a quantitative assessment can be performed.

#### 8C.1.3.2.1 Summary Data

The summary data from each of the source water locations includes all constituents and classes of constituents (e.g., trihalomethanes) that have been analyzed in the dataset. In addition to the summary characteristics identified in Section 4.4.2.1 and Section 4.4.2.2, the following were determined across all source water locations.

- Lowest reporting limit
- Maximum detected value
- Maximum of the source water detected averages
- Whether there were any detects at any source water location
- Which step the constituent was carried forward to

#### 8C.1.3.2.2 Screen Detects Versus Non-Detects

Constituents and constituent classes were initially screened and separated into two groups as follows.

- If any detects at any source water location, further screening in Screening Step 2.
- If all non-detects at all source water locations, further screening in Screening Step 3.

#### 8C.1.3.2.3 Quantitative Versus Qualitative Determination

Additionally, to aid in determining whether a quantitative analysis can be performed, the following were determined for each constituent or class of constituents.

- Whether measured at all locations
- Whether there were at least 10 measurements at each location
- Whether there were at least 10 detects at any location
- What was the minimum number of measurements at any location

### 8C.1.3.3 Screen Detected Constituents (Step 2)

Detected constituents were carried forward from screening in Step 1 and evaluated against the following triggers for potential detailed assessment:

- If any of the following four conditions are true, send forward for an evaluation of quantitative versus qualitative assessment in Step 5.
- Determine if maximum detect exceeds minimum applicable criterion
- Determine if constituent is on the U.S. EPA approved 2010 303(d) list
- Determine if constituent is of concern based on professional judgment
- Determine if constituent is of concern based on public comment
- If none of the above are true, then no further consideration.

An additional evaluation was performed for potential water quality degradation (i.e., antidegradation concern) for constituents that do not exceed the criteria. This degradation evaluation conservatively ignores any potential background concentration that could diminish the effect of the source waters (i.e., assumes background concentration is zero). Potential water quality degradation was assessed as follows.

- If maximum detected value exceeds lowest applicable criterion, then the constituent is already being considered for detailed assessment. Thus, not screened for potential water quality degradation.
- If maximum detected value is less than 10% of the criterion, water quality degradation is not possible.
- If maximum detected value is 10% of the criterion, or greater (but less than or equal to the criterion), water quality degradation is possible.
- The same screening was also applied using averages instead of maximum detected values.

#### 8C.1.3.4 Screen Non-detect Constituents (Step 3)

Non-detected constituents were carried forward from screening in Step 1 and evaluated against the following triggers for potential detailed assessment.

- If any of the following three conditions are true, send forward for detailed assessment in Step 6:
- Determine if constituents is on the U.S. EPA approved 2010 303(d) list
- Determine if constituent is of concern based on professional judgment
- Determine if constituent is of concern based on public comment
- If any of the last three are true, send forward for detailed assessment in Screening Step 6.
- If minimum reporting limit exceeds lowest applicable criterion (i.e., are all reporting limits above criteria), send constituent forward for further evaluation in Step 4.
- If none of the above are true, no further consideration.

#### 8C.1.3.5 Further Screen Non-detects and Non-measured Constituents (Step 4)

Non-detect constituents carried forward from screening in Step 3 and additional constituents of concern not analyzed for in the dataset (e.g., pyrethroids and dioxins) were assessed against the following triggers for potential detailed assessment.

- If any of the following four conditions are true, send forward for detailed assessment in Step 6.
- Determine whether there is knowledge about potential, relative source contributions
- Determine if constituents is on the U.S. EPA approved 2010 303(d) list
- Determine if constituent is of concern based on professional judgment
- Determine if constituent is of concern based on public comment
- If none of the above are true, then no further consideration

Note that constituents screened from Step 2 have already been screened for the last three bullets.

#### 8C.1.3.6 Determination of Quantitative versus Qualitative Assessment (Step 5)

Detected constituents carried forward from screening in Step 2 were evaluated to determine whether a quantitative assessment could be performed. If the following three conditions are all met, then the constituent is carried forward to Step 6 for quantitative assessment.

- Determine if data quantity is sufficient to perform a quantitative assessment
- Determine if adequate modeling tools, relative to the physical/chemical properties of the constituent, exist to perform a quantitative assessment in the Delta
- Determine if a quantitative assessment is necessary to determine the potential environmental impact (e.g., when all source water concentrations are similar, then the mixed condition is predictable without quantitative modeling)

If none of the above conditions are met, then the constituent is carried forward to Step 6 for qualitative assessment.

### 8C.1.3.7 Summary of Constituents for Detailed Assessment (Step 6)

All constituents carried forward from screening in Step 3, Step 4 and/or Step 5 are presented in Step 6 and are summarized by constituent, fraction, and qualitative or quantitative assessment.

- The need for quantitative determinations were made in Step 5.
- The need for qualitative determinations were made in Step 3, Step 4, and Step 5.

Step 6 also identifies which section of the Environmental Consequences chapter discusses each constituent.

### 8C.1.3.8 Screening Decisions Inputs

This section identifies information, other than source water data, that was used in the screening process to make decisions on the constituent assessments.

#### 8C.1.3.8.1 Criteria Sheet

To screen constituents and evaluate potential water quality degradation, a table of criteria and objectives applicable to the Sacramento-San Joaquin Delta and source waters was developed from the following sources.

- U.S. EPA approved California 2010 303(d) list for constituents in the Delta
- California Toxics Rule
- Freshwater and/or saltwater aquatic life criteria
- Human health criteria
- Region 5 Basin Plan (Sacramento-San Joaquin River Basins) objectives applicable at boundary locations or in Delta.
- Region 2 Basin Plan (San Francisco Bay) objectives except for: Marine water criteria.
- California drinking water maximum contaminant levels.

From the table of criteria and objectives, the minimum applicable criterion was identified for each constituent.

#### 8C.1.3.8.2 Other

The following tables of constituents were prepared to further assess constituents.

- Constituents of concern based on professional judgment
- Constituents of concern based on public scoping comments for the Bay-Delta Conservation Plan
- Constituents for which adequate Delta modeling tools were available
- Constituents for which quantitative modeling was not needed for impact assessments

## 8C.1.4 Data/Screening QC

The purpose of this section is to evaluate the accuracy and relevancy of the decisions and calculations performed during the Constituent Screening Analysis. This review is broken into the following sections.

- Data gathering
- Data compilations
- Screening process
- Sensitivity analysis
- Veracity check on screening results
- Constituent evaluations

### 8C.1.4.1 Data Gathering

For data gathering, the following items were performed.

- Evaluate decision on whether additional data/locations should be considered.
- Check that all data available at chosen stations was used.
- Make decisions about representativeness of datasets (e.g., eliminated old metals data with poor detection limit).

### 8C.1.4.2 Data Compilation

For data compilation, the following items were performed.

- Evaluate decisions on constituents to exclude, aggregation of constituent names, detects/non-detects, and determination of fraction.
- Evaluate whether measured values reported are likely to occur.

### 8C.1.4.3 Screening Process

For the screening process, the following items were performed.

- Ensure formulas are correct.
- Ensure most the up-to-date data has been carried through from databases through the screening process.
- Review accuracy and relevancy of:
    - Criteria (reviewed for drinking water source rules and added TOC)
    - Professional judgment concerns
    - Public scoping concerns
    - Adequate Delta modeling tools
    - Modeling needs for impact assessments

#### 8C.1.4.4 Sensitivity Analysis

The sensitivity analysis was focused on the effect of the quantitative analysis parameters. Specifically whether the constituents that were chosen for quantitative analysis changed substantially when the screening parameters were increased or decreased for: 1) the minimum number of measurements required at each source water location; and 2) the minimum number of detects required at any source water location.

For all constituents that were detected, determination of quantitative/qualitative was initially determined based on whether there were greater than ten (>10) measurements at all three locations and whether there were greater than ten (>10) detects at a single location.

These numbers were varied from 6–10 to determine if additional constituents would have a possibility of being quantitative. The sensitivity analysis resulted in the following observations:

- Decreasing the thresholds to nine would trigger quantitative analysis of iron and manganese. Further threshold reductions to six would trigger chromium.
- Review of chromium data indicated very poor quality. For example all “detections” occurred for values at the reporting limit, which was always 5 or 10 μg/L.

#### 8C.1.4.5 Veracity Check on Screening Results

As a check on the screening results, the following items were performed.

- For constituents carried forward to Step 6, reviewed data for outliers/aberrant data and reviewed applicable criteria
    - Reviewed ES/AE Section and added constituents, as needed, to professional judgment table to ensure constituents not analyzed, but of concern, were carried forward during Step 4
    - Reviewed results and evaluated whether additional data is needed or any changes to the process are needed

#### 8C.1.4.6 Constituent Evaluations

For constituent evaluations, the following items were performed.

- Compare to ES/AE Section to determine if quantitative evaluation is warranted.
- Determine if both total and dissolved need to be evaluated for a given constituent.
- Made the following overriding findings:
- If qualitative assessment and criteria is for group, do not need to discuss individual constituents.
- If qualitative assessment and criteria are for individual constituents, discuss as group and individual constituents, as needed.

### 8C.1.5 Constituents Receiving Further Assessment in Screening Appendix

Some of the constituents in Step 6 that were determined, through the Screening Analysis, to warrant further assessment, are assessed in the sections below. For these constituents, specific factors (e.g., insufficient data characterizing source water concentrations) make a full, detailed alternative-specific analysis within the Environmental Consequences section unnecessary. Nevertheless, these constituents did come through the initial screening analysis as requiring further assessment and thus are assessed below, relative to the assessment thresholds of significance. As discussed further below, none of these constituents are anticipated to exceed the assessment thresholds of significance, nor are there anticipated to be any water quality related adverse effects to beneficial uses of water bodies within the affected environment under any of the BDCP alternatives, relative to Existing Conditions or (for Alternatives 1A–9) the No Action Alternative.

### 8C.1.5.1 Asbestos, Chrysotile

Natural weathering of serpentine rock results in chrysotile asbestos fibers in surface waters originating in the western slopes of the Sierra Nevada and in the coastal mountains of California. Individual fibers are 0.03–0.04 μm in diameter, and typically 0.1 to 3.0 μm long (Bales et al. 1984:66). The primary MCL for chysotile asbestos is 7 million fibers per liter (MFL). The primary health concern is that some people who drink water containing asbestos in excess of the MCL over many years may have an increased risk of developing benign intestinal polyps (U.S. EPA 2012a). It is not clear whether levels in the three major source waters are substantially different. Although 14 data points existed for the Sacramento (average 794 MFL, standard deviation 882 MFL) and San Joaquin (average 1153 MFL, standard deviation 760 MFL) Rivers, there were only 2 data points for San Francisco Bay(240 MFL and 3490 MFL) (see Step 1, Table SA-6). Nevertheless, it is clear that all the source waters to the Delta contain chrysotile asbestos at levels far above the MCL, and that, given the variability in the data, at any given time, any of the major source waters may be contributing more asbestos to the Delta than the others. Drinking water treatment technologies, including coagulation/flocculation and filtration, are effective at removing asbestos from drinking water. In a study conducted in 1984, fiber removal in five California drinking water plants was >90% for plants whose influent levels of asbestos were above the MCL (i.e., average of between 500–600 MFL), and the average effluent level was below the MCL (Bales et al. 1984:73). The Delta is not 303(d) listed for chrysotile asbestos and thus no beneficial use impairment due to its current levels is occurring.

Given the lack of clear variability in asbestos levels among source waters to the Delta, it is not anticipated that levels of chrysotile asbestos will be substantially affected by the alternatives upstream of the Delta, within the Delta, or in the SWP and CVP Service Area, relative to Existing Conditions and (for Alternatives 1A–9) the No Action Alternative. Furthermore, given that drinking water treatment plants are effective at removing high levels of chrysotile asbestos with currently used technologies, any changes in asbestos levels that may occur in the water bodies of the affected environment under the alternatives would not be of frequency, magnitude and geographic extent that would adversely affect any beneficial uses or substantially degrade the quality of these water bodies on a long-term average basis, with regards to asbestos.

### 8C.1.5.2 Color

Color in water has a secondary MCL of 15 color units. Secondary MCLs are established only as guidelines to assist public water systems in managing their drinking water for aesthetic considerations. Color is not considered to present a risk to human health or aquatic life at or above the secondary MCL. Color in natural waters may be indicative of dissolved organic material, high disinfectant demand, and the potential for the production of excess amounts of disinfection byproducts. Inorganic contaminants such as metals are also common causes of color. To the degree that color as a constituent is indicative of other, constituent-specific concerns, such as dissolved organic carbon and its potential to cause disinfection byproducts, or metals at high concentrations, these considerations are addressed under the Environmental Consequences assessments for these specific constituents. To the degree that color itself is a concern from an aesthetic standpoint, conventional drinking water treatment removes many of the constituents that cause high color levels in water. Coagulation/flocculation and filtration remove metals like iron, manganese and zinc. Aeration removes iron and manganese. Granular activated carbon removes most of the contaminants which cause color (U.S. EPA 2012b). Color in the three major source waters to the Delta does not vary considerably (see Step 1, Table SA-6). The average in the Sacramento River at Freeport/Greene's Landing is approximately 22 units, while San Francisco Bay at Martinez and San Joaquin River at Vernalis average approximately 30 units. The standard deviations at these locations are 22–37 units, indicating that substantial variability exists at all three locations, and no specific source waters is consistently highest in color. The Delta is not 303(d) listed for color and thus no beneficial use impairment due to its current levels is occurring.

Based on the discussion above, it is not anticipated that color levels will be substantially affected by the alternatives upstream of the Delta, within the Delta, or in the SWP and CVP Service Area, relative to Existing Conditions, and (for Alternatives 1A–9) the No Action Alternative. It is anticipated that any negligible changes in color that may occur in the water bodies of the affected environment under the alternatives would not be of frequency, magnitude and geographic extent that would adversely affect any beneficial uses or substantially degrade the quality of these water bodies on a long-term average basis, with regards to color.

### 8C.1.5.3 Dioxins and Furans

Dioxins and furans are a class of organic compounds composed of many congeners – compounds of similar chemical structure but slightly different chemical formula. There are hundreds of these compounds, which can be grouped as polychlorinated dibenzo-p-dioxins (PCDD) and polychlorinated dibenzofurans (PCDF) and generally termed dioxins and furans. The compound 2,3,7,8-tetrachlordibenzo-p-dioxin (TCDD) is the most toxic of these compounds, and consequently the toxicity of the many other related compounds are expressed as "TCDD equivalents. "Dioxin and furan compounds are created unintentionally in chlorine-consuming manufacturing processes and through the combustion of chlorine containing organic compounds. Forest fires and volcanoes can contribute these compounds to the atmosphere as well as certain human activities (e.g., incineration of municipal solid waste, metal smelting, coal fired power plants, wood burning, and chlorine bleaching of wood pulp).

Dioxin and furan compounds are extremely persistent in the environment and once released to the environment can cycle through various phases including water, sediment, soil, air, and biota. Owing to their stability, lipophilicity (i.e., affinity for accumulation in the fats of animals), and slow biodegradation rates, dioxin and furan compounds can bioaccumulate in the tissues of exposed organisms. Although dioxin and furan concentrations in water may be very low, the process of bioaccumulation in organisms presents a human health concern, particularly for pregnant and nursing women that consume fish and shellfish that have concentrated dioxins and furans in their tissues.

Sensitive receptors that have the potential to be affected by dioxin and furan compounds are consumers of drinking water (i.e., the Municipal and Domestic Supply beneficial use), consumers of fish and shellfish (Commercial and Sport Fishing, Shellfish Harvesting), aquatic organisms (Cold, Warm, and Estuarine water fisheries), wildlife (Wildlife Habitat) and threatened and endangered species. Consumption of drinking water or organisms contaminated with dioxins and furans are generally of greatest concern.

Applicable dioxin/furan objectives for the affected environment are as follows: California Toxics Rule: human health based on consumption of water and organisms (TCDD equivalents) of 0.000000013 μg/L, human health based on consumption of organisms only (TCDD equivalents) of 0.000000014 μg/L; drinking water MCL (TCDD equivalents) of 0.00003 μg/L. The entire San Francisco Bay was Clean Water Act Section 303(d) listed for dioxin and furan compounds in 1999, due to an OEHHA fish consumption advisory being issued in San Francisco Bay. The 303(d) listing was later extended into the Delta due to migration of striped bass and sturgeon through the Bay and into the Delta. Stormwater runoff is the primary source of dioxins and furans in the Bay. Because of roughly equivalent concentrations in runoff around the Bay, atmospheric deposition is believed to be the primary source. Direct atmospheric deposition onto water is the only other major source. A study conducted in 2000 showed that 50–80% of the dioxin TCDD in fish tissue of Bay is due to dioxin-like PCBs (U.S. EPA 2012c). PCBs are assessed under the PCBs section of this Screening Analysis. Because atmospheric deposition is the primary source of dioxins and furans and the magnitude of this source is not affected by the alternatives, and because the 303(d) listing in San Francisco Bay and the Delta is related to fish tissue concentrations and not water column dioxin and furan concentrations, construction, operations and maintenance, and habitat restoration actions associated with implementing the alternatives are not anticipated to substantially affect concentrations of dioxins and furans upstream of the Delta, within the Delta, or in the SWP and CVP Service Area, relative to Existing Conditions and (for Alternatives 1A–9) the No Action Alternative.

Segments of the Stockton Deep Water Ship Canal at the Port of Stockton also are Clean Water Act Section 303(d) listed for dioxin and furan compounds. These listings are associated with high dioxin and furan concentrations in sediment that were localized and were traced to a point source, a wood treatment facility (McCormick and Baxter) immediately south of Mormon Slough (Hayward 1996:30). The facility is now a Superfund site and has undergone substantial cleanup efforts. EPA completed Phase I of the sediment remedy (bank stabilization) in 2003 and completed Phase II (placement of a sand cap over the contaminated sediment) in 2006 (U.S. EPA 2012d). Because of these actions, it is unlikely that the contaminated sediment poses any risk to the Stockton Deep Water Ship Channel or the San Joaquin River any longer. Even if some risk still remained, actions associated with the alternatives are not anticipated to substantially affect sediment or water column concentrations of dioxins and furans within these water bodies, relative to Existing Conditions and (for Alternatives 1A–9) the No Action Alternative.

Any negligible changes in dioxin and furan concentrations that may occur in the water bodies of the affected environment under the alternatives would not be of frequency, magnitude and geographic extent that would adversely affect any beneficial uses or substantially degrade the quality of these water bodies on a long-term average basis, with regards to dioxins and furans, nor would the potential negligible changes in the Bay-Delta region that may occur under the alternatives make current 303(d) listed impairments measurably worse.

#### 8C.1.5.4 Endocrine Disrupting Chemicals and Constituents of Emerging Concern

The World Health Organization (WHO) defines an endocrine disrupting compound (EDC) as "… an exogenous substance or mixture that alters function(s) of the endocrine system and consequently causes adverse health effects in an intact organism, or its progeny, or (sub)populations" (2002).

EDCs block, mimic, stimulate, or inhibit the production of natural hormones, disrupting the endocrine system's natural functions. Endocrine disruption may be described as a functional change that may lead to adverse effects to reproduction, metabolism, growth and development, and specific tissue functions, not necessarily a toxicological end-point.

Examples of EDCs include natural plant and animal steroid hormones, metals (e.g., arsenic, cadmium, lead, and mercury), dioxins, PAHs, pesticides, pharmaceuticals and personal care products (PPCPs), and PCBs. Sources of anthropogenic EDCs include wastewater treatment plants, private septic systems, urban stormwater runoff, industrial effluents, landfill leachates, discharges from fish hatcheries and dairy facilities, runoff from agricultural fields and livestock enclosures, and land amended with biosolids or manure. Constituents of emerging concern (CECs) include the following classes of chemicals: perfluoranated compounds (e.g., PFOS, PFOA), polybrominated diphenyl ethers (PBDEs), PPCPs, and phthalates. These chemicals are generally found in such low concentrations in the environment that only recently have analytical tools been developed to detect and quantify these concentrations.

In general, by definition, CECs do not have state or federally adopted criteria of any kind (i.e., there are no CTR/NTR standards, Region 5 and Region 2 Basin Plan objectives, Bay-Delta Water Quality Control Plan objectives, State or Federal drinking water standards). In general, all EDCs for which adopted criteria exist (e.g., selected pesticides, metals, and PAHs) are analyzed in other sections of the water quality chapter. This section addresses CECs and those EDCs not covered elsewhere, and, therefore, within this section, there are no adopted criteria which can be used for the assessment. No water bodies in the affected environment are on the State's Clean Water Act Section 303(d) list as impaired by these constituents, since no adopted criteria exist. EDCs and CECs have a broad range of physical and chemical properties that dictate their fate and transport in the environment. Depending on the specific chemical, key properties such as degradation rates, solubility, and partitioning coefficients may vary from very low to very high.

Lavado et al. (2009:1) collected 101 samples from 16 locations throughout the Central Valley at areas impacted by agriculture, and analyzed the samples using bioassays that measure total estrogenic activity, as well as steroid hormones and nonionic detergents and their metabolites. There were infrequent detections of low concentrations of the trace organic compounds, and the concentrations of compounds frequently associated with feminization effects on fish were far below thresholds for feminization of sensitive species. Estrogenic activity was definitively detected and confirmed at two sampling sites, including the Sacramento River at Walnut Grove. These samples were subjected to fractionation to attempt to determine compounds responsible for the estrogenic activity, and fractions were analyzed for numerous pharmaceuticals, pesticides, and potential endocrine disruptors. However, none of the compounds analyzed for in the study could explain the estrogenic activity that was observed.

Very little other data exists to characterize concentrations of EDCs and CECs upstream of the Delta. However, it is anticipated that concentrations of EDCs and CECs in Shasta, Oroville, and Folsom Reservoirs are low because the sources (identified above) of the majority of these constituents are not widely found in the watersheds of these reservoirs. Some of the sources identified above are found with increasing distance downstream of the reservoirs, so selected EDCs and CECs are likely discharged to the Sacramento, Feather, and American Rivers, as well as the San Joaquin River. Altered reservoir release schedules under the Alternatives, relative to Existing Conditions and (for Alternatives 1A–9) the No Action Alternative may affect dilution of these constituents, but because projected flows are within the range of historic operations, long-term average concentrations of

EDCs and CECs are expected to change negligibly, if at all, due to dilution in rivers upstream of the Delta. Increasing development upstream of the Delta in the LLT may increase the mass of EDCs and CECs discharged from the sources identified above to the Sacramento, Feather, and American Rivers, relative to Existing Conditions. Although a small amount of data exist for CECs in Delta source waters (e.g., the Sacramento and San Joaquin Rivers), there is insufficient data to determine relative loading of CECs/EDCs among the primary source waters to the Delta.

Because data on EDC and CEC concentrations in rivers upstream of the Delta (Delta source waters) and the Delta are sparse or nonexistent, and because environmental and human health endpoints are not well defined, it is not possible to readily estimate with any certainty the magnitude of changes of EDC and CEC concentrations, and their associated environmental effects, due to increased development and altered SWP and CVP operations under the alternatives in the LLT, relative to Existing Conditions. Hence, no further assessment or effect determinations can be made for EDCs and CECs with regards to implementation of the BDCP alternatives.

### 8C.1.5.5 PAHs (Polycyclic aromatic hydrocarbons)

Polycyclic aromatic hydrocarbons (PAHs) are a class of organic compounds that occur in many natural products such as coal, tar, and oil or are incidentally formed as a combustion byproduct of fossil fuels and biomass. PAHs have limited industrial utility and as such largely enter the environment by natural means such as from volcanoes and forest fires, or incidental to other human related combustion activities such as wood and fossil fuel burning. Releases of PAH to the atmosphere from the combustion of fossil fuels and biomass can eventually settle to the ground throughout a watershed and ultimately enter waterways through stormwater runoff. Hundreds of PAH compounds exist, with naphthalene and benzo(a)pyrene being common.

Sensitive receptors that have the potential to be affected by PAHs are consumers of drinking water (i.e., the Municipal and Domestic Supply beneficial use), consumers of fish and shellfish (Commercial and Sport Fishing, Shellfish Harvesting), aquatic organisms (Cold, Warm, and Estuarine water fisheries), wildlife (Wildlife Habitat) and threatened and endangered species. Consumption of drinking water or organisms contaminated with PAHs is generally of greatest concern.

Applicable PAH objectives for the affected environment are as follows: California Toxics Rule: human health based on consumption of water and organisms for all regulated PAHs of 0.0044 μg/L, human health based on consumption of organisms only for all regulated PAHs of 0.0049 μg/L; drinking water MCL of 0.2 μg/L for benzo(a)pyrene and for the sum of all PAHs. None of the water bodies in the affected environment have been listed as impaired on the state's Clean Water Act section 303(d) list due to PAHs.

PAHs are of special concern due to their ability to bioaccumulate in some aquatic organisms of commercial interest, but this ability to bioaccumulate is organism and PAH specific. Due to their physical and chemical properties, PAHs in water tend to partition to sediments and suspended matter.

Data, both in the form of water concentrations and toxicity testing, is insufficient to draw conclusions of impact based on the water quality criteria for these compounds. Water column measurement data for PAHs in Sacramento, Bay, and San Joaquin source waters contain no detections above analytical reporting limits in the data used for the Screening Analysis, but trace level analytical reporting conducted by the San Francisco Estuary Institute (SFEI 2010) suggest that PAHs are present in the Sacramento and San Joaquin Rivers in the Delta. Data is insufficient to conclude whether source waters contribute substantially different concentrations; however, because the major source of PAHs to waters of the affected environment is believed to be atmospheric deposition (both incident and via stormwater runoff), it is unlikely that the source waters contribute substantially different concentrations of PAHs, and therefore, that concentrations of PAHs will change substantially upstream of the Delta, within the Delta, or in the SWP and CVP Service Area under any of the alternatives relative to Existing Conditions and (for Alternatives 1A-9) the No Action Alternative.

Therefore, it is anticipated that any negligible changes in PAH concentrations that may occur in the water bodies of the affected environment would not be of frequency, magnitude and geographic extent that would adversely affect any beneficial uses or substantially degrade the quality of these water bodies, with regards to PAHs.

### 8C.1.5.6 PCBs (Polychlorinated biphenyls)

Polychlorinated biphenyls (PCBs) are a class of organic compounds composed of many congeners – compounds of similar chemical structure but slightly different chemical formula. As a congener class, there are 209 possible different PCBs. PCBs were used in numerous industrial applications, possibly most notably in transformers as electrical coolants and as hydraulic fluids. PCB manufacture in the United States was discontinued in 1979. Today, PCBs can enter the environment from a variety of sources such as leaking pre-1979 electrical transformers still in use, atmospheric deposition over connected watersheds, and industrial and municipal wastewater discharges.

Sensitive receptors that have the potential to be affected by PCBs are consumers of drinking water (i.e., the Municipal and Domestic Supply beneficial use), consumers of fish and shellfish (Commercial and Sport Fishing, Shellfish Harvesting), aquatic organisms (Cold, Warm, and Estuarine water fisheries), wildlife (Wildlife Habitat) and threatened and endangered species. Consumption of drinking water or organisms contaminated with PCBs is generally of greatest concern.

Applicable PCB objectives for the affected environment are as follows: California Toxics Rule (based on sum of PCBs in seven commercial aroclor product mixtures 1242, 1254, 1221, 1232, 1248, 1260, and 1016) freshwater chronic criterion of 0.014 μg/L, saltwater chronic criterion of 0.03μg/L, and human health (based on consumption of water and organisms) of 0.00017 μg/L; federal and state MCLs based on the sum of PCBs of 0.5 μg/L (as decachlorobiphenyl equivalent). Segments of the Stockton Deep Water Ship Canal at the Port of Stockton as well the western portion and northern portion of the Delta are Clean Water Action Section 303(d) listed for PCBs. Within the affected environment, the California Office of Environmental Health Hazard Assessment (OEHHA) has issued a fish consumption health advisory for the entire Delta and portions of the Sacramento River and American River inhabited by striped bass and sturgeon based on residues of PCBs found in these fish species (OEHAA 2009).

PCBs are extremely stable, and once released to the environment can cycle through various phases including water, sediment, soil, air, and biota. Although sources of loading to the Delta have not been quantified, suspension and transport of contaminated sediments is likely a dominant process. Owing to their stability, lipophilicity (i.e., affinity for accumulation in the fats of animals), and slow biodegradation rates, PCBs can bioaccumulate in the tissues of exposed organisms. Although PCB concentrations in water may be very low, the process of bioaccumulation in organisms presents a human health concern, particularly for pregnant and nursing women that consume fish and shellfish.

A study by deVlaming (2008) indicated that while high concentrations of PCBs can be found in older, fattier fish (e.g., the Sacramento Sucker, which should not be considered an appropriate model for other species because of its high lipid (i.e., fat) content and because it is unpopular for human consumption (p.1,2)) in specific regions of the Delta (north Delta, Sacramento, and Stockton), Delta PCB concentrations are generally below Office of Environmental Health Hazard Assessment (OEHHA) screening values, and generally, PCB levels in fish in the Delta are "neither extensive nor extreme" (p.2,3). The study also suggests that the results indicate that the north Delta may be eligible for 303(d) delisting (p.126).

Data, both in the form of water concentrations and toxicity testing, is insufficient to draw conclusions of impact based on the water quality criteria for these compounds. Water column measurement data for PCB compounds in Sacramento, Bay, and San Joaquin source waters contain no detections above analytical reporting limits in the data used for the Screening Analysis, but trace level analytical reporting conducted by the San Francisco Estuary Institute (SFEI 2010) that achieves extremely low detection limits suggests that PCBs are present in the Sacramento and San Joaquin Rivers in the Delta.

Leatherbarrow et al. (2005) found that PCB concentrations in Delta outflow at Mallard Island ranged from 200 to 6,700 pg/L during and after major storm events in 2002 and 2003. In their study PCB concentrations at Mallard Island fluctuated with tide, with highest PCB concentrations associated with flood tide (i.e., Bay water influenced). This observation was consistent with their hypothesis that legacy contaminants resuspended from the Bay and transported into the west Delta on a flood tide contain higher concentrations of PCBs than riverine suspended sediment being transported from the Delta into the Bay. Furthermore, the mixture of PCBs in riverine suspended sediment is indicative of stormwater runoff of relatively recent atmospherically deposited PCBs rather than resuspension of PCBs deposited in the Delta decades earlier.

It is not known whether sediment transported from the Bay into the Delta in this manner remains in the Delta, or if it is flushed back out into the Bay during storm events. It is also not possible at this time to accurately model sediment resuspension and subsequent transport in this area of the Bay-Delta. Even so, if these dynamics were to change under the alternatives, it is not possible to predict how bioaccumulation of PCBs in the Delta would be altered, if at all. Many of the larger fish that bioaccumulate PCBs to problematic levels migrate through the San Francisco Bay and the Delta, and therefore, would likely not experience substantially different bioaccumulation if distribution of sediment high in PCBs were to change somewhat under the alternatives. Finally, because PCBs are no longer in production, the 2008 TMDL for PCBs in San Francisco Bay states that PCBs are expected to attenuate naturally and be lost through outflow from the Golden Gate (SFBRWQCB 2008:A-2).

Based on the discussion above, any changes in PCB concentrations in water or sediment that may occur upstream of the Delta, within the Delta, or in the SWP and CVP Service Area would not be of frequency, magnitude and geographic extent that would adversely affect any beneficial uses or substantially degrade the quality of the water bodies within the affected environment, with regards to PCBs.

#### 8C.1.5.7 pH

The pH scale measures how acidic or basic a substance is. It ranges from 0 to 14. A pH of 7 is neutral. A pH less than 7 is acidic, and a pH greater than 7 is basic. Each integer pH unit below 7 is ten times more acidic than the next higher value. The same holds true for pH values above 7, each of which is ten times more alkaline (basic) than the next lower whole value. Pure water is neutral, with a pH of 7.0. When chemicals are mixed with water, the mixture can become either acidic or basic.

Natural waters typically have a pH of between 6 and 9. Pure rain water has a pH of 5.6, because it contains carbonic acid as a result of carbon dioxide from the atmosphere. The Region 2 and Region 5 Basin Plans contain pH objectives that state that pH shall not be depressed below 6.5 or above 8.5.

Because pH is a fundamental property of water, it affects the chemistry of numerous other constituents within the water, and thus, in addition to having potential direct effects on beneficial uses (such as municipal and domestic water supply and aquatic organisms), can also affect beneficial uses indirectly by altering the chemistry and toxicity of other constituents in the water.

Within the affected environment, pH is typically between 6.5 and 8.5. The pH within the affected environment is controlled primarily by natural factors, such as alkalinity from natural weathering of minerals and carbon dioxide concentrations controlled by algae and bacterial respiration. Figure 8C-1 shows exceedance probabilities of historical pH data from 1975 to 2009 in the Sacramento River at Freeport/Greene's Landing, the San Joaquin River at Vernalis, and San Francisco Bay at Martinez. The data indicate that the Sacramento River and San Francisco Bay are within the Basin Blan objective range of 6.5 to 8.5>95% of the time, while the San Joaquin River is between the limits >90% of the time. As water moves from these locations to areas within the Delta, pH changes as a result of natural factors, and therefore the pH at any given location within the Delta may have no correlation to the source waters that contribute water to that location. Given this, and given that the alternatives do not include components that would directly depress or elevate pH, it is not expected that pH would change substantially upstream of the Delta, within the Delta, or in the SWP and CVP Service Area under the alternatives, relative to Existing Conditions and (for Alternatives 1A–9)the No Action Alternative. Any negligible changes in pH that may occur in the water bodies of the affected environment would not be of frequency, magnitude and geographic extent that would adversely affect any beneficial uses or substantially degrade the quality of these water bodies, with regards to pH.

### 8C.1.5.8 Sulfate

Sulfate is an ion that is generally present at low concentrations in freshwater bodies; however, sulfate is a major anion in seawater at about 2,700 mg/L (Hem 1985:7). On a concentration basis, pure sea water has a ratio of sulfate to chloride that remains rather constant. Sources in the project area may also include atmospheric sources, natural weathering of rocks and soil, fertilizer runoff, wastewater effluent, and acid mine drainage.

The only numerical water quality objective is a recommended 250 mg/L as a secondary maximum contaminant level (SMCL) and human health standard contained in Title 22 of the California Code of Regulations, Section 64449 Section 64449 provides sulfate SMCL's as a range, with 250 mg/L recommended, 500 mg/L as an upper limit, and 600 mg/L as a temporary maximum limit. The secondary MCL for sulfate is incorporated by reference in the Region 2 and 5 Basin Plans, and is thus applicable to all surface waters in the affected environment that have the municipal and domestic supply beneficial use designation. None of the water bodies in the affected environment have been listed as impaired on the state's Clean Water Act section 303(d) list due to elevated sulfate. It should be noted, however, that the lower San Joaquin River is listed as impaired for salt and boron; sulfate has been estimated to comprise about 27% of the total ions contributing to salinity in the San

Joaquin River at Vernalis, comparable to the contribution of chloride (23%) (Table 2-3 in CVRWQCB 2002b).

Because substantial sources of sulfate do not exist upstream of the Delta in the Sacramento River watershed, concentrations of sulfate in this region are low (Table SA-5). Consequently, modified reservoir operations to accommodate greater water demands are expected to have negligible, if any, effects on reservoir and river sulfate concentrations, upstream of the Delta in the Sacramento River. Concentrations of sulfate are considerably higher in the San Joaquin River watershed, but typically well below the lowest 250 mg/L recommended human health criterion. The highest monthly average sulfate concentration was 116 mg/L (February) and the highest monthly 99$^{th}$ percentile concentration was 246 mg/L (February) (Table SA-5). The long term average concentration was 82 mg/L (data from 1986–2009, DWR 2009). Given the discussion above, it is expected that any changes in sulfate concentrations that may occur in the water bodies of the affected environment located upstream of the Delta would not be of frequency, magnitude and geographic extent that would adversely affect any beneficial uses or substantially degrade the quality of these water bodies, with regards to sulfate.

Based on the discussion above and data shown in Table SA-5, the dominant mechanism by which the alternatives could increase sulfate concentrations to levels of concern is seawater intrusion. Increased contribution of water from San Francisco Bay at Delta locations could increase sulfate concentrations substantially. While sulfate concentrations in Bay water are up to approximately 5 times higher than other Delta source waters, chloride concentrations in Bay water are up to approximately 80 times higher than other Delta source waters. Because of this, if seawater intrusion into the Delta were to increase under the alternatives, chloride concentrations would increase to a far greater degree than sulfate concentrations. For surface waters within the Delta, the Bay-Delta WQCP contains chloride objectives for municipal water supply beneficial use protection. Because the municipal beneficial use is protected within the Delta via chloride objectives, and because the primary mechanism by which sulfate concentrations could increase under the alternatives is greater intrusion of seawater (where the ratio of chloride to sulfate is relatively constant), sulfate will not be separately assessed in greater detail within the Delta or downstream in the SWP and CVP Service Area, but rather, the detailed chloride assessment (see Environmental Consequences section of water quality chapter)adequately addresses additional considerations for sulfate as well.

1 **Table SA-5. Source Water Concentrations for Sulfate (mg/L)**

| Source Water | Sacramento River | San Joaquin River[a] | San Francisco Bay[a] | East Side Tributaries | Agriculture within the Delta[a, b] |
|---|---|---|---|---|---|
| Mean (mg/L) | 9 | 53–116 | 73–514 | 3 | 45–173 |
| Minimum (mg/L) | 2 | 8–47 | 1–36 | 0.1 | 1–16 |
| Maximum (mg/L) | 19 | 113–251 | 309–874 | 26 | 186–900 |
| 75th Percentile (mg/L) | 10 | 60–159 | 72–725 | 4 | 42–216 |
| 99th Percentile (mg/L) | 17 | 111–246 | 302–799 | 11 | 182–804 |
| Data Source | DWR | DWR | DWR | USGS | DWR |
| Station(s) | Sac River at Greene's Landing | SJR at Vernalis | Sacramento River at Mallard Island | Mokelumne River and Cosumnes River | footnote |
| Date Range | 1986–1998 | 1986–2009 | 1986–2008 | 1961–1994 | 1986–2004 |
| ND Replaced with RL | No | No | Yes | Yes | Yes |
| Data Omitted | None | Zero values | None | Zero values and methods with detection limits > 100 µg/L | footnote |
| No. of Data Points | 172 | 40–49 | 21–24 | 197 | 22–225 |

[a] Values reported as range of monthly values (minimum monthly–maximum monthly). Trends in monthly average sulfate at these locations suggested a seasonality to concentration.

[b] Values calculated from all agriculture drain data pooled together. All sulfate data from agricultural drains contained in the DWR Water Data Library were placed into a single database.

## TableSA-6. Step 1: All constituents (totaling 182) measured at boundary stations, number of times analyzed and detected, and minimum and maximum vales reported in the data set

| | | | SAC | | | | | | SJR | | | | | | BAY | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Constituent | Fraction | Units | # Detects | # Measured | Non-Detect Min RL | Max Detect | Average | Stdev | # Detects | # Measured | Non-Detect Min RL | Max Detect | Average | Stdev | # Detects | # Measured | Non-Detect Min RL | Max Detect | Average | Stdev | Lowest Min RL | Highest Max Detect | Max of Averages | Detected at any locations? | Carried Forward? |
| 1,1,1,2-Tetrachloroethane | Total | µg/L | 0 | 6 | 0.500 | 0 | 0.500 | 0 | 0 | 33 | 0.500 | 0 | 0.500 | 0 | 0 | 8 | 0.500 | 0 | 0.500 | 0 | 0.500 | 0 | 0.500 | No | Step 3 |
| 1,1,1-Trichloroethane | Total | µg/L | 0 | 6 | 0.500 | 0 | 0.500 | 0 | 0 | 33 | 0.500 | 0 | 0.500 | 0 | 0 | 8 | 0.500 | 0 | 0.500 | 0 | 0.500 | 0 | 0.500 | No | Step 3 |
| 1,1,2,2-Tetrachloroethane | Total | µg/L | 0 | 6 | 0.500 | 0 | 0.500 | 0 | 0 | 33 | 0.500 | 0 | 0.500 | 0 | 0 | 8 | 0.500 | 0 | 0.500 | 0 | 0.500 | 0 | 0.500 | No | Step 3 |
| 1,1,2-Trichloroethane | Total | µg/L | 0 | 6 | 0.500 | 0 | 0.500 | 0 | 0 | 33 | 0.500 | 0 | 0.500 | 0 | 0 | 8 | 0.500 | 0 | 0.500 | 0 | 0.500 | 0 | 0.500 | No | Step 3 |
| 1,1-Dichloroethane | Total | µg/L | 0 | 6 | 0.500 | 0 | 0.500 | 0 | 0 | 33 | 0.500 | 0 | 0.500 | 0 | 0 | 8 | 0.500 | 0 | 0.500 | 0 | 0.500 | 0 | 0.500 | No | Step 3 |
| 1,1-Dichloroethene | Total | µg/L | 0 | 6 | 0.500 | 0 | 0.500 | 0 | 0 | 33 | 0.500 | 0 | 0.500 | 0 | 0 | 8 | 0.500 | 0 | 0.500 | 0 | 0.500 | 0 | 0.500 | No | Step 3 |
| 1,1-Dichloropropene | Total | µg/L | 0 | 6 | 0.500 | 0 | 0.500 | 0 | 0 | 33 | 0.500 | 0 | 0.500 | 0 | 0 | 8 | 0.500 | 0 | 0.500 | 0 | 0.500 | 0 | 0.500 | No | Step 3 |
| 1,2,3-Trichlorobenzene | Total | µg/L | 0 | 6 | 0.500 | 0 | 0.500 | 0 | 0 | 33 | 0.500 | 0 | 0.500 | 0 | 0 | 8 | 0.500 | 0 | 0.500 | 0 | 0.500 | 0 | 0.500 | No | Step 3 |
| 1,2,3-Trichloropropane | Total | µg/L | 0 | 6 | 0.500 | 0 | 0.500 | 0 | 0 | 33 | 0.500 | 0 | 0.500 | 0 | 0 | 8 | 0.500 | 0 | 0.500 | 0 | 0.500 | 0 | 0.500 | No | Step 3 |
| 1,2,4-Trichlorobenzene | Total | µg/L | 0 | 6 | 0.500 | 0 | 0.500 | 0 | 0 | 33 | 0.500 | 0 | 0.500 | 0 | 0 | 8 | 0.500 | 0 | 0.500 | 0 | 0.500 | 0 | 0.500 | No | Step 3 |
| 1,2,4-Trimethylbenzene | Total | µg/L | 0 | 6 | 0.500 | 0 | 0.500 | 0 | 0 | 33 | 0.500 | 0 | 0.500 | 0 | 0 | 8 | 0.500 | 0 | 0.500 | 0 | 0.500 | 0 | 0.500 | No | Step 3 |
| 1,2-Dibromo-3-chloropropane (DBCP) | Total | µg/L | 0 | 6 | 0.500 | 0 | 0.500 | 0 | 0 | 33 | 0.500 | 0 | 0.500 | 0 | 0 | 8 | 0.500 | 0 | 0.500 | 0 | 0.500 | 0 | 0.500 | No | Step 3 |
| 1,2-Dibromoethane (EDB) | Total | µg/L | 0 | 6 | 0.500 | 0 | 0.500 | 0 | 0 | 33 | 0.500 | 0 | 0.500 | 0 | 0 | 8 | 0.500 | 0 | 0.500 | 0 | 0.500 | 0 | 0.500 | No | Step 3 |
| 1,2-Dichlorobenzene | Total | µg/L | 0 | 6 | 0.500 | 0 | 0.500 | 0 | 0 | 33 | 0.500 | 0 | 0.500 | 0 | 0 | 8 | 0.500 | 0 | 0.500 | 0 | 0.500 | 0 | 0.500 | No | Step 3 |
| 1,2-Dichloroethane | Total | µg/L | 0 | 6 | 0.500 | 0 | 0.500 | 0 | 0 | 33 | 0.500 | 0 | 0.500 | 0 | 0 | 8 | 0.500 | 0 | 0.500 | 0 | 0.500 | 0 | 0.500 | No | Step 3 |
| 1,2-Dichloropropane | Total | µg/L | 0 | 6 | 0.500 | 0 | 0.500 | 0 | 0 | 33 | 0.500 | 0 | 0.500 | 0 | 0 | 8 | 0.500 | 0 | 0.500 | 0 | 0.500 | 0 | 0.500 | No | Step 3 |
| 1,3,5-Trimethylbenzene | Total | µg/L | 0 | 6 | 0.500 | 0 | 0.500 | 0 | 0 | 33 | 0.500 | 0 | 0.500 | 0 | 0 | 8 | 0.500 | 0 | 0.500 | 0 | 0.500 | 0 | 0.500 | No | Step 3 |
| 1,3-Dichlorobenzene | Total | µg/L | 0 | 6 | 0.500 | 0 | 0.500 | 0 | 0 | 33 | 0.500 | 0 | 0.500 | 0 | 0 | 8 | 0.500 | 0 | 0.500 | 0 | 0.500 | 0 | 0.500 | No | Step 3 |
| 1,3-Dichloropropane | Total | µg/L | 0 | 6 | 0.500 | 0 | 0.500 | 0 | 0 | 33 | 0.500 | 0 | 0.500 | 0 | 0 | 8 | 0.500 | 0 | 0.500 | 0 | 0.500 | 0 | 0.500 | No | Step 3 |
| 1,4-Dichlorobenzene | Total | µg/L | 0 | 6 | 0.500 | 0 | 0.500 | 0 | 0 | 33 | 0.500 | 0 | 0.500 | 0 | 0 | 8 | 0.500 | 0 | 0.500 | 0 | 0.500 | 0 | 0.500 | No | Step 3 |
| 2,2-Dichloropropane | Total | µg/L | 0 | 6 | 0.500 | 0 | 0.500 | 0 | 0 | 33 | 0.500 | 0 | 0.500 | 0 | 0 | 8 | 0.500 | 0 | 0.500 | 0 | 0.500 | 0 | 0.500 | No | Step 3 |
| 2,4-D | Total | µg/L | 0 | 2 | 0.250 | 0 | 0.250 | 0 | 0 | 1 | 0.250 | 0 | 0.250 | 0 | 0 | 1 | 0.250 | 0 | 0.250 | 0 | 0.250 | 0 | 0.250 | No | Step 3 |
| 2-Chlorotoluene | Total | µg/L | 0 | 6 | 0.500 | 0 | 0.500 | 0 | 0 | 33 | 0.500 | 0 | 0.500 | 0 | 0 | 8 | 0.500 | 0 | 0.500 | 0 | 0.500 | 0 | 0.500 | No | Step 3 |
| 4-Chlorotoluene | Total | µg/L | 0 | 6 | 0.500 | 0 | 0.500 | 0 | 0 | 33 | 0.500 | 0 | 0.500 | 0 | 0 | 8 | 0.500 | 0 | 0.500 | 0 | 0.500 | 0 | 0.500 | No | Step 3 |
| 4-Isopropyltoluene | Total | µg/L | 0 | 6 | 0.500 | 0 | 0.500 | 0 | 0 | 33 | 0.500 | 0 | 0.500 | 0 | 0 | 8 | 0.500 | 0 | 0.500 | 0 | 0.500 | 0 | 0.500 | No | Step 3 |
| Alachlor | Total | µg/L | 0 | 14 | 0.0500 | 0 | 0.0607 | 0.0213 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 12 | 0.0500 | 0 | 0.0542 | 0.0144 | 0.0500 | 0 | 0.0607 | No | Step 3 |
| Aldrin | Total | µg/L | 0 | 12 | 0.0100 | 0 | 0.0108 | 0.00289 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 12 | 0.0100 | 0 | 0.0108 | 0.00289 | 0.0100 | 0 | 0.0108 | No | Step 3 |
| Alkalinity | Total | mg/L as $CaCO^3$ | 175 | 175 | 0 | 86.0 | 58.6 | 10.9 | 0 | 0 | 0 | 0 | 0 | 0 | 266 | 266 | 0 | 105 | 69.6 | 12.6 | 0 | 105 | 69.6 | Yes | Step 2 |
| Aluminum | Dissolved | µg/L | 22 | 22 | 10 | 157 | 39 | 48 | 5 | 22 | 10 | 27 | 7 | 5 | - - | - - | - - | - - | - - | - - | 10 | 157 | 39 | Yes | |
| Aluminum | Total | µg/L | 22 | 22 | 10 | 901 | 151 | 155 | 22 | 22 | 10 | 258 | 122 | 57 | - - | - - | - - | - - | - - | - - | 10 | 901 | 151 | Yes | |
| Ammonia | Dissolved | mg/L as N | 574 | 576 | 0.00822 | 0.860 | 0.256 | 0.164 | 499 | 581 | 0 | 1.40 | 0.0795 | 0.125 | 802 | 803 | 0.0822 | 0.260 | 0.0749 | 0.0476 | 0.00822 | 1.40 | 0.256 | Yes | Step 2 |
| Ammonia | Total | mg/L as N | 78 | 78 | 0 | 0.470 | 0.159 | 0.0979 | 62 | 62 | 0 | 0.770 | 0.172 | 0.183 | 89 | 89 | 0 | 0.610 | 0.0865 | 0.0890 | 0 | 0.770 | 0.172 | Yes | Step 2 |
| Arsenic | Dissolved | µg/L | 34 | 85 | 0 | 2.00 | 0.741 | 0.804 | 55 | 89 | 0 | 20.0 | 1.44 | 2.22 | 16 | 25 | 0 | 3.00 | 1.48 | 1.12 | 0 | 20.0 | 1.48 | Yes | Step 2 |
| Arsenic | Total | µg/L | 15 | 16 | 0 | 10.0 | 2.44 | 2.13 | 1 | 1 | 0 | 20.0 | 20.0 | 0 | 19 | 19 | 0 | 10.0 | 4.95 | 3.36 | 0 | 20.0 | 20.0 | Yes | Step 2 |
| Asbestos, Chrysotile | None | MFL | 14 | 14 | 0 | 3,200 | 794 | 882 | 14 | 14 | 0 | 3,300 | 1,150 | 760 | 2 | 2 | 0 | 3,490 | 1,870 | 2,300 | 0 | 3,490 | 1,870 | Yes | Step 2 |
| Atra Simazine (Atrazine & Simazine together) | Total | µg/L | 1 | 1 | 0 | 0.0600 | 0.0600 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 4 | 0 | 0.150 | 0.115 | 0.0451 | 0 | 0.150 | 0.115 | Yes | Step 2 |

| | | | SAC | | | | | | SJR | | | | | | BAY | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Constituent | Fraction | Units | # Detects | # Measured | Non-Detect Min RL | Max Detect | Average | Stdev | # Detects | # Measured | Non-Detect Min RL | Max Detect | Average | Stdev | # Detects | # Measured | Non-Detect Min RL | Max Detect | Average | Stdev | Lowest Min RL | Highest Max Detect | Max of Averages | Detected at any locations? | Carried Forward? |
| Atrazine | Total | µg/L | 0 | 14 | 0.0200 | 0 | 0.0329 | 0.0289 | 0 | 1 | 0.100 | 0 | 0.100 | 0 | 0 | 12 | 0.0200 | 0 | 0.0217 | 0.00577 | 0.0200 | 0 | 0.100 | No | Step 3 |
| Barium | Dissolved | µg/L | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 37 | 1,000 | 0 | 1,000 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1,000 | 0 | 1,000 | No | Step 3 |
| Benzene | Total | µg/L | 0 | 6 | 0.500 | 0 | 0.500 | 0 | 0 | 33 | 0.500 | 0 | 0.500 | 0 | 0 | 8 | 0.500 | 0 | 0.500 | 0 | 0.500 | 0 | 0.500 | No | Step 3 |
| BHC | Total | µg/L | 0 | 48 | 0.0100 | 0 | 0.0108 | 0.00279 | 1 | 1 | 0 | 0.0200 | 0.0200 | 0 | 0 | 48 | 0.0100 | 0 | 0.0108 | 0.00279 | 0.0100 | 0.0200 | 0.0200 | Yes | Step 2 |
| BHC-alpha | Total | µg/L | 0 | 12 | 0.0100 | 0 | 0.0108 | 0.00289 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 12 | 0.0100 | 0 | 0.0108 | 0.00289 | 0.0100 | 0 | 0.0108 | No | Step 3 |
| BHC-beta | Total | µg/L | 0 | 12 | 0.0100 | 0 | 0.0108 | 0.00289 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 12 | 0.0100 | 0 | 0.0108 | 0.00289 | 0.0100 | 0 | 0.0108 | No | Step 3 |
| BHC-delta | Total | µg/L | 0 | 12 | 0.0100 | 0 | 0.0108 | 0.00289 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 12 | 0.0100 | 0 | 0.0108 | 0.00289 | 0.0100 | 0 | 0.0108 | No | Step 3 |
| BHC-gamma (Lindane) | Total | µg/L | 0 | 12 | 0.0100 | 0 | 0.0108 | 0.00289 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 12 | 0.0100 | 0 | 0.0108 | 0.00289 | 0.0100 | 0 | 0.0108 | No | Step 3 |
| Biochemical Oxygen Demand (BOD) | Total | mg/L | 36 | 36 | 0 | 2.60 | 1.53 | 0.423 | 0 | 0 | 0 | 0 | 0 | 0 | 71 | 71 | 0 | 2.80 | 1.23 | 0.459 | 0 | 2.80 | 1.53 | Yes | Step 2 |
| Boron | Dissolved | µg/L | 66 | 469 | 100 | 1,900 | 106 | 92.9 | 469 | 483 | 100 | 1100 | 349 | 185 | 223 | 264 | 100 | 1,600 | 517 | 409 | 100 | 1,900 | 517 | Yes | Step 2 |
| Bromacil | Total | µg/L | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 13 | 1.00 | 0 | 1.00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1.00 | 0 | 1.00 | No | Step 3 |
| Bromide | Dissolved | µg/L | 402 | 560 | 1.00 | 90.0 | 14.9 | 8.83 | 545 | 545 | 0 | 650 | 250 | 130 | 257 | 258 | 10.0 | 22,600 | 6,370 | 6,100 | 1.00 | 22,600 | 6,370 | Yes | Step 2 |
| Bromobenzene | Total | µg/L | 0 | 6 | 0.500 | 0 | 0.500 | 0 | 0 | 33 | 0.500 | 0 | 0.500 | 0 | 0 | 8 | 0.500 | 0 | 0.500 | 0 | 0.500 | 0 | 0.500 | No | Step 3 |
| Bromochloroacetic Acid (BCAA) | Total | µg/L | 20 | 24 | 1.00 | 8.00 | 2.76 | 1.69 | 49 | 53 | 1.00 | 49.0 | 17.6 | 9.40 | 26 | 26 | 0 | 31.0 | 8.52 | 6.32 | 1.00 | 49.0 | 17.6 | Yes | Step 2 |
| Bromochloromethane | Total | µg/L | 0 | 6 | 0.500 | 0 | 0.500 | 0 | 0 | 33 | 0.500 | 0 | 0.500 | 0 | 0 | 8 | 0.500 | 0 | 0.500 | 0 | 0.500 | 0 | 0.500 | No | Step 3 |
| Bromodichloromethane | Total | µg/L | 173 | 266 | 1.00 | 28.0 | 12.7 | 4.24 | 205 | 228 | 0.500 | 250 | 93.1 | 56.1 | 187 | 191 | 0.500 | 370 | 76.1 | 60.4 | 0.500 | 370 | 93.1 | Yes | Step 2 |
| Bromoform | Total | µg/L | 2 | 253 | 0.750 | 18.0 | 5.25 | 3.80 | 59 | 227 | 0.500 | 63.0 | 9.26 | 6.66 | 154 | 187 | 0.500 | 1,400 | 362 | 266 | 0.500 | 1,400 | 362 | Yes | Step 2 |
| Bromomethane | Total | µg/L | 0 | 6 | 0.500 | 0 | 0.500 | 0 | 0 | 33 | 0.500 | 0 | 0.500 | 0 | 0 | 8 | 0.500 | 0 | 0.500 | 0 | 0.500 | 0 | 0.500 | No | Step 3 |
| Cadmium | Dissolved | µg/L | 11 | 12 | 5.00 | 5.00 | 5.00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 14 | 14 | 0 | 10.0 | 5.71 | 1.82 | 5.00 | 10.0 | 5.71 | Yes | Step 2 |
| Cadmium | Total | µg/L | 12 | 13 | 5.00 | 5.00 | 5.00 | 0 | 1 | 1 | 0 | 10.0 | 10.0 | 0 | 18 | 18 | 0 | 20.0 | 7.22 | 3.92 | 5.00 | 20.0 | 10.0 | Yes | Step 2 |
| Calcium | Dissolved | µg/L | 190 | 190 | 0 | 17,000 | 11,700 | 2,050 | 0 | 0 | 0 | 0 | 0 | 0 | 304 | 304 | 0 | 249,000 | 51,900 | 36,700 | 0 | 249,000 | 51,900 | Yes | Step 2 |
| Captafol | Total | µg/L | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0.0200 | 0.0200 | 0 | 0 | 0.0200 | 0.0200 | Yes | Step 2 |
| Captan | Total | µg/L | 0 | 14 | 0.0200 | 0 | 0.0614 | 0.128 | 0 | 1 | 0.100 | 0 | 0.100 | 0 | 0 | 12 | 0.0200 | 0 | 0.0217 | 0.00577 | 0.0200 | 0 | 0.100 | No | Step 3 |
| Carbaryl | Total | µg/L | 0 | 2 | 2.00 | 0 | 2.00 | 0 | 0 | 1 | 2.00 | 0 | 2.00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2.00 | 0 | 2.00 | No | Step 3 |
| Carbofuran | Total | µg/L | 0 | 2 | 0.500 | 0 | 0.500 | 0 | 0 | 1 | 0.500 | 0 | 0.500 | 0 | 0 | 1 | 0.500 | 0 | 0.500 | 0 | 0.500 | 0 | 0.500 | No | Step 3 |
| Carbon tetrachloride | Total | µg/L | 0 | 6 | 0.500 | 0 | 0.500 | 0 | 0 | 33 | 0.500 | 0 | 0.500 | 0 | 0 | 8 | 0.500 | 0 | 0.500 | 0 | 0.500 | 0 | 0.500 | No | Step 3 |
| Chlordane | Total | µg/L | 0 | 12 | 0.0500 | 0 | 0.0542 | 0.0144 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 12 | 0.0500 | 0 | 0.0542 | 0.0144 | 0.0500 | 0 | 0.0542 | No | Step 3 |
| Chloride | Dissolved | µg/L | 866 | 866 | 0 | 33,000 | 6,380 | 2,690 | 844 | 844 | 0 | 221000 | 81,400 | 43,600 | 820 | 820 | 0 | 12600000 | 3750000 | 3380000 | 0 | 12600000 | 3750000 | Yes | Step 2 |
| Chloride | Total | µg/L | 85 | 85 | 0 | 18,000 | 7680 | 3170 | 85 | 85 | 0 | 383000 | 134,000 | 96,800 | 173 | 173 | 0 | 14700000 | 5300000 | 4260000 | 0 | 14700000 | 5300000 | Yes | Step 2 |
| Chlorobenzene | Total | µg/L | 0 | 6 | 0.500 | 0 | 0.500 | 0 | 0 | 33 | 0.500 | 0 | 0.500 | 0 | 0 | 8 | 0.500 | 0 | 0.500 | 0 | 0.500 | 0 | 0.500 | No | Step 3 |
| Chloroethane | Total | µg/L | 0 | 6 | 0.500 | 0 | 0.500 | 0 | 0 | 33 | 0.500 | 0 | 0.500 | 0 | 0 | 8 | 0.500 | 0 | 0.500 | 0 | 0.500 | 0 | 0.500 | No | Step 3 |
| Chloroform | Total | µg/L | 256 | 256 | 0 | 1,100 | 228 | 124 | 205 | 228 | 0.500 | 1,400 | 277 | 175 | 123 | 194 | 0.750 | 700 | 81.2 | 136 | 0.500 | 1400 | 277 | Yes | Step 2 |
| Chloromethane | Total | µg/L | 0 | 6 | 0.500 | 0 | 0.500 | 0 | 0 | 33 | 0.500 | 0 | 0.500 | 0 | 0 | 8 | 0.500 | 0 | 0.500 | 0 | 0.500 | 0 | 0.500 | No | Step 3 |
| Chlorophyll a | Total | µg/L | 609 | 610 | 0.0500 | 38.6 | 2.63 | 3.08 | 471 | 471 | 0 | 499 | 31.1 | 51.4 | 963 | 964 | 0.0500 | 49.4 | 4.14 | 5.92 | 0.0500 | 499 | 31.1 | Yes | Step 2 |
| Chlorothalonil | Total | µg/L | 0 | 10 | 0.0100 | 0 | 0.0110 | 0.00316 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10 | 0.0100 | 0 | 0.0110 | 0.00316 | 0.0100 | 0 | 0.0110 | No | Step 3 |
| Chlorpropham | Total | µg/L | 0 | 10 | 0.0200 | 0 | 0.0220 | 0.00632 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10 | 0.0200 | 0 | 0.0220 | 0.00632 | 0.0200 | 0 | 0.0220 | No | Step 3 |
| Chlorpyrifos | Total | µg/L | 0 | 12 | 0.0100 | 0 | 0.0108 | 0.00289 | 0 | 13 | 0.0100 | 0 | 0.0100 | 0 | 0 | 12 | 0.0100 | 0 | 0.0108 | 0.00289 | 0.0100 | 0 | 0.0108 | No | Step 3 |
| Chromium | Dissolved | µg/L | 12 | 13 | 5.00 | 10.0 | 5.77 | 1.88 | 0 | 0 | 0 | 0 | 0 | 0 | 15 | 15 | 0 | 10.0 | 6.33 | 2.29 | 5.00 | 10.0 | 6.33 | Yes | Step 2 |
| Chromium | Total | µg/L | 17 | 18 | 5.00 | 10.0 | 6.67 | 2.43 | 6 | 6 | 0 | 10.0 | 10.0 | 0 | 27 | 27 | 0 | 30.0 | 11.0 | 7.44 | 5.00 | 30.0 | 11.0 | Yes | Step 2 |
| cis-1,2-Dichloroethene | Total | µg/L | 0 | 6 | 0.500 | 0 | 0.500 | 0 | 0 | 33 | 0.500 | 0 | 0.500 | 0 | 0 | 8 | 0.500 | 0 | 0.500 | 0 | 0.500 | 0 | 0.500 | No | Step 3 |
| cis-1,3-Dichloropropene | Total | µg/L | 0 | 6 | 0.500 | 0 | 0.500 | 0 | 0 | 33 | 0.500 | 0 | 0.500 | 0 | 0 | 8 | 0.500 | 0 | 0.500 | 0 | 0.500 | 0 | 0.500 | No | Step 3 |
| Clostridium perfringens | Total | CFU/100ml | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | No | Step 3 |
| Color | Total | Color Units | 195 | 200 | 5.00 | 150 | 21.8 | 24.7 | 152 | 153 | 5.00 | 406 | 30.0 | 37.0 | 151 | 151 | 0 | 150 | 30.0 | 21.7 | 5.00 | 406 | 30.0 | Yes | Step 2 |
| Conductance (EC) | None | µS/cm | 748 | 748 | 0 | 1230 | 157 | 59.3 | 666 | 666 | 0 | 1,550 | 650 | 274 | 313 | 313 | 0 | 18,500 | 6,210 | 5,110 | 0 | 18,500 | 6,210 | Yes | Step 2 |
| Copper | Dissolved | µg/L | 28 | 79 | 1.00 | 10.0 | 5.13 | 2.07 | 51 | 121 | 1.00 | 20.0 | 4.52 | 2.41 | 26 | 27 | 1.00 | 149 | 14.6 | 27.5 | 1.00 | 149 | 14.6 | Yes | Step 2 |

| Constituent | Fraction | Units | SAC | | | | | | SJR | | | | | | BAY | | | | | | Lowest Min RL | Highest Max Detect | Max of Averages | Detected at any locations? | Carried Forward? |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | # Detects | # Measured | Non-Detect Min RL | Max Detect | Average | Stdev | # Detects | # Measured | Non-Detect Min RL | Max Detect | Average | Stdev | # Detects | # Measured | Non-Detect Min RL | Max Detect | Average | Stdev | | | | | |
| Copper | Total | µg/L | 32 | 32 | 0 | 30.0 | 11.6 | 7.87 | 7 | 7 | 0 | 40.0 | 15.7 | 11.3 | 40 | 40 | 0 | 478 | 27.7 | 74.2 | 0 | 478 | 27.7 | Yes | Step 2 |
| Cryptosporidium | None | Cysts/100L | 0 | 11 | 10.0 | 0 | 10.0 | 0 | 0 | 11 | 10.0 | 0 | 10.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10.0 | 0 | 10.0 | No | Step 3 |
| Dacthal (DCPA) | Total | µg/L | 0 | 14 | 0.0100 | 0 | 0.0236 | 0.0325 | 1 | 1 | 0 | 0.480 | 0.480 | 0 | 0 | 13 | 0.0100 | 0 | 0.0177 | 0.0249 | 0.0100 | 0.480 | 0.480 | Yes | Step 2 |
| Diazinon | Total | µg/L | 0 | 2 | 0.100 | 0 | 0.300 | 0.283 | 0 | 14 | 0.0100 | 0 | 0.0450 | 0.131 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0100 | 0 | 0.300 | No | Step 3 |
| Dibromoacetic Acid (DBAA) | Total | µg/L | 0 | 24 | 1.00 | 0 | 1.00 | 0 | 21 | 53 | 1.00 | 23.0 | 5.25 | 6.26 | 15 | 26 | 1.00 | 110 | 31.4 | 32.8 | 1.00 | 110 | 31.4 | Yes | Step 2 |
| Dibromochloromethane | Total | µg/L | 6 | 258 | 0.500 | 13.0 | 6.73 | 3.49 | 163 | 225 | 0.500 | 180 | 46.0 | 36.3 | 164 | 197 | 0.500 | 590 | 189 | 125 | 0.500 | 590 | 189 | Yes | Step 2 |
| Dibromomethane | Total | µg/L | 0 | 6 | 0.500 | 0 | 0.500 | 0 | 0 | 33 | 0.500 | 0 | 0.500 | 0 | 0 | 8 | 0.500 | 0 | 0.500 | 0 | 0.500 | 0 | 0.500 | No | Step 3 |
| Dichloran | Total | µg/L | 0 | 10 | 0.0100 | 0 | 0.0110 | 0.00316 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10 | 0.0100 | 0 | 0.0110 | 0.00316 | 0.0100 | 0 | 0.0110 | No | Step 3 |
| Dichloroacetic Acid (DCAA) | Total | µg/L | 24 | 24 | 0 | 54.0 | 26.6 | 11.5 | 53 | 53 | 0 | 140 | 49.6 | 26.0 | 25 | 26 | 1.00 | 130 | 21.8 | 28.0 | 1.00 | 140 | 49.6 | Yes | Step 2 |
| Dichlorodifluoromethane | Total | µg/L | 0 | 6 | 0.500 | 0 | 0.500 | 0 | 0 | 33 | 0.500 | 0 | 0.500 | 0 | 0 | 8 | 0.500 | 0 | 0.500 | 0 | 0.500 | 0 | 0.500 | No | Step 3 |
| Dicofol | Total | µg/L | 0 | 12 | 0.0100 | 0 | 0.0150 | 0.0117 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 12 | 0.0100 | 0 | 0.0175 | 0.0154 | 0.0100 | 0 | 0.0175 | No | Step 3 |
| Dieldrin | Total | µg/L | 0 | 12 | 0.0100 | 0 | 0.0108 | 0.00289 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 12 | 0.0100 | 0 | 0.0108 | 0.00289 | 0.0100 | 0 | 0.0108 | No | Step 3 |
| Diuron | Total | µg/L | 0 | 11 | 0.0500 | 0 | 0.0545 | 0.0151 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 11 | 0.0500 | 0 | 0.0573 | 0.0168 | 0.0500 | 0 | 0.0573 | No | Step 3 |
| Endosulfan (mixed isomers) | Total | µg/L | 0 | 12 | 0.0100 | 0 | 0.0125 | 0.00452 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 12 | 0.0100 | 0 | 0.0125 | 0.00452 | 0.0100 | 0 | 0.0125 | No | Step 3 |
| Endosulfan-I | Total | µg/L | 0 | 24 | 0.0100 | 0 | 0.0108 | 0.00282 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 24 | 0.0100 | 0 | 0.0108 | 0.00282 | 0.0100 | 0 | 0.0108 | No | Step 3 |
| Endosulfan-II | Total | µg/L | 0 | 12 | 0.0100 | 0 | 0.0108 | 0.00289 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 12 | 0.0100 | 0 | 0.0108 | 0.00289 | 0.0100 | 0 | 0.0108 | No | Step 3 |
| Endrin | Total | µg/L | 0 | 24 | 0.0100 | 0 | 0.0108 | 0.00282 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 24 | 0.0100 | 0 | 0.0108 | 0.00282 | 0.0100 | 0 | 0.0108 | No | Step 3 |
| Endrin aldehyde | Total | µg/L | 0 | 12 | 0.0100 | 0 | 0.0108 | 0.00289 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 12 | 0.0100 | 0 | 0.0108 | 0.00289 | 0.0100 | 0 | 0.0108 | No | Step 3 |
| Escherichiacoli | Total | MPN/100ml | 8 | 14 | 1.00 | 50.4 | 10.3 | 14.1 | 11 | 17 | 1.00 | 3440 | 402 | 919 | 11 | 11 | 0 | 78.2 | 18.2 | 20.9 | 1.00 | 3440 | 402 | Yes | Step 2 |
| Ethyl benzene | Total | µg/L | 0 | 6 | 0.500 | 0 | 0.500 | 0 | 0 | 33 | 0.500 | 0 | 0.500 | 0 | 0 | 8 | 0.500 | 0 | 0.500 | 0 | 0.500 | 0 | 0.500 | No | Step 3 |
| Fecal Coliform | Total | MPN | 0 | 5 | 1.00 | 0 | 1.00 | 0 | 0 | 5 | 1.00 | 0 | 1.00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1.00 | 0 | 1.00 | No | Step 3 |
| Fluorescence | Total | Fluoresence Uni | 11 | 11 | 0 | 4.38 | 0.257 | 0.826 | 0 | 0 | 0 | 0 | 0 | 0 | 182 | 182 | 0 | 56.7 | 14.3 | 15.3 | 0 | 56.7 | 14.3 | Yes | Step 2 |
| Giardia lamblia | Total | Cysts/100L | 0 | 11 | 10.0 | 0 | 10.0 | 0 | 0 | 11 | 10.0 | 0 | 10.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10.0 | 0 | 10.0 | No | Step 3 |
| Hardness | Dissolved | mg/L as CaCO$^{3}$ | 0 | 0 | 0 | 0 | 0 | 0 | 146 | 146 | 0 | 247 | 133 | 51.8 | 70 | 70 | 0 | 1710 | 586 | 520 | 0 | 1710 | 586 | Yes | Step 2 |
| Hardness | Total | mg/L as CaCO$^{3}$ | 189 | 189 | 0 | 84.0 | 56.2 | 11.3 | 372 | 372 | 0 | 347 | 147 | 61.3 | 234 | 234 | 0 | 2520 | 719 | 578 | 0 | 2520 | 719 | Yes | Step 2 |
| Heptachlor | Total | µg/L | 0 | 12 | 0.0100 | 0 | 0.0108 | 0.00289 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 12 | 0.0100 | 0 | 0.0108 | 0.00289 | 0.0100 | 0 | 0.0108 | No | Step 3 |
| Hexachlorobutadiene | Total | µg/L | 0 | 6 | 0.500 | 0 | 0.500 | 0 | 0 | 33 | 0.500 | 0 | 0.500 | 0 | 0 | 8 | 0.500 | 0 | 0.500 | 0 | 0.500 | 0 | 0.500 | No | Step 3 |
| Iron | Dissolved | µg/L | 39 | 39 | 0 | 110 | 31.5 | 21.3 | 9 | 9 | 0 | 50.0 | 25.6 | 15.1 | 37 | 37 | 0 | 100 | 21.3 | 24.8 | 0 | 110 | 31.5 | Yes | Step 2 |
| Iron | Total | µg/L | 42 | 42 | 0 | 3,700 | 849 | 656 | 9 | 9 | 0 | 8,400 | 3,690 | 2,520 | 49 | 49 | 0 | 3,200 | 997 | 705 | 0 | 8,400 | 3,690 | Yes | Step 2 |
| Isopropylbenzene | Total | µg/L | 0 | 6 | 0.500 | 0 | 0.500 | 0 | 0 | 33 | 0.500 | 0 | 0.500 | 0 | 0 | 8 | 0.500 | 0 | 0.500 | 0 | 0.500 | 0 | 0.500 | No | Step 3 |
| Kjeldahl Nitrogen | Total | mg/L as N | 629 | 630 | 0.100 | 1.50 | 0.502 | 0.210 | 608 | 611 | 0.100 | 3.40 | 0.837 | 0.429 | 927 | 927 | 0 | 2.10 | 0.422 | 0.176 | 0.100 | 3.40 | 0.837 | Yes | Step 2 |
| Lead | Dissolved | µg/L | 13 | 14 | 5.00 | 10.0 | 5.71 | 1.82 | 1 | 1 | 0 | 10.0 | 10.0 | 0 | 12 | 12 | 0 | 12.0 | 5.58 | 2.02 | 5.00 | 12.0 | 10.0 | Yes | Step 2 |
| Lead | Total | µg/L | 17 | 18 | 5.00 | 10.0 | 6.39 | 2.30 | 1 | 1 | 0 | 10.0 | 10.0 | 0 | 16 | 16 | 0 | 270 | 27.7 | 67.6 | 5.00 | 270 | 27.7 | Yes | Step 2 |
| m + p Xylene | Total | µg/L | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0.500 | 0 | 0.500 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.500 | 0 | 0.500 | No | Step 3 |
| Magnesium | Dissolved | µg/L | 190 | 190 | 0 | 10,000 | 6,530 | 1,560 | 517 | 517 | 0 | 40,000 | 16,100 | 7,100 | 304 | 304 | 0 | 461,000 | 136,000 | 116,000 | 0 | 461,000 | 136,000 | Yes | Step 2 |
| Malathion | Total | µg/L | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 13 | 0.0100 | 0 | 0.0100 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0100 | 0 | 0.0100 | No | Step 3 |
| Manganese | Dissolved | µg/L | 28 | 28 | 0 | 29.0 | 11.7 | 5.45 | 9 | 9 | 0 | 710 | 158 | 213 | 25 | 25 | 0 | 32.0 | 9.72 | 6.17 | 0 | 710 | 158 | Yes | Step 2 |
| Manganese | Total | µg/L | 42 | 42 | 0 | 80.0 | 27.7 | 13.1 | 9 | 9 | 0 | 950 | 297 | 290 | 48 | 48 | 0 | 100 | 31.0 | 18.3 | 0 | 950 | 297 | Yes | Step 2 |
| MCPA | Total | µg/L | 0 | 1 | 50.0 | 0 | 50.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 50.0 | 0 | 50.0 | 0 | 50.0 | 0 | 50.0 | No | Step 3 |
| Mercury | Dissolved | µg/L | 0 | 1 | 1.00 | 0 | 1.00 | 0 | 0 | 2 | 1.00 | 0 | 1.00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1.00 | 0 | 1.00 | No | Step 3 |
| Mercury | Total | µg/L | 14 | 15 | 1.00 | 1.00 | 0.773 | 0.392 | 5 | 5 | 0 | 0.200 | 0.120 | 0.0447 | 20 | 20 | 0 | 1.00 | 0.650 | 0.441 | 1.00 | 1.00 | 0.773 | Yes | Step 2 |

| | | | SAC | | | | | | SJR | | | | | | BAY | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Constituent | Fraction | Units | # Detects | # Measured | Non-Detect Min RL | Max Detect | Average | Stdev | # Detects | # Measured | Non-Detect Min RL | Max Detect | Average | Stdev | # Detects | # Measured | Non-Detect Min RL | Max Detect | Average | Stdev | Lowest Min RL | Highest Max Detect | Max of Averages | Detected at any locations? | Carried Forward? |
| Methamidophos | Total | µg/L | 0 | 1 | 1.00 | 0 | 1.00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1.00 | 0 | 1.00 | 0 | 1.00 | 0 | 1.00 | No | Step 3 |
| Methoxychlor | Total | µg/L | 1 | 13 | 0.0100 | 0.0900 | 0.0208 | 0.0236 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 12 | 0.0100 | 0 | 0.0175 | 0.0154 | 0.0100 | 0.0900 | 0.0208 | Yes | Step 2 |
| Methyl tert-butyl ether (MTBE) | Total | µg/L | 4 | 13 | 1.00 | 5.00 | 1.52 | 1.22 | 3 | 207 | 0.500 | 2.80 | 1.01 | 0.141 | 0 | 50 | 0.500 | 0 | 0.980 | 0.0990 | 0.500 | 5.00 | 1.52 | Yes | Step 2 |
| Methylene chloride | Total | µg/L | 0 | 6 | 0.500 | 0 | 0.500 | 0 | 0 | 33 | 0.500 | 0 | 0.500 | 0 | 0 | 8 | 0.500 | 0 | 0.500 | 0 | 0.500 | 0 | 0.500 | No | Step 3 |
| Molinate | Total | µg/L | 0 | 1 | 0.500 | 0 | 0.500 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0.500 | 0 | 0.500 | 0 | 0.500 | 0 | 0.500 | No | Step 3 |
| Monobromoacetic Acid (MBAA) | Total | µg/L | 2 | 24 | 1.00 | 1.10 | 1.00 | 0.0204 | 9 | 53 | 1.00 | 2.80 | 1.21 | 0.461 | 13 | 26 | 1.00 | 6.50 | 2.43 | 1.84 | 1.00 | 6.50 | 2.43 | Yes | Step 2 |
| Monochloroacetic Acid (MCAA) | Total | µg/L | 0 | 24 | 1.00 | 0 | 1.00 | 0 | 0 | 53 | 1.00 | 0 | 1.11 | 0.375 | 0 | 25 | 1.00 | 0 | 1.04 | 0.200 | 1.00 | 0 | 1.11 | No | Step 3 |
| m-Xylene | Total | µg/L | 0 | 6 | 0.500 | 0 | 0.500 | 0 | 0 | 32 | 0.500 | 0 | 0.500 | 0 | 0 | 8 | 0.500 | 0 | 0.500 | 0 | 0.500 | 0 | 0.500 | No | Step 3 |
| Naphthalene | Total | µg/L | 0 | 6 | 0.500 | 0 | 0.500 | 0 | 0 | 33 | 0.500 | 0 | 0.500 | 0 | 0 | 8 | 0.500 | 0 | 0.500 | 0 | 0.500 | 0 | 0.500 | No | Step 3 |
| n-Butylbenzene | Total | µg/L | 0 | 6 | 0.500 | 0 | 0.500 | 0 | 0 | 33 | 0.500 | 0 | 0.500 | 0 | 0 | 8 | 0.500 | 0 | 0.500 | 0 | 0.500 | 0 | 0.500 | No | Step 3 |
| Nickel | Dissolved | µg/L | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 39 | 5.00 | 10.0 | 5.13 | 0.801 | 0 | 0 | 0 | 0 | 0 | 0 | 5.00 | 10.0 | 5.13 | Yes | Step 2 |
| Nitrate | Dissolved | mg/L as N | 365 | 366 | 0.0226 | 2.80 | 0.188 | 0.271 | 392 | 392 | 0 | 9.79 | 1.49 | 0.797 | 165 | 165 | 0 | 1.85 | 0.419 | 0.206 | 0.0226 | 9.79 | 1.49 | Yes | Step 2 |
| Nitrite | Dissolved | mg/L as N | 629 | 637 | 0.0100 | 0.790 | 0.144 | 0.0871 | 626 | 628 | 0.0100 | 4.60 | 1.33 | 0.697 | 944 | 946 | 0.0100 | 1.60 | 0.333 | 0.153 | 0.0100 | 4.60 | 1.33 | Yes | Step 2 |
| Nitrite + Nitrate | Dissolved | mg/L as N | 629 | 637 | 0.0100 | 0.790 | 0.144 | 0.0871 | 608 | 610 | 0.0100 | 4.60 | 1.36 | 0.669 | 936 | 938 | 0.0100 | 1.60 | 0.336 | 0.150 | 0.0100 | 4.60 | 1.36 | Yes | Step 2 |
| n-Propylbenzene | Total | µg/L | 0 | 6 | 0.500 | 0 | 0.500 | 0 | 0 | 33 | 0.500 | 0 | 0.500 | 0 | 0 | 8 | 0.500 | 0 | 0.500 | 0 | 0.500 | 0 | 0.500 | No | Step 3 |
| Organic Carbon | Dissolved | mg/L as C | 753 | 755 | 0.100 | 7.90 | 2.02 | 0.737 | 568 | 568 | 0 | 11.4 | 3.49 | 1.30 | 268 | 268 | 0 | 11.0 | 2.55 | 1.05 | 0.100 | 11.4 | 3.49 | Yes | Step 2 |
| Organic Carbon | Total | mg/L as C | 562 | 564 | 0.100 | 11.0 | 2.33 | 1.13 | 452 | 452 | 0 | 14.9 | 4.39 | 1.77 | 152 | 152 | 0 | 6.60 | 2.68 | 1.04 | 0.100 | 14.9 | 4.39 | Yes | Step 2 |
| Organic Nitrogen | Dissolved | mg/L as N | 488 | 503 | 0.100 | 1.00 | 0.200 | 0.132 | 483 | 483 | 0 | 1.80 | 0.370 | 0.193 | 822 | 824 | 0.100 | 1.40 | 0.238 | 0.106 | 0.100 | 1.80 | 0.370 | Yes | Step 2 |
| Organic Nitrogen | Total | mg/L as N | 78 | 78 | 0 | 1.39 | 0.262 | 0.164 | 79 | 79 | 0 | 2.00 | 0.928 | 0.444 | 142 | 142 | 0 | 1.20 | 0.333 | 0.174 | 0 | 2.00 | 0.928 | Yes | Step 2 |
| Oxygen | Dissolved | mg/L | 955 | 955 | 0 | 834 | 9.73 | 26.6 | 479 | 479 | 0 | 22.3 | 8.93 | 2.35 | 937 | 937 | 0 | 11.3 | 8.26 | 2.07 | 0 | 834 | 9.73 | Yes | Step 2 |
| o-Xylene | Total | µg/L | 0 | 6 | 0.500 | 0 | 0.500 | 0 | 0 | 33 | 0.500 | 0 | 0.500 | 0 | 0 | 8 | 0.500 | 0 | 0.500 | 0 | 0.500 | 0 | 0.500 | No | Step 3 |
| p,p'-DDD | Total | µg/L | 0 | 12 | 0.0100 | 0 | 0.0108 | 0.00289 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 12 | 0.0100 | 0 | 0.0108 | 0.00289 | 0.0100 | 0 | 0.0108 | No | Step 3 |
| p,p'-DDE | Total | µg/L | 0 | 12 | 0.0100 | 0 | 0.0108 | 0.00289 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 12 | 0.0100 | 0 | 0.0108 | 0.00289 | 0.0100 | 0 | 0.0108 | No | Step 3 |
| p,p'-DDT | Total | µg/L | 0 | 12 | 0.0100 | 0 | 0.0108 | 0.00289 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 12 | 0.0100 | 0 | 0.0108 | 0.00289 | 0.0100 | 0 | 0.0108 | No | Step 3 |
| Parathion (Ethyl) | Total | µg/L | 0 | 2 | 0.100 | 0 | 0.300 | 0.283 | 0 | 14 | 0.0100 | 0 | 0.0450 | 0.131 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0100 | 0 | 0.300 | No | Step 3 |
| Parathion, Methyl | Total | µg/L | 0 | 2 | 0.100 | 0 | 0.300 | 0.283 | 0 | 14 | 0.0100 | 0 | 0.0450 | 0.131 | 0 | 1 | 0.500 | 0 | 0.500 | 0 | 0.0100 | 0 | 0.500 | No | Step 3 |
| PCB-1016 | Total | µg/L | 0 | 12 | 0.100 | 0 | 0.108 | 0.0289 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 12 | 0.100 | 0 | 0.108 | 0.0289 | 0.100 | 0 | 0.108 | No | Step 3 |
| PCB-1221 | Total | µg/L | 0 | 12 | 0.100 | 0 | 0.108 | 0.0289 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 12 | 0.100 | 0 | 0.108 | 0.0289 | 0.100 | 0 | 0.108 | No | Step 3 |
| PCB-1232 | Total | µg/L | 0 | 12 | 0.100 | 0 | 0.108 | 0.0289 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 12 | 0.100 | 0 | 0.108 | 0.0289 | 0.100 | 0 | 0.108 | No | Step 3 |
| PCB-1242 | Total | µg/L | 0 | 12 | 0.100 | 0 | 0.108 | 0.0289 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 12 | 0.100 | 0 | 0.108 | 0.0289 | 0.100 | 0 | 0.108 | No | Step 3 |
| PCB-1248 | Total | µg/L | 0 | 12 | 0.100 | 0 | 0.108 | 0.0289 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 12 | 0.100 | 0 | 0.108 | 0.0289 | 0.100 | 0 | 0.108 | No | Step 3 |
| PCB-1254 | Total | µg/L | 0 | 12 | 0.100 | 0 | 0.108 | 0.0289 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 12 | 0.100 | 0 | 0.108 | 0.0289 | 0.100 | 0 | 0.108 | No | Step 3 |
| PCB-1260 | Total | µg/L | 0 | 12 | 0.100 | 0 | 0.108 | 0.0289 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 12 | 0.100 | 0 | 0.108 | 0.0289 | 0.100 | 0 | 0.108 | No | Step 3 |
| Pentachloronitrobenzene (PCNB) | Total | µg/L | 0 | 12 | 0.0100 | 0 | 0.0108 | 0.00289 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 12 | 0.0100 | 0 | 0.0108 | 0.00289 | 0.0100 | 0 | 0.0108 | No | Step 3 |
| pH | None | pH Units | 809 | 809 | 0 | 8.50 | 7.29 | 0.427 | 795 | 795 | 0 | 10.7 | 7.61 | 0.559 | 830 | 830 | 0 | 8.60 | 7.76 | 0.348 | 0 | 369 | 7.76 | Yes | Step 2 |
| Pheophytin a | Total | µg/L | 607 | 610 | 0.0100 | 10.8 | 1.71 | 1.39 | 471 | 471 | 0 | 168 | 11.9 | 15.3 | 954 | 957 | 0 | 27.0 | 2.46 | 2.81 | 0.0100 | 168 | 11.9 | Yes | Step 2 |
| Phosphorus | Dissolved | µg/L as P | 523 | 523 | 0 | 6.52 | 0.0803 | 0.284 | 502 | 502 | 0 | 0.450 | 0.106 | 0.0553 | 738 | 738 | 0 | 0.210 | 0.0788 | 0.0296 | 0 | 6.52 | 0.106 | Yes | Step 2 |
| Phosphorus | Total | µg/L as P | 537 | 537 | 0 | 330 | 109 | 45.2 | 515 | 515 | 0 | 970 | 233 | 117 | 756 | 756 | 0 | 1400 | 142 | 77.7 | 0 | 1400 | 233 | Yes | Step 2 |
| Potassium | Dissolved | µg/L | 187 | 187 | 0 | 3,900 | 1,400 | 382 | 0 | 0 | 0 | 0 | 0 | 0 | 282 | 282 | 0 | 134,000 | 37,800 | 35,100 | 0 | 134,000 | 37,800 | Yes | Step 2 |
| Propanil | Total | µg/L | 0 | 2 | 0.100 | 0 | 0.300 | 0.283 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.100 | 0 | 0.300 | No | Step 3 |
| Propham | Total | µg/L | 0 | 2 | 2.00 | 0 | 2.00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2.00 | 0 | 2.00 | No | Step 3 |
| p-Xylene | Total | µg/L | 0 | 6 | 0.500 | 0 | 0.500 | 0 | 0 | 32 | 0.500 | 0 | 0.500 | 0 | 0 | 8 | 0.500 | 0 | 0.500 | 0 | 0.500 | 0 | 0.500 | No | Step 3 |
| sec-Butylbenzene | Total | µg/L | 0 | 6 | 0.500 | 0 | 0.500 | 0 | 0 | 33 | 0.500 | 0 | 0.500 | 0 | 0 | 8 | 0.500 | 0 | 0.500 | 0 | 0.500 | 0 | 0.500 | No | Step 3 |

| | | | SAC | | | | | | SJR | | | | | | BAY | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Constituent | Fraction | Units | # Detects | # Measured | Non-Detect Min RL | Max Detect | Average | Stdev | # Detects | # Measured | Non-Detect Min RL | Max Detect | Average | Stdev | # Detects | # Measured | Non-Detect Min RL | Max Detect | Average | Stdev | Lowest Min RL | Highest Max Detect | Max of Averages | Detected at any locations? | Carried Forward? |
| Secchi | Total | cm | 501 | 501 | 0 | 300 | 75.1 | 37.7 | 95 | 95 | 0 | 76.0 | 26.0 | 20.7 | 972 | 972 | 0 | 208 | 48.8 | 24.8 | 0 | 300 | 75.1 | Yes | Step 2 |
| Selenium | Dissolved | µg/L | 2 | 75 | 1.00 | 1.00 | 1.00 | 0 | 163 | 217 | 1.00 | 7.00 | 2.00 | 1.36 | 0 | 15 | 1.00 | 0 | 1.00 | 0 | 1.00 | 7.00 | 2.00 | Yes | Step 2 |
| Selenium | Total | µg/L as P | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | No | Step 3 |
| Silica ($SiO_2$) | Dissolved | mg/L | 515 | 515 | 0 | 23.6 | 17.1 | 2.06 | 485 | 485 | 0 | 28.0 | 15.1 | 3.09 | 858 | 858 | 0 | 23.3 | 11.3 | 3.50 | 0 | 28.0 | 17.1 | Yes | Step 2 |
| Simazine | Total | µg/L | 0 | 12 | 0.0200 | 0 | 0.0217 | 0.00577 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 12 | 0.0200 | 0 | 0.0217 | 0.00577 | 0.0200 | 0 | 0.0217 | No | Step 3 |
| Sodium | Dissolved | µg/L | 224 | 224 | 0 | 19,000 | 10,000 | 3130 | 0 | 0 | 0 | 0 | 0 | 0 | 313 | 313 | 0 | 3320000 | 1060000 | 917000 | 0 | 3320000 | 1060000 | Yes | Step 2 |
| Total Dissolved Solids | Total Dissolved | mg/L | 889 | 889 | 0 | 414 | 99.0 | 23.7 | 871 | 871 | 0 | 1150 | 379 | 183 | 943 | 943 | 0 | 25300 | 7620 | 6730 | 0 | 25300 | 7620 | Yes | Step 2 |
| Total Suspended Solids | Total Suspended | mg/L | 515 | 515 | 0 | 264 | 22.7 | 29.5 | 487 | 487 | 0 | 296 | 63.7 | 41.0 | 860 | 860 | 0 | 569 | 35.9 | 33.4 | 0 | 569 | 63.7 | Yes | Step 2 |
| Volatile Suspended Solids | Volatile Suspended | mg/L | 485 | 492 | 1.00 | 22.0 | 3.25 | 2.66 | 487 | 487 | 0 | 31.0 | 8.56 | 5.19 | 842 | 847 | 1.00 | 46.0 | 5.06 | 3.46 | 1.00 | 46.0 | 8.56 | Yes | Step 2 |
| Styrene | Total | µg/L | 0 | 6 | 0.500 | 0 | 0.500 | 0 | 0 | 33 | 0.500 | 0 | 0.500 | 0 | 0 | 8 | 0.500 | 0 | 0.500 | 0 | 0.500 | 0 | 0.500 | No | Step 3 |
| Sulfate | Dissolved | µg/L | 172 | 172 | 0 | 19,000 | 8,590 | 3,260 | 517 | 517 | 0 | 251000 | 82,400 | 42,700 | 263 | 264 | 1,000 | 874,000 | 250,000 | 230,000 | 1,000 | 874,000 | 250,000 | Yes | Step 2 |
| tert-Butylbenzene | Total | µg/L | 0 | 6 | 0.500 | 0 | 0.500 | 0 | 0 | 33 | 0.500 | 0 | 0.500 | 0 | 0 | 8 | 0.500 | 0 | 0.500 | 0 | 0.500 | 0 | 0.500 | No | Step 3 |
| Tetrachloroethene | Total | µg/L | 0 | 6 | 0.500 | 0 | 0.500 | 0 | 0 | 33 | 0.500 | 0 | 0.500 | 0 | 0 | 8 | 0.500 | 0 | 0.500 | 0 | 0.500 | 0 | 0.500 | No | Step 3 |
| Thiobencarb | Total | µg/L | 0 | 12 | 0.0200 | 0 | 0.102 | 0.186 | 0 | 1 | 0.500 | 0 | 0.500 | 0 | 0 | 11 | 0.0200 | 0 | 0.0655 | 0.144 | 0.0200 | 0 | 0.500 | No | Step 3 |
| Toluene | Total | µg/L | 0 | 6 | 0.500 | 0 | 0.500 | 0 | 0 | 33 | 0.500 | 0 | 0.500 | 0 | 0 | 8 | 0.500 | 0 | 0.500 | 0 | 0.500 | 0 | 0.500 | No | Step 3 |
| Total Coliform | None | MPN | 0 | 5 | 1.00 | 0 | 1.00 | 0 | 0 | 5 | 1.00 | 0 | 1.00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1.00 | 0 | 1.00 | No | Step 3 |
| Toxaphene | Total | µg/L | 0 | 12 | 0.200 | 0 | 0.217 | 0.0577 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 12 | 0.200 | 0 | 0.217 | 0.0577 | 0.200 | 0 | 0.217 | No | Step 3 |
| trans-1,2-Dichloroethene | Total | µg/L | 0 | 6 | 0.500 | 0 | 0.500 | 0 | 0 | 33 | 0.500 | 0 | 0.500 | 0 | 0 | 8 | 0.500 | 0 | 0.500 | 0 | 0.500 | 0 | 0.500 | No | Step 3 |
| trans-1,3-Dichloropropene | Total | µg/L | 0 | 6 | 0.500 | 0 | 0.500 | 0 | 0 | 33 | 0.500 | 0 | 0.500 | 0 | 0 | 8 | 0.500 | 0 | 0.500 | 0 | 0.500 | 0 | 0.500 | No | Step 3 |
| Trichloroacetic Acid (TCAA) | Total | µg/L | 24 | 24 | 0 | 88.0 | 28.3 | 21.3 | 53 | 53 | 0 | 190 | 58.1 | 42.2 | 21 | 26 | 1.00 | 160 | 22.9 | 33.9 | 1.00 | 190 | 58.1 | Yes | Step 2 |
| Trichloroethene | Total | µg/L | 0 | 4 | 0.500 | 0 | 0.500 | 0 | 0 | 32 | 0.500 | 0 | 0.500 | 0 | 0 | 5 | 0.500 | 0 | 0.500 | 0 | 0.500 | 0 | 0.500 | No | Step 3 |
| Trichlorofluoromethane | Total | µg/L | 0 | 6 | 0.500 | 0 | 0.500 | 0 | 0 | 33 | 0.500 | 0 | 0.500 | 0 | 0 | 8 | 0.500 | 0 | 0.500 | 0 | 0.500 | 0 | 0.500 | No | Step 3 |
| Turbidity | None | NTU | 1239 | 1239 | 0 | 194 | 15.9 | 19.1 | 1105 | 1105 | 0 | 196 | 22.8 | 15.5 | 1229 | 1229 | 0 | 360 | 21.4 | 18.7 | 0 | 360 | 22.8 | Yes | Step 2 |
| Unknown hydrocarbon | Total | µg/L | 4 | 4 | 0 | 0.0300 | 0.0200 | 0.00816 | 2 | 2 | 0 | 0.110 | 0.0800 | 0.0424 | 1 | 1 | 0 | 0.220 | 0.220 | 0 | 0 | 0.220 | 0.220 | Yes | Step 2 |
| UV Absorbance @254nm | None | absorbance/cm | 230 | 230 | 0 | 0.219 | 0.0591 | 0.0295 | 0 | 0 | 0 | 0 | 0 | 0 | 258 | 258 | 0 | 0.295 | 0.0842 | 0.0391 | 0 | 0.295 | 0.0842 | Yes | Step 2 |
| Vinyl chloride | Total | µg/L | 0 | 6 | 0.500 | 0 | 0.500 | 0 | 0 | 33 | 0.500 | 0 | 0.500 | 0 | 0 | 8 | 0.500 | 0 | 0.500 | 0 | 0.500 | 0 | 0.500 | No | Step 3 |
| Water Temperature | None | °C | 973 | 973 | 0 | 34.6 | 16.3 | 5.14 | 486 | 486 | 0 | 28.0 | 17.8 | 5.44 | 979 | 979 | 0 | 24.0 | 16.8 | 4.36 | 0 | 34.6 | 17.8 | Yes | Step 2 |
| Yttrium | Dissolved | µg/L | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 100 | 0 | 860 | 767 | 100 | 0 | 860 | No | Step 3 |
| Zinc | Dissolved | µg/L | 23 | 23 | 0 | 12.0 | 8.78 | 2.26 | 34 | 43 | 5.00 | 120 | 15.7 | 20.0 | 26 | 26 | 0 | 163 | 15.2 | 30.4 | 5.00 | 163 | 15.7 | Yes | Step 2 |
| Zinc | Total | µg/L | 35 | 35 | 0 | 30.0 | 11.7 | 5.73 | 9 | 9 | 0 | 60.0 | 25.6 | 18.1 | 40 | 40 | 0 | 590 | 30.2 | 91.7 | 0 | 590 | 30.2 | Yes | Step 2 |
| Totals | | | | | | | | | | | | | | | | | | | | | | | | | |
| PCBs (Polychlorinated biphenyls) | Total | µg/L | 0 | 12 | 0.100 | 0 | 0.108 | 0.0289 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 12 | 0.100 | 0 | 0.108 | 0.0289 | 0.100 | 0 | 0.108 | No | Step 3 |
| Haloacetic acids | Total | µg/L | 24 | 24 | 1.00 | 144 | 57.5 | 32.5 | 53 | 53 | 1.00 | 330 | 113 | 63.7 | 26 | 26 | 1.00 | 141 | 61.4 | 26.7 | 1.00 | 330 | 113 | Yes | Step 2 |
| Total Trihalomethanes | Total | µg/L | 253 | 256 | 0.500 | 1,110 | 236 | 129 | 205 | 206 | 0.500 | 1470 | 462 | 176 | 188 | 188 | 0.500 | 1640 | 518 | 212 | 0.500 | 1,640 | 518 | Yes | Step 2 |
| Xylenes | Total | µg/L | 0 | 6 | 0.500 | 0 | 0.500 | 0 | 0 | 33 | 0.500 | 0 | 0.500 | 0 | 0 | 8 | 0.500 | 0 | 0.500 | 0 | 0.500 | 0 | 0.500 | No | Step 3 |
| PAHs | Total | µg/L | 0 | 6 | 0.500 | 0 | 0.500 | 0 | 0 | 33 | 0.500 | 0 | 0.500 | 0 | 0 | 8 | 0.500 | 0 | 0.500 | 0 | 0.500 | 0 | 0.500 | No | Step 3 |

**Table SA-7. Step 2: All Constituents (Totaling 65) that were Detected at Least Once at a Source Water Monitoring Location**

| Detected Constituents | Fraction | Units | Criteria | Maximum Detect | Exceeds Water Quality Objective or Criteria | 2010 303(d) listed | Concern Based on Professional Judgment | Concern Based on Public Scoping | Carried Forward? | Altered Water Quality (e.g., degradation) Possible |
|---|---|---|---|---|---|---|---|---|---|---|
| Alkalinity | Total | mg/L as $CaCO^3$ | None | 105 | | | | | No | |
| Aluminum | Dissolved | µg/L | 87 | 157 | X | | X | | Step 5 | Yes |
| Aluminum | Total | µg/L | 200 | 901 | X | X | X | | Step 5 | Yes |
| Ammonia | Dissolved | mg/L as N | 25 | 1.40 | | | X | X | Step 5 | No |
| Ammonia | Total | mg/L as N | 25 | 0.770 | | | X | X | Step 5 | No |
| Arsenic | Dissolved | µg/L | 10 | 20.0 | X | | X | | Step 5 | Yes |
| Arsenic | Total | µg/L | 10 | 20.0 | X | | X | | Step 5 | Yes |
| Asbestos, Chrysotile | None | MFL | 7 | 3,490 | X | | | | Step 5 | |
| Atra Simazine (Atrazine & Simazine together) | Total | µg/L | None | 0.150 | | | | | No | |
| BHC | Total | µg/L | None | 0.0200 | | X | | | Step 5 | |
| Biochemical Oxygen Demand (BOD) | Total | mg/L | None | 2.80 | | | | | No | |
| Boron | Dissolved | µg/L | 800 | 1,900 | X | X | X | X | Step 5 | Yes |
| Bromide | Dissolved | µg/L | None | 22,600 | | | X | X | Step 5 | |
| Bromochloroacetic Acid (BCAA) | Total | µg/L | None | 49.0 | | | | | No | |
| Bromodichloromethane | Total | µg/L | 0.56 | 370 | X | | | | Step 5 | |
| Bromoform | Total | µg/L | 4.3 | 1,400 | X | | | | Step 5 | |
| Cadmium | Dissolved | µg/L | 1.1 | 10.0 | X | | X | X | Step 5 | |
| Cadmium | Total | µg/L | 1.1 | 20.0 | X | | X | X | Step 5 | |
| Calcium | Dissolved | µg/L | None | 249,000 | | | | | No | |
| Captafol | Total | µg/L | None | 0.0200 | | | | | No | |
| Chloride | Dissolved | µg/L | 250,000 | 12,600,000 | X | X | X | | Step 5 | |

| Detected Constituents | Fraction | Units | Criteria | Maximum Detect | Exceeds Water Quality Objective or Criteria | 2010 303(d) listed | Concern Based on Professional Judgment | Concern Based on Public Scoping | Carried Forward? | Altered Water Quality (e.g., degradation) Possible |
|---|---|---|---|---|---|---|---|---|---|---|
| Chloride | Total | µg/L | 250,000 | 14,700,000 | X | X | X | | Step 5 | |
| Chloroform | Total | µg/L | None | 1,400 | | | | | No | |
| Chlorophyll a | Total | µg/L | None | 499 | | | | | No | |
| Chromium | Dissolved | µg/L | 50 | 10.0 | | | | | No | Yes |
| Chromium | Total | µg/L | 50 | 30.0 | | | | | No | Yes |
| Color | Total | Color Units | 15 | 406 | X | | | | Step 5 | |
| Conductance (EC) | None | µS/cm | 900 | 18,500 | X | X | X | | Step 5 | |
| Copper | Dissolved | µg/L | 3.1 | 149 | X | X | X | | Step 5 | |
| Copper | Total | µg/L | 3.1 | 478 | X | X | X | | Step 5 | |
| Dacthal (DCPA) | Total | µg/L | None | 0.480 | | | | | No | |
| Dibromoacetic Acid (DBAA) | Total | µg/L | 60 | 110 | X | | | | Step 5 | Yes |
| Dibromochloromethane | Total | µg/L | 0.401 | 590 | X | | | | Step 5 | |
| Dichloroacetic Acid (DCAA) | Total | µg/L | 60 | 140 | X | | | | Step 5 | Yes |
| Escherichiacoli | Total | MPN/100ml | None | 3,440 | | X | X | | Step 5 | |
| Fluorescence | Total | Fluoresence Uni | None | 56.7 | | | | | No | |
| Hardness | Dissolved | mg/L as CaCO$^3$ | None | 1,710 | | | | | No | |
| Hardness | Total | mg/L as CaCO$^3$ | None | 2,520 | | | | | No | |
| Iron | Dissolved | µg/L | 300 | 110 | | | | | No | Yes |
| Iron | Total | µg/L | 300 | 8,400 | X | | | | Step 5 | Yes |
| Kjeldahl Nitrogen | Total | mg/L as N | None | 3.40 | | | | | No | |
| Lead | Dissolved | µg/L | 2.5 | 12.0 | X | | X | | Step 5 | |
| Lead | Total | µg/L | 2.5 | 270 | X | | X | | Step 5 | |
| Magnesium | Dissolved | µg/L | None | 461,000 | | | | | No | |

| Detected Constituents | Fraction | Units | Criteria | Maximum Detect | Exceeds Water Quality Objective or Criteria | 2010 303(d) listed | Concern Based on Professional Judgment | Concern Based on Public Scoping | Carried Forward? | Altered Water Quality (e.g., degradation) Possible |
|---|---|---|---|---|---|---|---|---|---|---|
| Manganese | Dissolved | µg/L | 50 | 710 | X | | | | Step 5 | |
| Manganese | Total | µg/L | 50 | 950 | X | | | | Step 5 | |
| Mercury | Total | µg/L | 0.025 | 1.00 | X | X | X | | Step 5 | |
| Methoxychlor | Total | µg/L | 30 | 0.0900 | | | | | No | No |
| Methyl tert-butyl ether (MTBE) | Total | µg/L | 5 | 5.00 | | | | | No | Yes |
| Monobromoacetic Acid (MBAA) | Total | µg/L | 60 | 6.50 | | | | | No | No |
| Nickel | Dissolved | µg/L | 8.2 | 10.0 | X | X | X | X | Step 5 | Yes |
| Nitrate | Dissolved | mg/L as N | 10 | 9.79 | | | X | X | Step 5 | Yes |
| Nitrite | Dissolved | mg/L as N | 1 | 4.60 | X | | | | Step 5 | |
| Nitrite + Nitrate | Dissolved | mg/L as N | 10 | 4.60 | | | X | X | Step 5 | Yes |
| Organic Carbon | Dissolved | mg/L as C | 2 | 11.4 | X | | X | X | Step 5 | |
| Organic Carbon | Total | mg/L as C | 2 | 14.9 | X | | X | X | Step 5 | |
| Organic Nitrogen | Dissolved | mg/L as N | None | 1.80 | | | | | No | |
| Organic Nitrogen | Total | mg/L as N | None | 2.00 | | | | | No | |
| Oxygen | Dissolved | mg/L | 7 | 834 | X | X | | X | Step 5 | |
| pH | None | pH Units | 6.5 | 10.7 | X | | | | Step 5 | |
| Pheophytin a | Total | µg/L | None | 168 | | | | | No | |
| Phosphorus | Dissolved | µg/L as P | None | 6.52 | | | X | X | Step 5 | |
| Phosphorus | Total | µg/L as P | None | 1,400 | | | X | X | Step 5 | |
| Potassium | Dissolved | µg/L | None | 134,000 | | | | | No | |
| Secchi | Total | cm | None | 300 | | | | | No | |
| Selenium | Dissolved | µg/L | 4 | 7.00 | X | X | X | X | Step 5 | Yes |
| Silica ($SiO_2$) | Dissolved | mg/L | None | 28.0 | | | | | No | |
| Sodium | Dissolved | µg/L | None | 3,320,000 | | | | | No | |

| Detected Constituents | Fraction | Units | Criteria | Maximum Detect | Exceeds Water Quality Objective or Criteria | 2010 303(d) listed | Concern Based on Professional Judgment | Concern Based on Public Scoping | Carried Forward? | Altered Water Quality (e.g., degradation) Possible |
|---|---|---|---|---|---|---|---|---|---|---|
| Total Dissolved Solids | Total Dissolved | mg/L | 500 | 25,300 | X | X | X | | Step 5 | |
| Total Suspended Solids | Total Suspended | mg/L | None | 569 | | | X | | Step 5 | |
| Volatile Suspended Solids | Volatile Suspended | mg/L | None | 46.0 | | | X | | Step 5 | |
| Sulfate | Dissolved | µg/L | 250,000 | 874,000 | X | | | | Step 5 | |
| Trichloroacetic Acid (TCAA) | Total | µg/L | 60 | 190 | X | | | | Step 5 | Yes |
| Turbidity | None | NTU | 5 | 360 | X | | X | X | Step 5 | |
| Unknown hydrocarbon | Total | µg/L | None | 0.220 | | | | | No | |
| UV Absorbance @254nm | None | absorbance/cm | None | 0.295 | | | | | No | |
| Water Temperature | None | °C | None | 34.6 | | | X | X | Step 5 | |
| Zinc | Dissolved | µg/L | 81 | 163 | X | X | X | | Step 5 | Yes |
| Zinc | Total | µg/L | 81 | 590 | X | X | X | | Step 5 | Yes |
| Haloacetic acids | Total | µg/L | 60 | 330 | X | | X | | Step 5 | |
| Total Trihalomethanes | Total | µg/L | 80 | 1,640 | X | | X | | Step 5 | |

1 **Table SA-8. Step 3: Constituents Analyzed but Never Detected (Totaling 119) at a Source Water Monitoring Location**

| Non-Detected Constituents | Fraction | Units | Criteria | Minimum RL | All RL's are Above Criteria? | 2010 303(d) listed | Concern Based on Professional Judgment | Concern Based on Public Scoping | Carried Forward for Detailed Assessment |
|---|---|---|---|---|---|---|---|---|---|
| 1,1,1,2-Tetrachloroethane | Total | µg/L | None | 0.5 | | | | | No |
| 1,1,1-Trichloroethane | Total | µg/L | 200 | 0.5 | | | | | No |
| 1,1,2,2-Tetrachloroethane | Total | µg/L | 0.17 | 0.5 | X | | | | Step 4 |
| 1,1,2-Trichloroethane | Total | µg/L | 0.6 | 0.5 | | | | | No |
| 1,1-Dichloroethane | Total | µg/L | 5 | 0.5 | | | | | No |
| 1,1-Dichloroethene | Total | µg/L | 0.057 | 0.5 | X | | | | Step 4 |
| 1,1-Dichloropropene | Total | µg/L | None | 0.5 | | | | | No |
| 1,2,3-Trichlorobenzene | Total | µg/L | None | 0.5 | | | | | No |
| 1,2,3-Trichloropropane | Total | µg/L | None | 0.5 | | | | | No |
| 1,2,4-Trichlorobenzene | Total | µg/L | 5 | 0.5 | | | | | No |
| 1,2,4-Trimethylbenzene | Total | µg/L | None | 0.5 | | | | | No |
| 1,2-Dibromo-3-chloropropane (DBCP) | Total | µg/L | 0.2 | 0.5 | X | | | | Step 4 |
| 1,2-Dibromoethane (EDB) | Total | µg/L | 0.05 | 0.5 | X | | | | Step 4 |
| 1,2-Dichlorobenzene | Total | µg/L | 600 | 0.5 | | | | | No |
| 1,2-Dichloroethane | Total | µg/L | 0.38 | 0.5 | X | | | | Step 4 |
| 1,2-Dichloropropane | Total | µg/L | 0.52 | 0.5 | | | | | No |
| 1,3,5-Trimethylbenzene | Total | µg/L | None | 0.5 | | | | | No |
| 1,3-Dichlorobenzene | Total | µg/L | 400 | 0.5 | | | | | No |
| 1,3-Dichloropropane | Total | µg/L | None | 0.5 | | | | | No |
| 1,4-Dichlorobenzene | Total | µg/L | 5 | 0.5 | | | | | No |
| 2,2-Dichloropropane | Total | µg/L | None | 0.5 | | | | | No |
| 2,4-D | Total | µg/L | 70 | 0.25 | | | | | No |
| 2-Chlorotoluene | Total | µg/L | None | 0.5 | | | | | No |

| Non-Detected Constituents | Fraction | Units | Criteria | Minimum RL | All RL's are Above Criteria? | 2010 303(d) listed | Concern Based on Professional Judgment | Concern Based on Public Scoping | Carried Forward for Detailed Assessment |
|---|---|---|---|---|---|---|---|---|---|
| 4-Chlorotoluene | Total | µg/L | None | 0.5 | | | | | No |
| 4-Isopropyltoluene | Total | µg/L | None | 0.5 | | | | | No |
| Alachlor | Total | µg/L | 2 | 0.05 | | | | | No |
| Aldrin | Total | µg/L | 0.00013 | 0.01 | X | X | X | | Step 6 |
| Atrazine | Total | µg/L | 1 | 0.02 | | | | | No |
| Barium | Dissolved | µg/L | 100 | 1000 | X | | | | Step 4 |
| Benzene | Total | µg/L | 1 | 0.5 | | | | | No |
| BHC-alpha | Total | µg/L | 0.0039 | 0.01 | X | X | X | | Step 6 |
| BHC-beta | Total | µg/L | 0.014 | 0.01 | | X | X | | Step 6 |
| BHC-delta | Total | µg/L | None | 0.01 | | X | X | | Step 6 |
| BHC-gamma (Lindane) | Total | µg/L | 0.019 | 0.01 | | X | X | | Step 6 |
| Bromacil | Total | µg/L | None | 1 | | | | | No |
| Bromobenzene | Total | µg/L | None | 0.5 | | | | | No |
| Bromochloromethane | Total | µg/L | None | 0.5 | | | | | No |
| Bromomethane | Total | µg/L | 48 | 0.5 | | | | | No |
| Captan | Total | µg/L | None | 0.02 | | | | | No |
| Carbaryl | Total | µg/L | None | 2 | | | | | No |
| Carbofuran | Total | µg/L | 18 | 0.5 | | | | | No |
| Carbon tetrachloride | Total | µg/L | 0.25 | 0.5 | X | | | | Step 4 |
| Chlordane | Total | µg/L | 0.00057 | 0.05 | X | X | X | | Step 6 |
| Chlorobenzene | Total | µg/L | 70 | 0.5 | | | | | No |
| Chloroethane | Total | µg/L | None | 0.5 | | | | | No |
| Chloromethane | Total | µg/L | None | 0.5 | | | | | No |
| Chlorothalonil | Total | µg/L | None | 0.01 | | | | | No |

| Non-Detected Constituents | Fraction | Units | Criteria | Minimum RL | All RL's are Above Criteria? | 2010 303(d) listed | Concern Based on Professional Judgment | Concern Based on Public Scoping | Carried Forward for Detailed Assessment |
|---|---|---|---|---|---|---|---|---|---|
| Chlorpropham | Total | µg/L | None | 0.02 | | | | | No |
| Chlorpyrifos | Total | µg/L | 0.015 | 0.01 | | X | X | | Step 6 |
| cis-1,2-Dichloroethene | Total | µg/L | 6 | 0.5 | | | | | No |
| cis-1,3-Dichloropropene | Total | µg/L | None | 0.5 | | | | | No |
| Clostridium perfringens | Total | CFU/100ml | None | 0 | | | | | No |
| Cryptosporidium | None | Cysts/100L | None | 10 | | X | | | Step 6 |
| Diazinon | Total | µg/L | 0.1 | 0.01 | | X | X | | Step 6 |
| Dibromomethane | Total | µg/L | None | 0.5 | | | | | No |
| Dichloran | Total | µg/L | None | 0.01 | | | | | No |
| Dichlorodifluoromethane | Total | µg/L | None | 0.5 | | | | | No |
| Dicofol | Total | µg/L | None | 0.01 | | | | | No |
| Dieldrin | Total | µg/L | 0.00014 | 0.01 | X | X | X | | Step 6 |
| Diuron | Total | µg/L | None | 0.05 | | | | | No |
| Endosulfan (mixed isomers) | Total | µg/L | None | 0.01 | | X | X | | Step 6 |
| Endosulfan-I | Total | µg/L | 0.0087 | 0.01 | X | X | X | | Step 6 |
| Endosulfan-II | Total | µg/L | 0.0087 | 0.01 | X | X | X | | Step 6 |
| Endrin | Total | µg/L | 0.0023 | 0.01 | X | X | X | | Step 6 |
| Endrin aldehyde | Total | µg/L | 0.76 | 0.01 | | | | | No |
| Ethyl benzene | Total | µg/L | 300 | 0.5 | | | | | No |
| Fecal Coliform | Total | MPN | None | 1 | | | | | No |
| Giardia lamblia | Total | Cysts/100L | None | 10 | | | | | No |
| Heptachlor | Total | µg/L | 0.00021 | 0.01 | X | X | | | Step 6 |
| Hexachlorobutadiene | Total | µg/L | 0.44 | 0.5 | X | | | | Step 4 |
| Isopropylbenzene | Total | µg/L | None | 0.5 | | | | | No |

| Non-Detected Constituents | Fraction | Units | Criteria | Minimum RL | All RL's are Above Criteria? | 2010 303(d) listed | Concern Based on Professional Judgment | Concern Based on Public Scoping | Carried Forward for Detailed Assessment |
|---|---|---|---|---|---|---|---|---|---|
| m + p Xylene | Total | µg/L | 1750 | 0.5 | | | | | No |
| Malathion | Total | µg/L | None | 0.01 | | | | | No |
| MCPA | Total | µg/L | None | 50 | | | | | No |
| Mercury | Dissolved | µg/L | 0.025 | 1 | X | X | X | | Step 6 |
| Methamidophos | Total | µg/L | None | 1 | | | | | No |
| Methylene chloride | Total | µg/L | 4.7 | 0.5 | | | | | No |
| Molinate | Total | µg/L | 20 | 0.5 | | | | | No |
| Monochloroacetic Acid (MCAA) | Total | µg/L | 60 | 1 | | | | | No |
| m-Xylene | Total | µg/L | 1,750 | 0.5 | | | | | No |
| Naphthalene | Total | µg/L | None | 0.5 | | | | | No |
| n-Butylbenzene | Total | µg/L | None | 0.5 | | | | | No |
| n-Propylbenzene | Total | µg/L | None | 0.5 | | | | | No |
| o-Xylene | Total | µg/L | 1,750 | 0.5 | | | | | No |
| p,p'-DDD | Total | µg/L | 0.00083 | 0.01 | X | | X | | Step 6 |
| p,p'-DDE | Total | µg/L | 0.00059 | 0.01 | X | | X | | Step 6 |
| p,p'-DDT | Total | µg/L | 0.00059 | 0.01 | X | X | X | | Step 6 |
| Parathion (Ethyl) | Total | µg/L | None | 0.01 | | | | | No |
| Parathion, Methyl | Total | µg/L | None | 0.01 | | | | | No |
| PCB-1016 | Total | µg/L | 0.00017 | 0.1 | X | X | | | Step 6 |
| PCB-1221 | Total | µg/L | 0.00017 | 0.1 | X | X | | | Step 6 |
| PCB-1232 | Total | µg/L | 0.00017 | 0.1 | X | X | | | Step 6 |
| PCB-1242 | Total | µg/L | 0.00017 | 0.1 | X | X | | | Step 6 |
| PCB-1248 | Total | µg/L | 0.00017 | 0.1 | X | X | | | Step 6 |
| PCB-1254 | Total | µg/L | 0.00017 | 0.1 | X | X | | | Step 6 |

| Non-Detected Constituents | Fraction | Units | Criteria | Minimum RL | All RL's are Above Criteria? | 2010 303(d) listed | Concern Based on Professional Judgment | Concern Based on Public Scoping | Carried Forward for Detailed Assessment |
|---|---|---|---|---|---|---|---|---|---|
| PCB-1260 | Total | µg/L | 0.00017 | 0.1 | X | X | | | Step 6 |
| Pentachloronitrobenzene (PCNB) | Total | µg/L | None | 0.01 | | | | | No |
| Propanil | Total | µg/L | None | 0.1 | | | | | No |
| Propham | Total | µg/L | None | 2 | | | | | No |
| p-Xylene | Total | µg/L | 1750 | 0.5 | | | | | No |
| sec-Butylbenzene | Total | µg/L | None | 0.5 | | | | | No |
| Selenium | Total | µg/L as P | 4 | 1 | | X | X | X | Step 6 |
| Simazine | Total | µg/L | 4 | 0.02 | | | | | No |
| Styrene | Total | µg/L | 100 | 0.5 | | | | | No |
| tert-Butylbenzene | Total | µg/L | None | 0.5 | | | | | No |
| Tetrachloroethene | Total | µg/L | 0.8 | 0.5 | | | | | No |
| Thiobencarb | Total | µg/L | 1 | 0.02 | | | | | No |
| Toluene | Total | µg/L | 150 | 0.5 | | | | | No |
| Total Coliform | None | MPN | None | 1 | | | | | No |
| Toxaphene | Total | µg/L | 0.0002 | 0.2 | X | X | | | Step 6 |
| trans-1,2-Dichloroethene | Total | µg/L | 10 | 0.5 | | | | | No |
| trans-1,3-Dichloropropene | Total | µg/L | None | 0.5 | | | | | No |
| Trichloroethene | Total | µg/L | 2.7 | 0.5 | | | | | No |
| Trichlorofluoromethane | Total | µg/L | 150 | 0.5 | | | | | No |
| Vinyl chloride | Total | µg/L | 0.5 | 0.5 | | | | | No |
| Yttrium | Dissolved | µg/L | None | 100 | | | | | No |
| PCBs (Polychlorinated biphenyls) | Total | µg/L | 0.00017 | 0.1 | X | X | X | | Step 6 |
| Xylenes | Total | µg/L | 1750 | 0.5 | | | | | No |
| PAHs | Total | µg/L | None | 0.5 | | | X | | Step 6 |

**Table SA-9. Step 4: Constituents analyzed but not detected which have reporting limits above minimum applicable criteria and constituents never analyzed but still considered for detailed assessment (totaling 13).**

| Non-Detect Constituents and Constituents not in database considered for assessment | Fraction | Knowledge about potential, relative source contributions? | 2010 303(d) listed | Concern Based on Professional Judgment | Concern Based on Public Scoping | Carried Forward for Detailed Assessment |
|---|---|---|---|---|---|---|
| 1,1,2,2-Tetrachloroethane | Total | | | | | No |
| 1,1-Dichloroethene | Total | | | | | No |
| 1,2-Dibromo-3-chloropropane (DBCP) | Total | | | | | No |
| 1,2-Dibromoethane (EDB) | Total | | | | | No |
| 1,2-Dichloroethane | Total | | | | | No |
| Barium | Dissolved | | | | | No |
| Carbon tetrachloride | Total | | | | | No |
| Hexachlorobutadiene | Total | | | | | No |
| *Other Constituents* | | | | | | |
| Endocrine Disruptors and CECs | Total | X | | X | | Step 6 |
| Pyrethroids | Total | X | | X | | Step 6 |
| Aluminum | Total | X | | X | | Step 6 |
| Silver | Total | X | | X | | Step 6 |
| Dioxins/Furans | Total | X | | X | | Step 6 |

**Table SA-10. Step 5: Determination of whether constituents detected at least once at a source water monitoring location (totaling 39) will be assessed quantitatively.**

| Detected Constituents of Concern | Measured at all locations | # Measured Exceeds Threshold at Each Location [1] | # Detects Exceeds Threshold at Each Location [2] | Adequate Delta Modeling Tools | Modeling Needed for Impact Assessment | Type of Assessment |
|---|---|---|---|---|---|---|
| Aluminum | | | | | | Qualitative |
| Ammonia | X | X | X | | | Qualitative |
| Arsenic | X | X | X | X | | Qualitative |
| Asbestos, Chrysotile | X | | | | | Qualitative |
| BHC | X | | | | | Qualitative |
| Boron | X | X | X | X | X | Quantitative |
| Bromide | X | X | X | X | X | Quantitative |
| Bromodichloromethane | X | X | X | | | Qualitative |
| Bromoform | X | X | | | | Qualitative |
| Cadmium | X | | | X | | Qualitative |
| Chloride | X | X | X | X | X | Quantitative |
| Color | X | X | X | | | Qualitative |
| Conductance (EC) | X | X | X | X | X | Quantitative |
| Copper | X | X | X | X | | Qualitative |
| Dibromoacetic Acid (DBAA) | X | X | | | | Qualitative |
| Dibromochloromethane | X | X | | | | Qualitative |
| Dichloroacetic Acid (DCAA) | X | X | X | | | Qualitative |
| Escherichiacoli | X | X | | | | Qualitative |
| Lead | X | | | X | | Qualitative |
| Manganese | X | | | X | | Qualitative |
| Mercury | X | | | X | X | Qualitative |
| Nickel | | | | X | | Qualitative |
| Nitrate | X | X | X | | | Qualitative |
| Nitrite | X | X | X | | | Qualitative |
| Nitrite + Nitrate | X | X | X | | | Qualitative |
| Organic Carbon | X | X | X | X | X | Quantitative |
| Oxygen | X | X | X | | | Qualitative |
| pH | X | X | X | | | Qualitative |
| Phosphorus | X | X | X | | | Qualitative |
| Selenium | X | X | X [3] | X | X | Quantitative |
| Total Dissolved Solids | X | X | X | X | X | Quantitative |
| Total Suspended Solids | X | X | X | | | Qualitative |
| Volatile Suspended Solids | X | X | X | | | Qualitative |
| Sulfate | X | X | X | X | | Qualitative |
| Trichloroacetic Acid (TCAA) | X | X | X | | | Qualitative |
| Turbidity | X | X | X | | | Qualitative |
| Water Temperature | X | X | X | X | | Qualitative |
| Zinc | X | X | X | X | | Qualitative |
| Haloacetic acids | X | X | X | | | Qualitative |
| Total Trihalomethanes | X | X | X | | | Qualitative |

[1] Threshold was at least 10 measurements at each location.
[2] Threshold was at least 10 detects at a single location.
[3] Additional data not included in the original Screening Analysis database allowed for a quantitative assessment for selenium

**Table SA-11. Step 6 Water quality constituents (totaling 72) for which detailed assessments were performed**

| Constituents Carried Forward for Further Analysis | Quantitative | Qualitative | Location of Assessment |
|---|---|---|---|
| Aluminum | | X | Trace Metals |
| Ammonia | | X | Ammonia |
| Boron | X | | Boron |
| Bromide | X | | Bromide |
| Chloride | X | | Chloride |
| Oxygen | | X | Dissolved Oxygen |
| Conductance (EC) | X | | Electrical Conductivity (EC)/TDS |
| Total Dissolved Solids | X | | Electrical Conductivity (EC)/TDS |
| Mercury | X | | Mercury |
| Nitrate | X | X | Nitrate |
| Nitrite | | X | Nitrate |
| Nitrite + Nitrate | | X | Nitrate |
| Bromodichloromethane | | X | Organic Carbon (DOC/TOC) |
| Bromoform | | X | Organic Carbon (DOC/TOC) |
| Dibromoacetic Acid (DBAA) | | X | Organic Carbon (DOC/TOC) |
| Dibromochloromethane | | X | Organic Carbon (DOC/TOC) |
| Dichloroacetic Acid (DCAA) | | X | Organic Carbon (DOC/TOC) |
| Organic Carbon | X | | Organic Carbon (DOC/TOC) |
| Trichloroacetic Acid (TCAA) | | X | Organic Carbon (DOC/TOC) |
| Haloacetic acids | | X | Organic Carbon (DOC/TOC) |
| Total Trihalomethanes | | X | Organic Carbon (DOC/TOC) |
| Cryptosporidium | | X | Pathogens |
| Escherichiacoli | | X | Pathogens |
| Aldrin | | X | Pesticides and Herbicides |
| BHC | | X | Pesticides and Herbicides |
| BHC-alpha | | X | Pesticides and Herbicides |
| BHC-beta | | X | Pesticides and Herbicides |
| BHC-delta | | X | Pesticides and Herbicides |
| BHC-gamma (Lindane) | | X | Pesticides and Herbicides |
| Chlordane | | X | Pesticides and Herbicides |
| Chlorpyrifos | | X | Pesticides and Herbicides |
| Diazinon | | X | Pesticides and Herbicides |
| Dieldrin | | X | Pesticides and Herbicides |
| Endosulfan (mixed isomers) | | X | Pesticides and Herbicides |
| Endosulfan-I | | X | Pesticides and Herbicides |
| Endosulfan-II | | X | Pesticides and Herbicides |
| Endrin | | X | Pesticides and Herbicides |
| Heptachlor | | X | Pesticides and Herbicides |
| p,p'-DDD | | X | Pesticides and Herbicides |
| p,p'-DDE | | X | Pesticides and Herbicides |
| p,p'-DDT | | X | Pesticides and Herbicides |
| Toxaphene | | X | Pesticides and Herbicides |
| Pyrethroids | | X | Pesticides and Herbicides |
| Phosphorus | | X | Phosphorus |
| Selenium | X | | Selenium |
| Arsenic | | X | Trace Metals |

| Constituents Carried Forward for Further Analysis | Quantitative | Qualitative | Location of Assessment |
|---|---|---|---|
| Cadmium | | X | Trace Metals |
| Copper | | X | Trace Metals |
| Lead | | X | Trace Metals |
| Manganese | | X | Trace Metals |
| Nickel | | X | Trace Metals |
| Zinc | | X | Trace Metals |
| Aluminum | | X | Trace Metals |
| Silver | | X | Trace Metals |
| Total Suspended Solids | | X | Turbidity and TSS |
| Volatile Suspended Solids | | X | Turbidity and TSS |
| Turbidity | | X | Turbidity and TSS |
| Water Temperature | | X | Fisheries and Aquatic Resources |
| Asbestos, Chrysotile | | X | Screening Analysis |
| Color | | X | Screening Analysis |
| Dioxins/Furans | | X | Screening Analysis |
| Endocrine Disruptors and CECs | | X | Screening Analysis |
| PAHs | | X | Screening Analysis |
| PCB-1016 | | X | Screening Analysis |
| PCB-1221 | | X | Screening Analysis |
| PCB-1232 | | X | Screening Analysis |
| PCB-1242 | | X | Screening Analysis |
| PCB-1248 | | X | Screening Analysis |
| PCB-1254 | | X | Screening Analysis |
| PCB-1260 | | X | Screening Analysis |
| PCBs (Polychlorinated biphenyls) | | X | Screening Analysis |
| pH | | X | Screening Analysis |
| Sulfate | | X | Screening Analysis |

# 8C.2 References

Bales, R. C., D. D. Newkirk and S. B. Hayward. Chrysotile Asbestos in California Surface Waters: from Upstream Rivers through Water Treatment Journal of American Water Works Association, 76: 66-74,1984.

BDAT (Bay Delta and Tributaries Project). 2009. Bay Delta and Tributaries Project. Site accessed March 2, 2009. URL = http://bdat.ca.gov/index.html.

CVRWQCB (Central Valley Regional Water Quality Control Board). 2002b. Amendment to the Water Quality Control Plan for the Sacramento River and San Joaquin River Basins for Bacteria, Staff Report and Functional Equivalent Document, Final Report. Prepared by the Regional Water Quality Control Board, Central Valley Region. September.

deVlaming, V. 2008. Organochlorine Pesticides and Polychlorinated Biphenyls (PCB) Concentrations in Muscle Tissue of Fish Collected from the San Joaquin River and Sacramento River Watersheds and Delta During 2005. March. Davis, CA. Prepared for Central Valley Regional Water Quality Control Board, Rancho Cordova, CA.

DWR (California Department of Water Resources). 2009. Water Data Library. Site accessed March 3, 2009. URL =www.wdl.water.ca.gov.

Hayward, D., M. Petreas, J. Visita, M. McKinney, and R. Stephens. 1996. Investigation of a Wood Treatment Facility: Impact on an Aquatic Ecosystem in the San Joaquin River, Stockton, California. *Environmental Contamination and Toxicology*. Volume 30(1996): 30–39.

Hem, J. 1985. Study and Interpretation of the Chemical Characteristics of Natural Water. Third Edition. United State Geological Survey Water-Supply Paper 2254. Reprinted in 1986 and 1989.

Lavado, R., J. E. Loyo-Rosales, E. Floyd, E. P. Kolodziej, S. A. Snyder, D. L. Sedlak, and D. Schlenk. 2009. Site-Specific Profiles of Estrogenic Activity in Agricultural Areas of California's Inland Waters. Environmental Science and Technology 43(24):9110–9116.

Leatherbarrow, J. E., L. J. McKee, D. H. Schoellhamer, N. K. Ganju, and A. R. Flegal. 2005. Concentrations and loads of organic contaminants and mercury associated with suspended sediment discharged to San Francisco Bay from the Sacramento-San Joaquin River Delta, California RMP Technical Report. SFEI Contribution 405. San Francisco Estuary Institute. Oakland, CA.

OEHHA. 2009. 2009 update of California sport fish advisories. March 2009.

SFBRWQCB. 2008. Order No. R2-2008-0012. Amending the Water Quality Control Plan for the San Francisco Bay Region to Establish a Total Maximum Daily Load and Implementation Plan for PCBs in the San Francisco Bay.

SFEI (San Francisco Estuary Institute). 2010. San Francisco Estuary Institute. Site accessed April 13, 2010. URL = http://www.sfei.org/RMP/report.

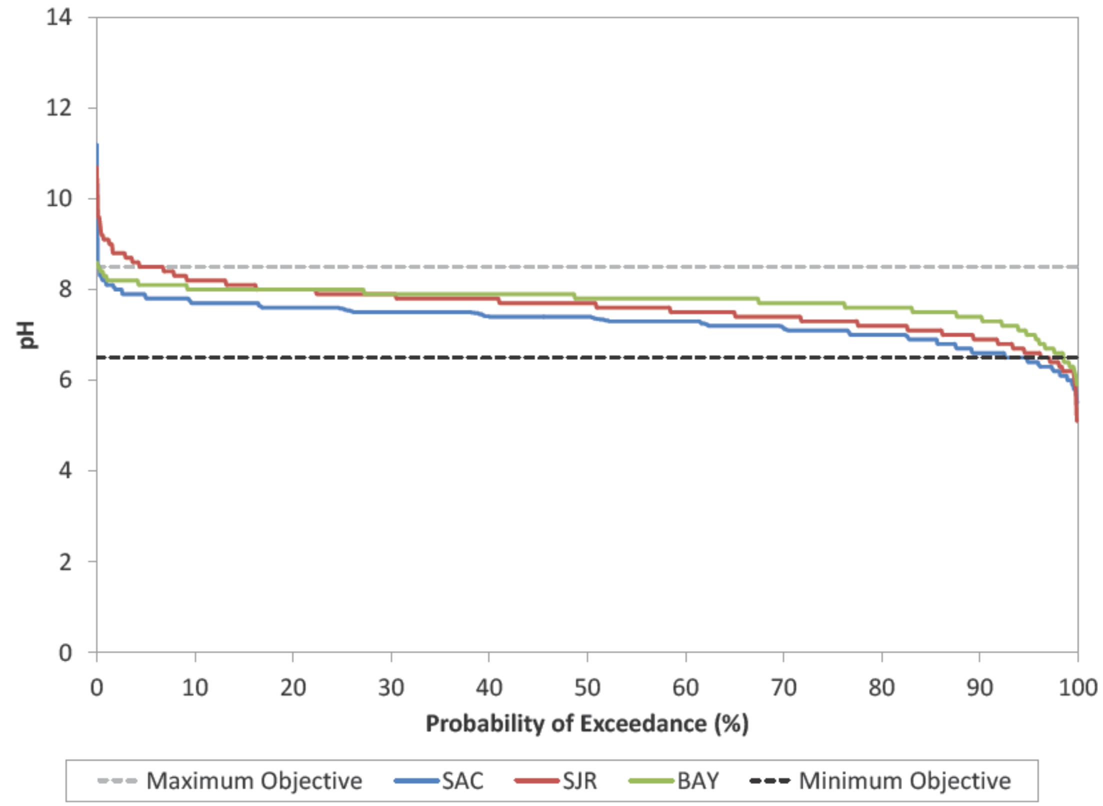
USEPA. 2012a. Basic Information about Asbestos in Drinking Water. Site accessed February 8, 2012. URL = http://water.epa.gov/drink/contaminants/basicinformation/asbestos.cfm.

USEPA. 2012b. Secondary Drinking Water Regulations: Guidance for Nuisance Chemicals. Site accessed February 8, 2012.URL = http://water.epa.gov/drink/contaminants/secondarystandards.cfm

USEPA. 2012b. Dioxins in San Francisco Bay: Questions and Answers. Site accessed February 8, 2012. EPA 2012c http://www.epa.gov/region9/water/dioxin/sfbay.html

USEPA. 2012d. Region 9 Superfund; McCormick and Baxter Creosoting Co. Site accessed February 8, 2012.URL =http://yosemite.epa.gov/r9/sfund/r9sfdocw.nsf/vwsoalphabetic/McCormick+&+Baxter+Creosoting+Co.

World Health Organization. 2002. Global Assessment of the State-of-the-Sciences of Endocrine Disruptors. International Programme on Chemical Safety.




App_8C-1_Prob_Exceedance (September 25, 2013 3:28 PM) SS

**Figure 8C-1**
**Probability of Exceedance for pH for Sacramento River at Freeport/Greene's Landing, San Joaquin River at Vernalis, and San Francisco Bay at Martinez for 1975–2009**