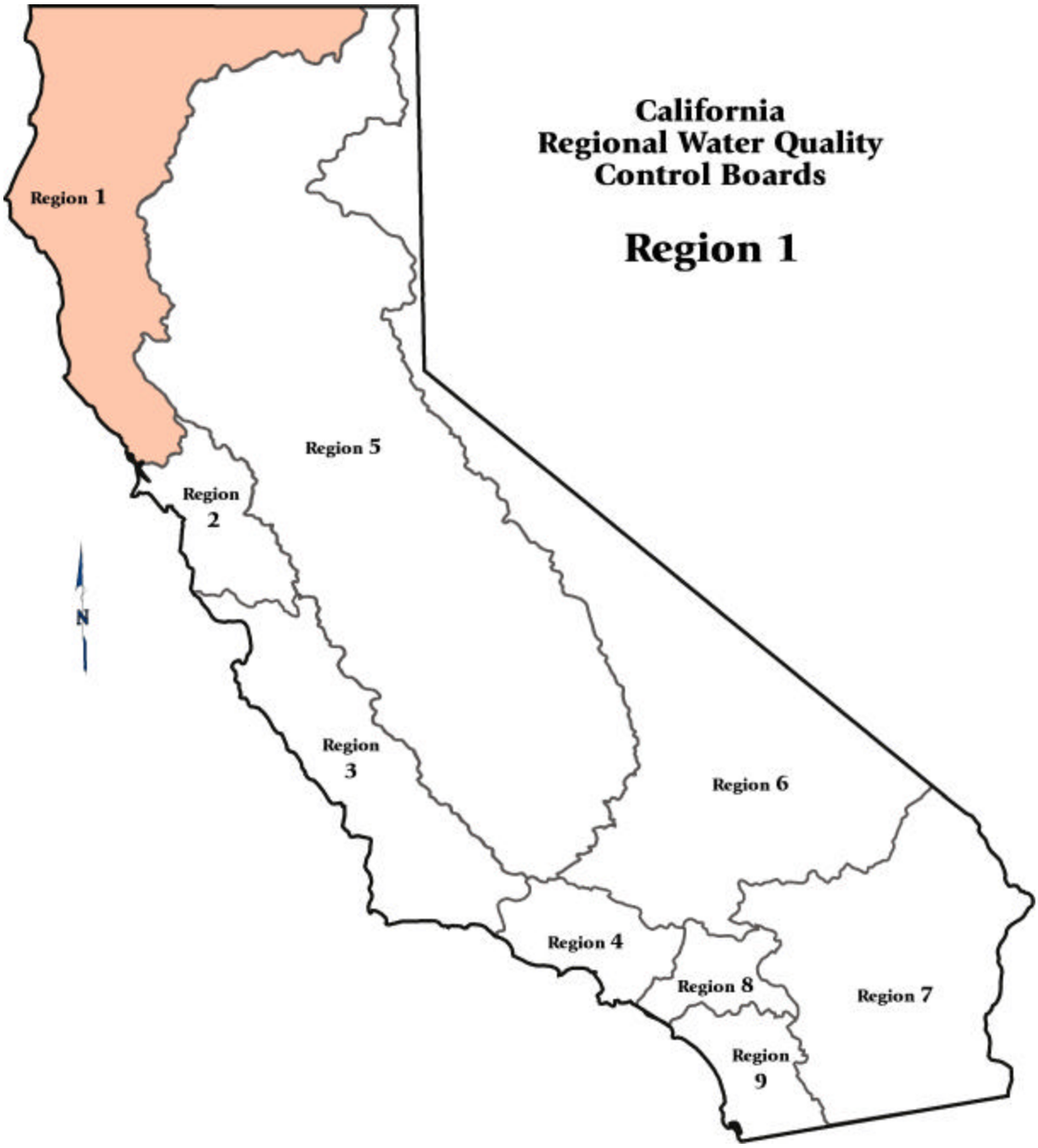
# Fact Sheets Supporting
# Revision of the Section 303(d) List




September 2005

# *Table of Contents*

Page left blank intentionally.

# North Coast Region (1)

# LIST

## Recommendations to place waters and pollutants on the section 303(d) List

Page left blank intentionally.

Region 1

---

**Water Segment:** Bodega HU, Bodega Harbor HA

**Pollutant:** Exotic Species

**Decision:** List

**Weight of Evidence:** This pollutant is being considered for placement on the section 303(d) list under section 3.10 of the Listing Policy. Under section 3.10 a single line of evidence is necessary to assess listing status.

One line of evidence is available in the administrative record to assess this pollutant. Over a nine-year period, experiments strongly indicated that non-native presence was responsible for sharp native benthic community abundance declines in Bodega Bay Harbor.

Based on the readily available data and information, the weight of evidence indicates that there is sufficient justification in favor of placing this water segment-pollutant combination on the section 303(d) list in the Water Quality Limited Segments category.

This conclusion is based on the staff findings that:
1) This study was conducted from 1989-1998, excluding 1992.
2) Path analysis was applied on and similar methods were used to measure abundance data.
3) The non-native European green crab exerted top-down control significantly reducing the abundances of several native invertebrate species monitored, which showed sharp declines within 3 years of green crab arrival.
4) Field and lab experiments indicated green crab predation was responsible for these declines.
5) It cannot be determined if the trend in water quality is expected to meet water standards by the next listing cycle.
6) Pursuant to section 3.11 of the Listing Policy, no additional data and information are available indicating that standards are not met.

**SWRCB Staff Recommendation:** After review of the available data and information, SWRCB staff concludes that the water body-pollutant combination should be placed on the section 303(d) list because applicable water quality standards are exceeded and a pollutant contributes to or causes the problem.

**Lines of Evidence:**

---

***Numeric Line of Evidence*** Population/Community Degradation

| | |
|---|---|
| *Beneficial Use:* | MA - Marine Habitat |
| *Matrix:* | Water |
| *Water Quality Objective/ Water Quality Criterion:* | All waters shall be maintained free of toxic substances in concentrations that are toxic to, or that produce detrimental physiological responses in human, plant, animal, or aquatic life. Use of indicator organisms, analyses of species diversity, population density, growth anomalies, bioassays of appropriate duration, or other appropriate methods as specified by the Regional Water Board will determine compliance with this objective. |
| *Data Used to Assess Water Quality:* | Non-native green crab (Grosholz et al. 2000) was first observed in 1993 in Bodega Bay Harbor, CA. This study measured the impact of the green crab, Carcinus maenus, on a coastal marine food web and found this predator exerted strong top-down control significantly reducing the abundances of several native invertebrate species monitored over a nine year period, (Grosholz et al. 2000). Several native species showed sharp declines within three years of the arrival of green crabs. Field and lab experiments indicated that green crab predation was responsible for these declines. To analyze the strength of direct and indirect impacts of green crab predation, path analysis was employed on the abundance data. |
| *Spatial Representation:* | Bodega Bay Harbor in California is ~2 km squared in area. Abundance of all crab species was estimated using three pitfall traps at 50-m intervals along four transect lines parallel to the shoreline. Benthic invertebrate abundance and both native shore crab species were measured along the four transects. In April of each year, a total of six core samples were taken at 20-m intervals along these transects for both Nutricola species. The same method was used to estimate changes in selected invertebrates at other sites in BBH. |
| *Temporal Representation:* | The time period, unless otherwise specified is from 1989-1998, excluding 1992. Abundance of all crab species was estimated annually in late May to early June. Actual density of green crabs was estimated visually 2-4 times annually from 1994-1996. Invertebrate abundance was measured annually. Abundance for both native shore crab species was measured during April of each year. The same time period was used to estimate changes in selected invertebrates at other sites in BBH, and for 13 species of wintering shorebirds. For the shorebirds, data were collected three times annually (Aug 15 to Sept 30, Nov 15 to Dec 31, and Jan 15 to Feb 28). |
| *Environmental Conditions:* | Changes in relative diversity and abundance of native species may also be driven by habitat alteration, flow changes, or hydro-modification. |
| *Data Quality Assessment:* | Peer Reviewed Journal Article. |

Region 1

---

**Water Segment:** Clair Engle Lake

**Pollutant:** Mercury

**Decision:** List

**Weight of Evidence:** This pollutant is being considered for placement on the section 303(d) list under section 3.5 of the Listing Policy. One line of evidence is available in the administrative record to assess this pollutant.

Based on the readily available data and information, the weight of evidence indicates that there is sufficient justification in favor of placing this water segment-pollutant combination on the section 303(d) list in the Water Quality Limited Segments category.

This conclusion is based on the staff findings that:
1. The data used satisfies the data quality requirements of section 6.1.4 of the Policy.
2. The data used satisfies the data quantity requirements of section 6.1.5 of the Policy.
3. Eleven of the 50 samples exceeded the OEHHA Screening Value and this exceeds the allowable frequency listed in Table 3.1 of the Listing Policy.
4. Pursuant to section 3.11 of the Listing Policy, no additional data and information are available indicating that standards are not met.

**SWRCB Staff Recommendation:** After review of the available data and information, SWRCB staff concludes that the water body-pollutant combination should be placed on the section 303(d) list because applicable water quality standards are exceeded and a pollutant contributes to or causes the problem.

**Lines of Evidence:**

---

***Numeric Line of Evidence*** Pollutant-Tissue

*Beneficial Use:* CM - Commercial and Sport Fishing (CA)

*Matrix:* Tissue

*Water Quality Objective/ Water Quality Criterion:* North Coast RWQCB Water Quality Control Plan: All waters shall be maintained free of toxic substances in concentrations that are toxic to, or that produce detrimental physiological responses in human, plant, animal, or aquatic life.

| | |
|---|---|
| *Evaluation Guideline:* | 0.3 ug/g (OEHHA Screening Value). |
| *Data Used to Assess Water Quality:* | Eleven out of 50 samples exceeded. Filet composite and individual samples were collected. Species collected were brown trout, rainbow trout, chinook salmon, largemouth bass, smallmouth bass, and white catfish. Two individual samples of chinook salmon, 8 individual samples of smallmouth bass, and 1 composite of smallmouth bass exceeded the guideline (TSMP, 2002). |
| *Spatial Representation:* | One station located along the east fork of the lake. |
| *Temporal Representation:* | Samples were collected in 9/24/2002, 9/25/2002, and 9/27/2002. |
| *Data Quality Assessment:* | Environmental Chemistry Quality Assurance and Data Report for the Toxic Substances Monitoring Program, 2001-2002, Department of Fish and Game. |

Region 1

---

**Water Segment:** Klamath River HU, Lower HA, Klamath Glen HSA

**Pollutant:** Sedimentation/Siltation

**Decision:** List

**Weight of Evidence:** This pollutant is being considered for placement on the section 303(d) list under section 3 of the Listing Policy. Under section 3 a single line of evidence is necessary to assess listing status.

Three lines of evidence are available in the administrative record to assess this pollutant. Two of these lines of evidence support placing this water body segment on the section 303(d) list. The narrative information, photos and study findings submitted supports the numerical information submitted in concluding that a sedimentation problem exists in this water body.

Based on the readily available data and information, the weight of evidence indicates that there is sufficient justification in favor of placing this water segment-pollutant combination on the section 303(d) list in the Water Quality Limited Segments category.

This conclusion is based on the staff findings that:
1. The data used satisfies the data quality requirements of section 6.1.4 of the Policy.
2. The data used satisfies the data quantity requirements of section 6.1.5 of the Policy.
3. There are 8 weekly averages out of 31 weeks of 7 consecutive day averages that exceeded the evaluation guideline for turbidity and this exceeds the allowable frequency listed in Table 3.2 of the Listing Policy.
4. Pursuant to section 3.11 of the Listing Policy, no additional data and information are available indicating that standards are not met.

**SWRCB Staff Recommendation:** After review of the available data and information, SWRCB staff concludes that the water body-pollutant combination should be placed on the section 303(d) list because applicable water quality standards are exceeded and a pollutant contributes to or causes the problem.

**Lines of Evidence:**

---

***Numeric Line of Evidence*** Pollutant-Water

*Beneficial Use:* CO - Cold Freshwater Habitat

| | |
|---|---|
| *Matrix:* | Water |
| *Water Quality Objective/ Water Quality Criterion:* | Basin Plan: The suspended sediment load and suspended sediment discharge rate of surface waters shall not be altered in such a manner as to cause nuisance or adversely affect beneficial uses. Turbidity shall not be increased more than 20 percent above naturally occurring background levels. Allowable zones of dilution within which higher percentages can be tolerated may be defined for specific discharges upon the issuance of discharge permits or waiver thereof. Water shall not contain substances in concentrations that result in deposition of material that causes nuisance or adversely affect beneficial uses. |
| *Evaluation Guideline:* | The evaluation guideline that has been used to help determine exceedance is from published-peer reviewed paper, Noggle (1978, cited in Meehan 1991) reported that suspended sediment concentrations of 300 mg/L caused reduced growth and feeding. |
| *Data Used to Assess Water Quality:* | When you consider the entire data set from the three creeks sampling locations the data only shows one exceedance of the evaluation guideline out of the 21 samples taken. The one Suspended Sediment Concentration (SSC) exceedance that was shown was on 12/14/02 at 12:45 at McGarvey Creek and the SSC was 307 mg/L. The other samples taken at McGarvey had an average of 231.5 mg/L for 12/14/02, 117 for the 1/13/ 03 Avg., and 8.39 mg/L for the April 2003 Avg. The Blue Creek location had an SSC average 5.05 mg/L for 4/28/03 and 9.97 mg/L average for samples taken on 12/9/03. The Turwar Creek only had samples on 4/29/03 with and average SSC of 3.46 mg/L (Yurok Tribe, 2003). |
| *Spatial Representation:* | Three sampling locations; Blue Creek, McGarvey Creek and Turwar Creek gauging stations are located in the Lower Klamath River Basin. |
| *Temporal Representation:* | The data were collected from only 6 days from 4 different months between 12/2002 and 12/2003. SSC Data was collected from the McGarvey Creek station on 12/14/02, 1/13/03, 4/4/03, and 4/30/03. Data were collected from this location between 12:28 pm and 13:45 pm on each of the respective sampling dates. SSC Data was collected from the Blue Creek Sampling location on 4/28/03 and 12/9/03. Data was collected from this location between 12:28pm on 4/28/03 and between 14:50 and 15:15pm on 12/29/03. SSC Data was collected from the Turwar location on 4/29/03 only between 12:00 and 12:20 pm. |
| *Environmental Conditions:* | Regional Water Board staff have long suggested that beneficial uses may be impaired in portions of the mainstem Klamath (particularly in the lower Klamath River) and tributaries to the Klamath River (Beaver Creek and tributaries to the Klamath below the confluence with the Trinity River have been specifically identified) due to excessive sediment loading and instream sediment conditions. Insufficient information was available in 2002 to make a listing determination. The Yurok Indian Reservation boundaries lie approximately one mile on either side of the Klamath River from the Pacific Ocean to the confluence with the Trinity River. The Yurok, Karuk, and Hoopa Tribes are very active throughout the Klamath basin in both fisheries and water quality monitoring efforts. The Yurok and Hoopa Tribe are actively pursuing approval of Clean Water Act authority from US EPA. Coordination among the Regional Water Board, State Water Board, the Tribes and US EPA is critical to successful development and implementation of TMDL's for the Klamath River basin. |

| | |
|---|---|
| *Data Quality Assessment:* | "Sampling and Analysis Plan for the Yurok Reservation, May 2003." This plan includes the tribe's data quality objectives, sampling rationales and procedures, field methods and procedures, sample preservation and storage and quality control information. They also included Appendix-C of that plan in their submittal, which is their "Draft Water Quality Control Plan for the Yurok Indian Reservation, January 2003". These documents have been submitted to USEPA for approval. |

---

| | |
|---|---|
| ***Numeric Line of Evidence*** | Pollutant-Water |
| *Beneficial Use:* | CO - Cold Freshwater Habitat |
| *Matrix:* | Water |
| *Water Quality Objective/ Water Quality Criterion:* | Basin Plan: The suspended sediment load and suspended sediment discharge rate of surface waters shall not be altered in such a manner as to cause nuisance or adversely affect beneficial uses. Turbidity shall not be increased more than 20 percent above naturally occurring background levels. Allowable zones of dilution within which higher percentages can be tolerated may be defined for specific discharges upon the issuance of discharge permits or waiver thereof. Water shall not contain substances in concentrations that result in deposition of material that causes nuisance or adversely affect beneficial uses. |
| *Evaluation Guideline:* | The evaluation guideline that has been used to determine turbidity exceedance is from published-peer reviewed paper, "The Effects of Chronic Turbidity on Density and Growth of Steelheads and Coho Salmon", John W Sigler (1984). The guideline is "In our studies, as little as 25 NTUs of turbidity caused a reduction in fish growth." |
| *Data Used to Assess Water Quality:* | Blue Creek: Nine weekly sample averages with 2 of those weeks with an average of 29.73 NTU and 223.36 NTU respectively, that were both in exceedance of the turbidity evaluation guideline. The other 7 weekly averages for the Blue Creek sampling location were below the 25 NTU guideline with a range of averages between 1.02 NTU and 13.16 NTU.<br>Turwar Creek: Thirteen weekly sample averages with 1 of those weeks with an average of 136.88 NTU in exceedance of the turbidity evaluation guideline. The other 12 weekly averages for the Blue Creek sampling location were below the 25 NTU guideline with a range of averages between 0.40 NTU and 19.25 NTU.<br>McGarvey Creek: Nine weekly samples averages with 5 of those weeks with averages of 25.31 NTU, 54.79 NTU, 69.03 NTU, 36.36 NTU, and 26.82 NTU respectively, that were all in exceedance of the turbidity evaluation guideline. The other 4 weekly samples averages that were below the 25 NTU guideline with a range of averages between 5.24 NTU and 19.13 NTU.<br>These measurements considered collectively, there are 31 weeks of 7 consecutive days averages- over three locations with 8 of those weekly averages in exceedance of the 25 NTU evaluation guideline for turbidity (Yurok Tribe, 2003). |
| *Spatial Representation:* | Three sampling locations; Blue Creek, McGarvey Creek and Turwar Creek gauging stations are within their respective watersheds within the located on the |

| | |
|---|---|
| | Lower Klamath River Basin. |
| *Temporal Representation:* | At the three sampling locations, turbidity data and stage feet data were collected every 15 minutes, over a 24 hour period, every day. Blue Station- Data was collected from 10/1/03 through 1/29/04. McGarvey Station- Data was collected from 10/1/03 through 2/3/04. Turwar Station- Data was collected from 10/1/03 through 1/5/04.Turbidity data and Stage feet data were collected. |
| *Environmental Conditions:* | Regional Water Board staff have long suggested that beneficial uses may be impaired in portions of the mainstem Klamath (particularly in the lower Klamath River) and tributaries to the Klamath River (Beaver Creek and tributaries to the Klamath below the confluence with the Trinity River have been specifically identified) due to excessive sediment loading and instream sediment conditions. Insufficient information was available in 2002 to make a listing determination. The Yurok Indian Reservation boundaries lie approximately one mile on either side of the Klamath River from the Pacific Ocean to the confluence with the Trinity River. The Yurok, Karuk, and Hoopa Tribes are very active throughout the Klamath basin in both fisheries and water quality monitoring efforts. The Yurok and Hoopa Tribe are actively pursuing approval of Clean Water Act authority from US EPA. Coordination among the Regional Water Board, State Water Board, the Tribes and US EPA is critical to successful development and implementation of TMDLs for the Klamath River basin. |
| *Data Quality Assessment:* | "Sampling and Analysis Plan for the Yurok Reservation, May 2003". This plan includes the tribe's data quality objectives, sampling rationales and procedures, field methods and procedures, sample preservation and storage and quality control information. They also included Appendix-C of that plan in their submittal, which is their "Draft Water Quality Control Plan for the Yurok Indian Reservation, January 2003". These documents have been submitted to USEPA for approval. |

---

| | |
|---|---|
| ***Line of Evidence*** | Visual |
| *Beneficial Use* | CO - Cold Freshwater Habitat |
| *Information Used to Assess Water Quality:* | Photographs show the Lower Klamath River in 1998, looking upstream from the Highway 101 Bridge. Sediment deposits in the margins show sediment accumulated. A second plate shows watershed conditions and land use management in lower Blue Creek contributes to sediment yields. High road densities contribute chronic fine sediment to Blue Creek and other Lower Klamath tributaries. Road failures during storm events may also lead to larger yields, which aggraded stream beds to the point where surface flows are sometimes lost. In this photograph, Blue Creek remains on the surface, but the lower creek is widened by sediment. An aerial photo shows tracks of debris torrents in Walker Creek, which buried the stream channel and extended all the way to the mainstem Klamath River. A photo at the mouth of Elk Creek shows the delta extending to the edge of the photo at right was aggraded more than ten feet after the January 1997 storm. A photo of the mainstem Scott River stream bed below Jones Beach has a high amount of decomposed granite sand, contributed from upland. This sand also makes its way into the Klamath River. |

*Non-Numeric Objective:*

Basin Plan: The suspended sediment load and suspended sediment discharge rate of surface waters shall not be altered in such a manner as to cause nuisance or adversely affect beneficial uses. Turbidity shall not be increased more than 20 percent above naturally occurring background levels. Allowable zones of dilution within which higher percentages can be tolerated may be defined for specific discharges upon the issuance of discharge permits or waiver thereof. Water shall not contain substances in concentrations that result in deposition of material that causes nuisance or adversely affect beneficial uses.

*Data Used to Assess Water Quality:*

The Long Range Plan for the Klamath River Basin Fishery Conservation Area Restoration Program (Kier Associates, 1991), presents considerable evidence that the mainstem Klamath River is impacted by sediment. With regard to the Lower Klamath Basin, the Long Range Plan noted huge contributions of sediment from tributaries. Contributed sediment is creating problems with fish passage and stream bed stability, and for the lower mainstem: Payne and Associates (1989) found that stream-mouth deltas, almost nonexistent prior to 1955, have grown to 500 and 700 feet in width since 1964. Delta widths changed dramatically after the 1964 flood, but increased even more after the high water of 1972. The initial incursion of sediment came with the 1964 flood but is still being delivered to the lower reaches of the streams. Streambed conditions near the mouths were found by Payne and Associates (1989) to be so unstable that no fish ways could be installed and the study concluded that no lasting solution, other than natural recovery, was possible. Logging in many of these drainages continues today. This delays their recovery and, according to Coats and Miller (1981), could lead to substantial new sediment loads in the event of a major flood. Voight and Gale (1998) noted that 17 of 23 tributaries to the Lower Klamath River remained underground, indicating lack of recovery and continuing contributions of sediment. The Long Range Plan (Kier Assoc., 1991) cites longer term sediment impacts noted by CalTrans (1989):

These stream sections (Lower Klamath) are thought to be in an aggraded condition: the Klamath River is reportedly aggrading at the rate of 100,000 to 150,000 cubic yards per year in the proposed reach while Turwar Creek has shown "substantial aggradations in the channel" over the last thirty years. The stream flow goes subsurface during the summer and early fall, posing a barrier to upstream migrants in the fall (CalTrans, 1989).

The Long Range Plan (Kier Associates, 1991) also made the case that the near extinction of the eulachon or candlefish (Larson and Belchik, 1998), a lower mainstem Klamath River spawner, was indicative of major problems with sediment supply, size and bed load movement.

The mid-term evaluation of the Klamath River Basin Fisheries Restoration Program (Kier Assoc., 1999) evaluated changes in the health of the Klamath River and its tributaries between the inception of the program in 1989 and 1998. They found evidence of continued sediment contributions from logging in the Lower Klamath basin, but also major pulses associated with the January 1997 storm in reaches further upstream. With regard to the Lower Klamath, Kier Associates (1999) found:

Channels of most Lower Klamath tributaries have continued to fill in as sediment yield in the watersheds remains high. Timber harvest in all Lower Klamath watersheds exceeds cumulative effect thresholds and all streams

(except upper Blue Creek) have been severely damaged during the evaluation period. Clear-cut timber harvest in riparian zones on the mainstem of lower Blue Creek and the mainstem Klamath River occurred since 1988 in inner gorge locations. Aggradations in salmon spawning reaches can be expected to persist for decades. Aggradations in salmon spawning reaches can be expected to persist for decades (Higgins, 2004).

Region 1

---

**Water Segment:** Mendocino Coast HU, Albion River HA, Albion River

**Pollutant:** Temperature, water

**Decision:** List

**Weight of Evidence:** This pollutant is being considered for placement on the section 303(d) list under section 3 of the Listing Policy. Under section 3 a single line of evidence is necessary to assess listing status.

One line of evidence is available in the administrative record to assess temperature consistent with Listing Policy section 6.1.5.9. A large number of samples exceed the water quality objective. When compared to the 14.8 °C coho threshold, the sampling locations had a total of 342 measurements of which 245 exceeded the 14.8 °C evaluation guideline.

Based on the readily available data and information, the weight of evidence indicates that there is sufficient justification in favor of placing this water segment-pollutant combination on the section 303(d) list in the Water Quality Limited Segments category.

This conclusion is based on the staff findings that:
1. The data used satisfies the data quality requirements of section 6.1.4 of the Policy.
2. The data used satisfies the data quantity requirements of section 6.1.5 of the Policy.
3. There were 245 of 342 samples that exceeded the 14.8 °C evaluation guideline used to interpret the temperature water quality objective and this exceeds the allowable frequency calculated from the equation in Table 3.2 of the Listing Policy.
4. Pursuant to section 3.11 of the Listing Policy, no additional data and information are available indicating that standards are not met.

**SWRCB Staff Recommendation:** After review of the available data and information, SWRCB staff concludes that the water body-pollutant combination should be placed on the section 303(d) list because applicable water quality standards are exceeded and a pollutant contributes to or causes the problem.

**Lines of Evidence:**

---

***Numeric Line of Evidence*** Pollutant-Water

*Beneficial Use:* CO - Cold Freshwater Habitat

| | |
|---|---|
| *Matrix:* | Water |
| *Water Quality Objective/ Water Quality Criterion:* | Basin Plan: Temperature objectives for COLD interstate waters, WARM interstate waters, and Enclosed Bays and Estuaries are as specified in the "Water Quality Control Plan for Control of Temperature in the Coastal and Interstate Waters and Enclosed Bays of California" including any revisions thereto. A copy of this plan is included verbatim in the Appendix Section of this Plan. In addition, the following temperature objectives apply to surface waters: The natural receiving water temperature of intrastate waters shall not be altered unless it can be demonstrated to the satisfaction of the Regional Water Board that such alteration in temperature does not adversely affect beneficial uses. At no time or place shall the temperature of any COLD water be increased by more than 5°F above natural receiving water temperature. At no time or place shall the temperature of WARM intrastate waters be increased more than 5°F above natural receiving water temperature. |
| *Evaluation Guideline:* | The guideline used was from Sullivan et al. (2000) Published Temperature Thresholds-Peer Reviewed Literature which includes reviewed sub-lethal and acute temperature thresholds from a wide range of studies, incorporating information from laboratory-based research, field observations, and risk assessment approaches. This report calculated the 7-day Mean (maximum value of the 7-day moving average of the daily mean temperature) upper threshold criterion for coho salmon as 14.8°C and for steelhead trout as 17.0°C. The risk assessment approach used by Sullivan et al. (2000) suggests that an upper threshold for the 7-day average of 14.8°C for coho and 17.0°C for steelhead will reduce average growth 10% from optimum. |
| *Data Used to Assess Water Quality:* | The Albion River was sampled at Flynn Creek Road and below Railroad Gulch; and at Marsh Gulch at Flynn Creek Road. There were a total of 342 7-day average water temperature measurements taken at 3 separate locations. Of these, 245 measurements of 342 were in exceedance of the 14.8°C guideline for coho and 106 of the 342 exceeded the 17.0°C evaluation guideline for steelhead (Mendocino County Water Agency, 2003). Data were collected hourly from 5/23/2003 to 9/7/2003. |
| *Spatial Representation:* | There were three sampling locations: The Albion River at Flynn Creek Road; Albion River below Railroad Gulch; and Marsh Gulch at Flynn Creek Road. |
| *Temporal Representation:* | Temperature data was collected hourly at each of the three sampling locations between May 23, 2003 and September 7, 2003. |
| *Data Quality Assessment:* | No QAPP was provided. The data was collected from the Mendocino County Water Agency. |

Region 1

---

**Water Segment:** Mendocino Coast HU, Garcia River HA, Garcia River

**Pollutant:** Sediment

**Decision:** List

**Weight of Evidence:** This pollutant is being considered for listing under section 2.2 of the Listing Policy. Under this section of the Policy, a minimum of one line of evidence is needed to assess listing status.

One line of evidence is available in the administrative record to assess this pollutant. A TMDL has been developed and approved by USEPA and an approved implementation plan is expected to result in attainment of the standard. This water segment-pollutant combination was moved off the section 303(d) list during the 2002 listing cycle.

Based on the readily available data and information, the weight of evidence indicates that there is sufficient justification in favor of placing this water segment-pollutant combination in the Water Quality Limited Segments Being Addressed portion of the section 303(d) list.

**SWRCB Staff Recommendation:** After review of the available data and information for this recommendation, SWRCB staff conclude that the water body should be placed in the Water Quality Limited Segments Being Addressed category of the section 303(d) list because a TMDL has been approved by USEPA and an implementation plan has been approved.

**Lines of Evidence:**

---

***Line of Evidence*** Remedial Program in Place

*Beneficial Use* CO - Cold Freshwater Habitat

*Information Used to Assess Water Quality:* A TMDL and implementation plan has been approved for this water segment-pollutant combination. The Garcia River Sediment TMDL was approved by USEPA in March 2002.

The Garcia River was listed for sediment in 1992. The TMDL was adopted as a Basin Plan amendment by the NCRWQCB and approved by the SWRCB and

USEPA. The Garcia Sediment TMDL document indicates that impairments will persist for decades, even in the eventuality that all responsible land owners implement aggressive erosion control measures (North Coast RWQCB, 2004a)

Region 1

---

**Water Segment:** Mendocino Coast HU, Noyo River HA, Noyo River

**Pollutant:** Temperature, water

**Decision:** List

**Weight of Evidence:** This pollutant is being considered for placement on the section 303(d) list under section 3 of the Listing Policy. Under section 3 a single line of evidence is necessary to assess listing status.

One line of evidence is available in the administrative record to assess temperature consistent with Listing Policy section 6.1.5.9. This decision is applicable to the 12 sampling locations on Hayshed Gulch at the confluence of the Noyo River; the mainstem at and upstream of Hayshed Gulch; Kass Creek; on the Little North Fork of the Noyo; and on Duffy Gulch. A large number of samples exceed the water quality objective. When compared to the 14.8°C threshold, were 3,376 exceedances out of 7,743 samples taken over all the sampling years at this location. When compared to the 17°C threshold there were 1,185 exceedances found out of all of the data.

Based on the readily available data and information, the weight of evidence indicates that there is sufficient justification in favor of placing this water segment-pollutant combination on the section 303(d) list in the Water Quality Limited Segments category.

This conclusion is based on the staff findings that:
1. The data used satisfies the data quality requirements of section 6.1.4 of the Policy.
2. The data used satisfies the data quantity requirements of section 6.1.5 of the Policy.
3. There were 3,376 of 7,743 samples that exceeded the 14.8 degree evaluation guideline used to interpret the water quality objective and this exceeds the allowable frequency calculated from the equation in Table 3.2 of the Listing Policy.
4. Pursuant to section 3.11 of the Listing Policy, no additional data and information are available indicating that standards are not met.

**SWRCB Staff Recommendation:** After review of the available data and information, SWRCB staff concludes that the water body-pollutant combination should be placed on the section 303(d) list because applicable water quality standards are exceeded and a pollutant contributes to or causes the problem.

**Lines of Evidence:**

---

***Numeric Line of Evidence*** Pollutant-Water

| | |
|---|---|
| *Beneficial Use:* | CO - Cold Freshwater Habitat |
| *Matrix:* | Water |
| *Water Quality Objective/ Water Quality Criterion:* | Basin Plan: Temperature objectives for COLD interstate waters, WARM interstate waters, and Enclosed Bays and Estuaries are as specified in the "Water Quality Control Plan for Control of Temperature in the Coastal and Interstate Waters and Enclosed Bays of California" including any revisions thereto. A copy of this plan is included verbatim in the Appendix Section of this Plan. In addition, the following temperature objectives apply to surface waters: The natural receiving water temperature of intrastate waters shall not be altered unless it can be demonstrated to the satisfaction of the Regional Water Board that such alteration in temperature does not adversely affect beneficial uses. At no time or place shall the temperature of any COLD water be increased by more than 5° F above natural receiving water temperature. At no time or place shall the temperature of WARM intrastate waters be increased more than 5° F above natural receiving water temperature. |
| *Evaluation Guideline:* | The guideline used was from Sullivan et al. (2000) Published Temperature Thresholds-Peer Reviewed Literature which includes reviewed sub-lethal and acute temperature thresholds from a wide range of studies, incorporating information from laboratory-based research, field observations, and risk assessment approaches. This report calculated the 7-day Mean (maximum value of the 7-day moving average of the daily mean temperature) upper threshold criterion for coho salmon as 14.8°C and for steelhead trout as 17.0°C. The risk assessment approach used by Sullivan et al. (2000) suggests that an upper threshold for the for the 7-day average of 14.8°C for coho and 17.0°C for steelhead will reduce average growth 10% from optimum. |
| *Data Used to Assess Water Quality:* | When compared to the 14.8 °C coho threshold, were 3,376 exceedances out of 7,743 total samples taken over all the sampling years at the sampling locations on the Noyo River. When compared to the 17°C threshold there were 1,185 exceedances found out of all of the data. (Hawthorne Timber Co., 2003). |
| *Spatial Representation:* | There were 12 sampling locations on Hayshed Gulch at the confluence of the Noyo River; the mainstem at and upstream of Hayshed Gulch; Kass Creek; on the Little North Fork of the Noyo; and on Duffy Gulch. Hobo-Temps were placed in the pools near the bottom and towards the deepest portion to record the in-stream temperatures. In stream and riparian measurements were taken at all monitoring locations. |
| *Temporal Representation:* | There were samples taken over 9 years:1994,1997,1998,1999,2000,2001,2002, and 2003. Water temperature data were recorded at ninety-minute intervals, generally from June until Mid-October. Stream temperatures were measured continuously with temperature data loggers (Onset Computer Corp. model HOBO-Temp and OST temperature loggers) in Class 1 streams throughout the property from 1994 to 2003. Hobo-temps allowed uninterrupted data collection to occur throughout the critical summer period. |
| *Data Quality Assessment:* | QA/QC Information Summary was submitted. Installation of the temperature data logger (Onset Computer Corp. model HOBO-Temp and OST temperature loggers in Class 1 streams throughout the property devices occurred one day |

before the first day logged on the continuous temperature monitoring figures. This was done to allow the data loggers to reach equilibrium with the instream temperature regimes and to capture complete daily cycles. No information on equipment calibration, standard operating procedures or data protocols were included with the submittal.

Region 1

| | |
|---|---|
| **Water Segment:** | Mendocino Coast HU, Noyo River HA, Pudding Creek |
| **Pollutant:** | Temperature, water |
| **Decision:** | List |
| **Weight of Evidence:** | This pollutant is being considered for placement on the section 303(d) list under section 3 of the Listing Policy. Under section 3 a single line of evidence is necessary to assess listing status.<br><br>One line of evidence is available in the administrative record to assess temperature consistent with Listing Policy section 6.1.5.9. When compared to the 14.8°C coho threshold, there were 289 exceedances out of 1,391 total samples taken over all the sampling years in the middle to upper watershed of Pudding Creek. When compared to the 17°C steelhead threshold there were no exceedances found for any of the data.<br><br>Based on the readily available data and information, the weight of evidence indicates that there is sufficient justification in favor of placing this water segment-pollutant combination on the section 303(d) list in the Water Quality Limited Segments category.<br><br>This conclusion is based on the staff findings that:<br>1. The data used satisfies the data quality requirements of section 6.1.4 of the Policy.<br>2. The data used satisfies the data quantity requirements of section 6.1.5 of the Policy.<br>3. There were 289 of 1,391 samples that exceeded the Sullivan 14.8 degree evaluation guideline used to interpret the water quality objective and this exceeds the allowable frequency calculated from the equation in Table 3.2 of the Listing Policy.<br>4. Pursuant to section 3.11 of the Listing Policy, no additional data and information are available indicating that standards are not met. |
| **SWRCB Staff Recommendation:** | After review of the available data and information, SWRCB staff concludes that the water body-pollutant combination should be placed on the section 303(d) list because applicable water quality standards are exceeded and a pollutant contributes to or causes the problem. |
| **Lines of Evidence:** | |

| | |
|---|---|
| ***Numeric Line of Evidence*** | Pollutant-Water |
| *Beneficial Use:* | CO - Cold Freshwater Habitat |
| *Matrix:* | Water |
| *Water Quality Objective/ Water Quality Criterion:* | Basin Plan: Temperature objectives for COLD interstate waters, WARM interstate waters, and Enclosed Bays and Estuaries are as specified in the "Water Quality Control Plan for Control of Temperature in the Coastal and Interstate Waters and Enclosed Bays of California" including any revisions thereto. A copy of this plan is included verbatim in the Appendix Section of this Plan. In addition, the following temperature objectives apply to surface waters: The natural receiving water temperature of intrastate waters shall not be altered unless it can be demonstrated to the satisfaction of the Regional Water Board that such alteration in temperature does not adversely affect beneficial uses. At no time or place shall the temperature of any COLD water be increased by more than 5°F above natural receiving water temperature. At no time or place shall the temperature of WARM intrastate waters be increased more than 5°F above natural receiving water temperature. |
| *Evaluation Guideline:* | The guideline used was from Sullivan et al. (2000) Published Temperature Thresholds-Peer Reviewed Literature which includes reviewed sub-lethal and acute temperature thresholds from a wide range of studies, incorporating information from laboratory-based research, field observations, and risk assessment approaches. This report calculated the 7-day Mean (maximum value of the 7-day moving average of the daily mean temperature) upper threshold criterion for coho salmon as 14.8°C and for steelhead trout as 17.0°C. The risk assessment approach used by Sullivan et al. (2000) suggests that an upper threshold for the for the 7-day average of 14.8°C for coho and 17.0°C for steelhead will reduce average growth 10% from optimum. |
| *Data Used to Assess Water Quality:* | When compared to the 14.8 °C coho threshold, there were 289 exceedances out of 1391 total samples taken over the all of the years at this location. When compared to the 17°C threshold there were no exceedances found for any of the data (Hawthorne Timber Co., 2003). |
| *Spatial Representation:* | There were 1,391 total samples taken at the middle to upper watershed of Pudding Creek. Hobo-Temps were placed in the pools near the bottom and towards the deepest portion to record the in-stream temperatures. In stream and riparian measurements were taken at all monitoring locations on Pudding Creek. |
| *Temporal Representation:* | Samples were recorded for 9 years between 1994 and 2001 and again in 2003. Water temperature data were recorded at 90-minute intervals, generally from June until Mid-October upstream temperatures were measured continuously with temperature data loggers (Onset Computer Corp. model HOBO-Temp and OST temperature loggers) in Class 1 streams throughout the property from 1994 to 2004. Hobo-temps allowed uninterrupted data collection to occur throughout the critical summer period. |
| *Data Quality Assessment:* | QA/QC Information Summary was submitted. Installation of the temperature data logger (Onset Computer Corp. model HOBO-Temp and OST temperature |

loggers in Class 1 streams throughout the property devices occurred one day before the first day logged on the continuous temperature monitoring figures. This was done to allow the data loggers to reach equilibrium with the instream temperature regimes and to capture complete daily cycles. No information on equipment calibration, standard operating procedures or data protocols were included with the submittal.

Region 1

---

**Water Segment:** Russian River HU, Lower Russian River HA, Guerneville HSA

**Pollutant:** pH

**Decision:** List

**Weight of Evidence:** This pollutant is being considered for placement on the section 303(d) list under section 3 of the Listing Policy. Under section 3 a single line of evidence is necessary to assess listing status.

One line of evidence is available in the administrative record to assess this pollutant. Six out of 27 samples did not meet the minimum of the pH water quality objective of 6.5.

Based on the readily available data and information, the weight of evidence indicates that there is sufficient justification in favor of placing this water segment-pollutant combination on the section 303(d) list in the Water Quality Limited Segments category.

This conclusion is based on the staff findings that:
1. The data used satisfies the data quality requirements of section 6.1.4 of the Policy.
2. The data used satisfies the data quantity requirements of section 6.1.5 of the Policy.
3. There were 6 out of the 27 samples that exceeded the pH water quality objective and this exceeds the allowable frequency listed in Table 3.2 of the Listing Policy.
4. Pursuant to section 3.11 of the Listing Policy, no additional data and information are available indicating that standards are not met.

**SWRCB Staff Recommendation:** After review of the available data and information, SWRCB staff concludes that the water body-pollutant combination should be placed on the section 303(d) list because applicable water quality standards are exceeded and a pollutant contributes to or causes the problem.

**Lines of Evidence:**

---

***Numeric Line of Evidence*** Pollutant-Water

*Beneficial Use:* CO - Cold Freshwater Habitat

*Matrix:* Water

*Water Quality Objective/* Basin Plan: pH for Russian River shall not be depressed below 6.5 nor raised

| | |
|---|---|
| *Water Quality Criterion:* | above 8.5. Changes in normal ambient pH levels shall not exceed 0.2 units in waters with designated marine (MAR) or saline (SAL) beneficial uses nor 0.5 units within the range specified above in fresh waters with designated COLD or WARM beneficial uses. |
| *Data Used to Assess Water Quality:* | Six out of 27 samples did not meet the minimum of the objective. The samples below 6.5 ranged from 6 to 6.4. (Sandler, 2004). |
| *Spatial Representation:* | Sampling was done in Pocket (Canyon) Creek a tributary to the lower Russian River within the greater Guerneville HSA. PCC020 is located in Guerneville, at 12170 Hwy 116, downstream of Inn and the tank in the creek. PCC030 is located in Guerneville, at 11900 Hwy 116, in the backyard. PCC040 is located in Guerneville, 50 feet upstream from bridge along Hwy 116 at May's Canyon Road. |
| *Temporal Representation:* | Samples were taken at all 3 sites once a month on the same days in January, February, March, May, and August through December 2003. |
| *Environmental Conditions:* | This listing should be focused on Pocket Canyon Creek because sampling was limited to Pocket Creek a tributary to the lower Russian River within the greater Guerneville HSA. |
| *Data Quality Assessment:* | Draft QAPP for Volunteer Water Quality Monitoring Project for the Community Clean Water Institute. |

Region 1

---

**Water Segment:** Russian River HU, Middle Russian River HA, Big Sulphur Creek HSA

**Pollutant:** Specific Conductance

**Decision:** List

**Weight of Evidence:** This pollutant is being considered for placement on the section 303(d) list under section 3 of the Listing Policy. Under section 3 a single line of evidence is necessary to assess listing status. One line of evidence is available in the administrative record to assess this pollutant.

Based on the readily available data and information, the weight of evidence indicates that there is sufficient justification in favor of placing this water segment-pollutant combination on the section 303(d) list in the Water Quality Limited Segments category.

This conclusion is based on the staff findings that:
1. The data used satisfies the data quality requirements of section 6.1.4 of the Policy.
2. The data used satisfies the data quantity requirements of section 6.1.5 of the Policy.
3. Five months of the 7 months of samples exceeded the specific conductance water quality objective and this exceeds the allowable frequency listed in Table 3.2 of the Listing Policy.
4. Pursuant to section 3.11 of the Listing Policy, no additional data and information are available indicating that standards are not met.

**SWRCB Staff Recommendation:** After review of the available data and information, SWRCB staff concludes that the water body-pollutant combination should be placed on the section 303(d) list because applicable water quality standards are exceeded and a pollutant contributes to or causes the problem.

**Lines of Evidence:**

---

***Numeric Line of Evidence*** Pollutant-Water

*Beneficial Use:* CO - Cold Freshwater Habitat

*Matrix:* Water

*Water Quality Objective/ Water Quality Criterion:* Basin Plan: Specific conductance- 50% upper and lower limits of 250 micromhos represent the 50 percentile values of the monthly means for a calendar year. 50% or more of the monthly means must be less than or equal to

| | |
|---|---|
| | an upper limit and greater than or equal to a lower limit. 90% upper and lower limits of 320 micromhos represent the 90 percentile values for a calendar year. 90% or more of the values must be less than or equal to an upper limit and greater than or equal to a lower limit. |
| *Data Used to Assess Water Quality:* | There was one sample taken on one day of each month for 7 months in 2003. Five months out of 7 months samples were above the 50% upper limit of 250 micromhos. No samples taken were above the 90% upper limit of 320 micromhos (Sandler, 2004). |
| *Spatial Representation:* | There was one sampling location, BSC010 that is located upstream of Laguna de Santa Rosa, 20 feet below River Rd. bridge. |
| *Temporal Representation:* | Samples were taken once a month, January through August 2003 with no samples taken in June. |
| *Data Quality Assessment:* | Draft QAPP for Volunteer Water Quality Monitoring Project for the Community Clean Water Institute. |

Region 1

| | |
|---|---|
| **Water Segment:** | Russian River HU, Middle Russian River HA, Laguna de Santa Rosa |
| **Pollutant:** | Mercury |
| **Decision:** | List |
| **Weight of Evidence:** | This pollutant is being considered for placement on the section 303(d) list under section 3.5 of the Listing Policy. One line of evidence is available in the administrative record to assess this pollutant.<br><br>Based on the readily available data and information, the weight of evidence indicates that there is sufficient justification in favor of placing this water segment-pollutant combination on the section 303(d) list in the Water Quality Limited Segments category.<br><br>This conclusion is based on the staff findings that:<br>1. The data used satisfies the data quality requirements of section 6.1.4 of the Policy.<br>2. The data used satisfies the data quantity requirements of section 6.1.5 of the Policy.<br>3. Three out of 17 samples exceeded the OEHHA Screening Value and this exceeds the allowable frequency listed in Table 3.1 of the Listing Policy.<br>4. Pursuant to section 3.11 of the Listing Policy, no additional data and information are available indicating that standards are not met. |
| **SWRCB Staff Recommendation:** | After review of the available data and information, SWRCB staff concludes that the water body-pollutant combination should be placed on the section 303(d) list because applicable water quality standards are exceeded and a pollutant contributes to or causes the problem. |
| **Lines of Evidence:** | |

| | |
|---|---|
| ***Numeric Line of Evidence*** | Pollutant-Tissue |
| *Beneficial Use:* | CM - Commercial and Sport Fishing (CA) |
| *Matrix:* | Tissue |
| *Water Quality Objective/ Water Quality Criterion:* | North Coast RWQCB Basin Plan: All waters shall be maintained free of toxic substances in concentrations that are toxic to, or that produce detrimental physiological responses in human, plant, animal, or aquatic life. |

| | |
|---|---|
| *Evaluation Guideline:* | 0.3 ug/g (OEHHA Screening Value) |
| *Data Used to Assess Water Quality:* | Three out of 17 samples exceeded. Individual and composite filet samples of the following species were collected: black bullhead, bluegill, carp, channel catfish, green sunfish, redear sunfish, Sacramento blackfish, and sucker. Samples were collected from 1996-2000. One 1996 (Stony Point) individual green sunfish sample, one 1999 (Stony Point) composite green sunfish sample, and one 2000 (Occidental Pond) individual bluegill sample exceeded the guideline (TSMP, 2002). |
| *Spatial Representation:* | Three stations were sampled: upstream of Occidental Road (Occidental Pond), adjacent to the sewage treatment plant in Sebastopol (Sebastopol Pond), and Laguna de Santa Rosa at Stony Point Road (Stony Point). |
| *Temporal Representation:* | Samples were collected 1996-2000. |
| *Data Quality Assessment:* | Environmental Chemistry Quality Assurance and Data Report for the Toxic Substances Monitoring Program,1996-2000. Department of Fish and Game. |

Region 1

---

**Water Segment:** Russian River HU, Middle Russian River HA, Santa Rosa Creek

**Pollutant:** Specific Conductance

**Decision:** List

**Weight of Evidence:** This pollutant is being considered for placement on the section 303(d) list under section 3 of the Listing Policy. Under section 3 a single line of evidence is necessary to assess listing status. One line of evidence is available in the administrative record to assess this pollutant.

Based on the readily available data and information, the weight of evidence indicates that there is sufficient justification in favor of placing this water segment-pollutant combination on the section 303(d) list in the Water Quality Limited Segments category.

This conclusion is based on the staff findings that:
1. The data used satisfies the data quality requirements of section 6.1.4 of the Policy.
2. The data used satisfies the data quantity requirements of section 6.1.5 of the Policy.
3. There were 5 out of 6 samples that exceeded the specific conductance water quality objective and this exceeds the allowable frequency listed in Table 3.2 of the Listing Policy.
4. Pursuant to section 3.11 of the Listing Policy, no additional data and information are available indicating that standards are not met.

**SWRCB Staff Recommendation:** After review of the available data and information, SWRCB staff concludes that the water body-pollutant combination should be placed on the section 303(d) list because applicable water quality standards are exceeded and a pollutant contributes to or causes the problem.

**Lines of Evidence:**

---

***Numeric Line of Evidence*** Pollutant-Water

*Beneficial Use:* CO - Cold Freshwater Habitat

*Matrix:* Water

*Water Quality Objective/ Water Quality Criterion:* Basin Plan: Specific conductance- 50% upper and lower limits of 250 micromhos represent the 50 percentile values of the monthly means for a calendar year. 50% or more of the monthly means must be less than or equal to

| | |
|---|---|
| | an upper limit and greater than or equal to a lower limit. 90% upper and lower limits of 320 micromhos represent the 90 percentile values for a calendar year. 90% or more of the values must be less than or equal to an upper limit and greater than or equal to a lower limit. |
| *Data Used to Assess Water Quality:* | Six samples were taken from site SRC040, of which 5 were greater than 320 micromhos; two samples were at 370 micromhos, the other exceedances were at 460, 510 and 520 micromhos. Five of the 6 samples were above the 50% upper limit of 250 micromhos and above the 90% upper limit of 320 micromhos as well (Sandler, 2004). |
| *Spatial Representation:* | There was one sampling site that was located at 3rd St., behind Vineyard Hotel, west of Highway 101 along the Prince George Greenway, Santa Rosa. |
| *Temporal Representation:* | Samples were taken once a month, on one day each month, from February through August 2003 with no samples taken in May 2003. |
| *Data Quality Assessment:* | Draft QAPP for Volunteer Water Quality Monitoring Project for the Community Clean Water Institute. |

# North Coast Region (1)

# DELIST

## Recommendations to remove waters and pollutants from the section 303(d) List

Page left blank intentionally.

Region 1

---

**Water Segment:** Klamath River HU, Lost River HA, Clear Lake, Boles HSAs

**Pollutant:** Nutrients

**Decision:** Delist

**Weight of Evidence:** This pollutant is being considered for removal from the section 303(d) list under section 4.1 of the Listing Policy. Under this section a single line of evidence is necessary to assess listing status.

Five lines of evidence are available in the administrative record to assess this pollutant. There is no evidence that the biostimulatory narrative objective is exceeded. The NCWRQCB Staff summary of the Upper Lost River De-Listing Recommendation along with the TMDL Analysis Staff Report support the decision to remove nutrients from the 303(d) List for this water segment.

Based on the readily available data and information, the weight of evidence indicates that there is sufficient justification in favor of removing this water segment-pollutant combination from the section 303(d) list in the Water Quality Limited Segments category.

This conclusion is based on the staff findings that:
1. The sediment quality guideline used complies, with the requirements of section 6.1.3 of the Policy.
2. The data used satisfies the data quality requirements of section 6.1.4 of the Policy.
3. The data used satisfies the data quantity requirements of section 6.1.5 of the Policy.
4. The results of the nutrient analysis on the nitrogen, chlorophyll-a, phosphorus samples show that there is no evidence that the bio-stimulatory narrative objective has been exceeded. The Dissolved oxygen samples show that the lowest values sampled are still above the minimum objective. These results do not exceed the allowable frequency listed in Table 4.1 of the Listing Policy.
5. Pursuant to section 4.11 of the Listing Policy, no additional data and information are available indicating that standards are met.

**SWRCB Staff Recommendation:** After review of the available data and information, SWRCB staff concludes that the water body-pollutant combination should be removed from the section 303(d) list because applicable water quality standards for the pollutant are not exceeded.

**Lines of Evidence:**

| | |
|---|---|
| ***Numeric Line of Evidence*** | Pollutant-Nuisance |
| *Beneficial Use:* | WA - Warm Freshwater Habitat |
| *Matrix:* | Water |
| *Water Quality Objective/ Water Quality Criterion:* | Basin Plan: Water shall not contain bio-stimulatory substances in concentrations that promote aquatic growths to the extent that such growths cause nuisance or adversely affect beneficial uses. |
| *Evaluation Guideline:* | The Bio-stimulatory WQO is inclusive of nutrients. |
| *Data Used to Assess Water Quality:* | The TMDL Analysis was completed for Upper Lost River and Clear Lake Reservoir Watershed. The Chlorophyll-a in the water column was measured from monthly grab samples at the six sampling stations, for a total of 57 samples. The water samples were filtered in the field, rinsed with magnesium carbonate, and preserved on dry ice because full-volume samples could not be delivered to analytical laboratory within the recommended holding period. The chlorophyll-a concentrations showed variability ranging from below the analytical reporting limit (0.00050 mg/l) to 0.016 mg/l. Of the 57 samples, 38 were below the analytical reporting limit; for statistical analyses, these concentrations were assumed to be half of the reporting limit. The high measurement, 0.016 mg/l, was from a sample taken in October 2002 at Mowitz Creek. The median of all of the chlorophyll-a results was 0.00025 mg/l (the default value for samples below the reporting limit), and the 95% upper confidence limit is 0.00174 mg/l. The two stations on the Upper Lost River (WFLAT and LRCLDM) were analyzed separately from the four upstream stations on streams that lead to Clear Lake Reservoir (MOWCRK, BCFORD, WCGSB, and FCFORD).<br><br>The 28 data points for the two Upper Lost River stations showed chlorophyll-a concentrations ranging from below the analytical reporting limit to 0.0032 mg/l, with a median of 0.00025 mg/l (the default value for samples below the reporting limit), and an 95% upper confidence limit of 0.00174 mg/l (including 21 nondetects assumed to be half of the reporting limit).<br><br>The 29 points from the four stations on streams leading to Clear Lake Reservoir showed chlorophyll-a concentrations ranging from below the laboratory reporting limit to 0.016 mg/l, with a median of 0.00025 mg/l (this is half of the laboratory reporting limit), and a 95% upper confidence level of 0.00279 mg/l. Although most of the data points in this dataset are nondetects (17 non-detects out of 29 data points), for the statistical analysis, they were assumed to be half of the reporting limit.<br><br>Using the 57 observations in the complete dataset, the relationship between total phosphorus and chlorophyll-a was weak. Neither visual observations nor water column chlorophyll-a measurements indicated impairment due to excess phosphorus. The lack of Chlorophyll-a in the |

water samples obtained for this analysis indicates that either the level of nutrients is too low to support excess algal growth or that some other factor is suppressing the algal growth. In either case, the beneficial uses of the Upper Lost River/Clear Lake Reservoir system are not impaired by nutrient concentrations (North Coast RWQCB, 2004d)

*Spatial Representation:*

The monitoring locations for the Upper Lost River/Clear Lake Reservoir area are:

1. Lost River below Clear Lake Reservoir dam, LRCLDM.
2. Lost River at Walter Flat, WFLAT.
3. Mowitz Creek just downstream of the 136 bridge, MOWCRK.
4. Boles Creek just upstream of the 136 ford, BCFORD.
5. No. Fork Willow Creek below the Great Society Bridge, WCGSB.
6. Fletcher Creek just upstream of the 73 ford, FCFORD.

Two stations are on the Upper Lost River mainstem, one is downstream of the dam and the other at Walter Flat. Station LRCLDM is at a point about 1,000 meters downstream of Clear Lake Reservoir dam. Station WFLAT is at a point about 10 meters downstream of the Walter Flat Bridge, about eight miles downstream of the dam. In addition to the two stations on the Upper Lost River, there were four monitoring locations in streams that lead to Clear Lake Reservoir, the source of the Lost River. One station was on North Fork Willow Creek, the main tributary to Clear Lake Reservoir and the primary spawning stream for the endangered Lost River and shortnose suckers. Two other sites, on Boles and Fletcher Creeks, drain into Willow Creek. The fourth site, on Mowitz Creek, drains directly into Clear Lake Reservoir but does not contribute much water to the reservoir. This site was added late in the investigation because of the opportunity to add to a sparse dataset. All of the sites, except the station below the dam, were accessible only during late spring to early fall because wet weather made the roads impassable. Sampling locations were limited to areas that could be reached by truck. Logistical issues precluded sampling in Clear Lake Reservoir.

*Temporal Representation:*

Sampling represents only one full season, late spring to early fall of one year. Sampling included monthly grab samples and instantaneous measurements for one season, continuous temperature monitoring for one season, and two short continuous multiparameter deployments. The sampling periods do not correspond to the time periods that the suckers are in the streams. There were limited spots at which the streams could be accessed; these might not correspond to the points that provide representative data. Drawing conclusions about the impact of water temperature and nutrients on suckers based on sampling during summer, however, is justified because those months represent the conditions worse than the fish encounter during their time in the streams.

*Environmental Conditions:*

There are no point source waste discharges within the watershed. The land use operations that may impact the Upper Lost River watershed as nonpoint sources of water pollution are livestock operations (grazing) and timber harvest.

*Data Quality Assessment:*

NCRWQCB QA Procedures followed for the TMDL analysis.

| | |
|---|---|
| ***Numeric Line of Evidence*** | Pollutant-Water |
| *Beneficial Use:* | MU - Municipal & Domestic, WA - Warm Freshwater Habitat |
| *Matrix:* | Water |
| *Water Quality Objective/ Water Quality Criterion:* | Basin Plan: Water shall not contain bio-stimulatory substances in concentrations that promote aquatic growths to the extent that such growths cause nuisance or adversely affect beneficial uses. |
| *Evaluation Guideline:* | The WQO for Bio-stimulatory substances includes Nitrogen. The USEPA concentration of 10 mg/l NO3-N set by the USEPA (1986) to protect human health consuming domestic water supplies. |
| *Data Used to Assess Water Quality:* | Nitrogen concentration was measured from monthly grab samples at the six sampling stations, for a total of 57 samples. The system appears to be nitrogen limited with nitrogen levels far below levels expected to cause bio-stimulation in this system. There is no evidence that the bio-stimulatory narrative is exceeded. The total nitrogen concentrations were similar between the two Upper Lost River stations and the four stations upstream of Clear Lake Reservoir. The total nitrogen concentrations are well below the 10 mg/l NO3-N set by the U.S. EPA (1986) to protect human health consuming domestic water supplies. In other words, the nitrogen levels are below the concentration of concern for human health.<br><br>The analytical laboratory measured ammonia, nitrate, nitrite and TKN. Total nitrogen was calculated from the sum of TKN, nitrate, and nitrite. The total nitrogen levels showed some variability ranging from below the analytical reporting limit of 0.05 mg/l to 1.85 mg/l. Of the 57 samples, 17 were below the analytical reporting limit. Since nitrogen was present in the system these were assumed to be half of the reporting limit for statistical analyses. The highest concentration of total nitrogen, 1.85 mg/l, consisted entirely of TKN (ammonia and organic nitrogen). It was from a sample taken in August 2002 at Boles Creek during a time when the creek had no surface flow. The median of all of the total nitrogen results was 0.69 mg/l, and the 95% upper confidence level was 0.77 mg/l.<br><br>The two stations on the Upper Lost River (WFLAT and LRCLDM) were analyzed separately from the four upstream stations on streams that drain to Clear Lake Reservoir (MOWCRK, BCFORD, WCGSB, and FCFORD). The 28 data points for the two Upper Lost River stations showed total nitrogen concentrations ranging from below the laboratory-reporting limit to 1.65 mg/l, with a median of 0.76 (including 8 non-detects assumed to be half of the reporting limit for statistical analysis purposes). The 29 points from the four stations on streams leading to Clear Lake Reservoir showed total nitrogen concentrations ranging from below the laboratory-reporting limit to 1.85 mg/l, with a median of 0.57 (including 10 non-detects assumed to be half of the reporting limit for statistical analysis purposes). Ammonia concentrations are low or below the laboratory reporting level at the six sampling stations. |

Analysis of all six stations grouped together shows that of 57 samples, 37 were below the analytical reporting limit. If the non-detects are included at a concentration equal to half of the reporting limit, the median concentration of ammonia is 0.025 mg/l (the default level for the nondetect samples), and the range is from below the reporting limit to 0.23 mg/l NH4-N.

Separating the four upstream stations from the two Upper Lost River stations does not show a significant difference in ammonia concentrations. If the nondetects are included at a concentration equal to half of the laboratory reporting limit, both upstream stations and downstream stations have a median ammonia concentration of 0.025 NH4-N. There is a large proportion of samples with ammonia concentrations below the laboratory-reporting limit (29 total samples with 17 non-detects in the upstream stations and 20 non-detects out of 28 total samples in the downstream sites), so analysis of these data is difficult. Calculations of the percentage of ammonia present as the toxic un-ionized ammonia were not necessary because the concentration of total ammonia at all of the stations is well below the level needed to protect the sensitive life stages of the sucker population (North Coast RWQCB, 2004d).

*Spatial Representation:*

The monitoring locations for the Upper Lost River/Clear Lake Reservoir area are:

1. Lost River below Clear Lake Reservoir dam, LRCLDM.
2. Lost River at Walter Flat, WFLAT.
3. Mowitz Creek just downstream of the 136 bridge, MOWCRK.
4. Boles Creek just upstream of the 136 ford, BCFORD.
5. No. Fork Willow Creek below the Great Society Bridge, WCGSB.
6. Fletcher Creek just upstream of the 73 ford, FCFORD.

Two stations are on the Upper Lost River mainstem, one is downstream of the dam and the other at Walter Flat. Station LRCLDM is at a point about 1,000 meters downstream of Clear Lake Reservoir dam. Station WFLAT is at a point about 10 meters downstream of the Walter Flat Bridge, about eight miles downstream of the dam. In addition to the two stations on the Upper Lost River, there were four monitoring locations in streams that lead to Clear Lake Reservoir, the source of the Lost River. One station was on North Fork Willow Creek, the main tributary to Clear Lake Reservoir and the primary spawning stream for the endangered Lost River and shortnose suckers. Two other sites, on Boles and Fletcher Creeks, drain into Willow Creek. The fourth site, on Mowitz Creek, drains directly into Clear Lake Reservoir but does not contribute much water to the reservoir. This site was added late in the investigation because of the opportunity to add to a sparse dataset. All of the sites, except the station below the dam, were accessible only during late spring to early fall because wet weather made the roads impassable. Sampling locations were limited to areas that could be reached by truck. Logistical issues precluded sampling in Clear Lake Reservoir.

*Temporal Representation:*

Sampling represents only one full season, late spring to early fall of one year. Sampling included monthly grab samples and instantaneous measurements for one season, continuous temperature monitoring for one season, and two short continuous multi-parameter deployments. The sampling periods do not correspond to the time periods that the suckers

| | |
|---|---|
| | are in the streams. There were limited spots at which the streams could be accessed; these might not correspond to the points that provide representative data. Drawing conclusions about the impact of water temperature and nutrients on suckers based on sampling during summer, however, is justified because those months represent the conditions worse than the fish encounter during their time in the streams. Water temperature in the Upper Lost River/Clear Lake Reservoir watershed was investigated using: Remote continuous water and air temperature monitors (Optic stowaway data loggers) that took readings every 15 minutes from May through September 2002. Remote sensors that measured air temperature (Optic stowaway data loggers) and relative humidity (HOBO instruments) every 15 minutes for three days in June 2003. Solar pathfinder measurements to calculate solar radiation that reached stream surfaces. A thermal infrared aerial survey in July 2001and computer simulation modeling using the SSTEMP model. The monitoring instrument at the Boles Creek station was out of the water during that period due to seasonal dewatering and the sampling at Mowitz Creek did not begin until the following month. |
| *Environmental Conditions:* | There are no point source waste discharges within the watershed. The land use operations that may impact the Upper Lost River watershed as nonpoint sources of water pollution are livestock operations (grazing) and timber harvest. |
| *Data Quality Assessment:* | NCRWQCB QA procedures followed in the TMDL analysis. |

---

| | |
|---|---|
| ***Numeric Line of Evidence*** | Pollutant-Water |
| *Beneficial Use:* | WA - Warm Freshwater Habitat |
| *Matrix:* | Water |
| *Water Quality Objective/ Water Quality Criterion:* | Basin Plan: Dissolved Oxygen, Table3.1 Specific Water Quality Objectives for North Coast Region Clear Lake, Upper & Lower Lost River, Tule Lake, Lower Klamath Lake:<br>> 5.0 mg/l, minimum 8.0 mg/l, 50% lower limit (this means that 50% or more of the monthly mean values must be equal to or greater than 8.0 mg/l).<br>Other Streams in Upper Lost River HA:<br>> 7.0 mg/l, minimum 8.0 mg/l, 50% lower limit (this means that 50% or more of the monthly mean values must be equal to or greater than 8.0 mg/l). |
| *Evaluation Guideline:* | Specific WQOs in the Basin Plan Table 3.1. |
| *Data Used to Assess Water Quality:* | The TMDL Analysis was completed for Upper Lost River and Clear Lake Reservoir Watershed. The Upper Lost River/Clear Lake Reservoir area is not listed for dissolved oxygen. This parameter, however, can be impacted by excessive biomass growth related to high nutrient concentrations. Diurnal cycles of algal respiration can lead to water that is |

photosynthetically supersaturated with dissolved oxygen in late afternoons and depressed in very early mornings by overnight respiration.

The most sensitive beneficial use that could be impacted by low dissolved oxygen concentrations is the ESA-listed sucker species. The amount of dissolved oxygen in water at 100% saturation is partly dependent on the altitude; the sampling stations in this analysis ranged in altitude from 4,163 to 4,921 feet above sea level. The water at this altitude can hold less dissolved oxygen, at 100% saturation, than water at lower elevations. Dissolved oxygen data at the six sampling stations consisted of instantaneous measurements at the time that grab samples were obtained and of two brief periods of continuous measurement. The Basin Plan objectives for dissolved oxygen in the Upper Lost River/Clear Lake Reservoir area are 5.0 mg/l as a minimum and 8.0 as a 50% lower limit.

There were 57 instantaneous measurements of dissolved oxygen ranging from 6.1 mg/l to 13.02 mg/l. The mean value of these measurements is 8.83 mg/l, with a median of 8.53 mg/l, and a lower 95% confidence level of 8.44 mg/l. The high value of 13.02 mg/l was obtained at the Boles Creek station in October 2002 at a time when there was no surface flow; this value was taken at 14:30 and may represent a photosynthetically supersaturated condition. Field notes state that heavy algal growth was noted in the pool upstream of the dewatered area where samples were taken. The lowest values were still above the minimum required by the Basin Plan. The lowest value, 6.1 mg/l was obtained at 17:30 in June 2003 at Walter Flat. The next lowest value, 6.55 mg/l was obtained at 08:30 in August 2001 at the station just downstream of Clear Lake Reservoir dam.

Continuous dissolved oxygen measurements using a YSI Datasonde 6600 that measured dissolved oxygen, pH, specific conductivity, and water temperature at 15-minute increments were made in the Upper Lost River at Walter Flat from September 30 to October 2, 2002. The data show a diurnal variation with a low of 9.59 mg/l and a high of 12.11 mg/l. The mean is 10.47 mg/l, the median is 10.34 mg/l, and the 95% lower confidence level is 10.38 mg/l. A Datasonde also was deployed at this station from June 9 through June 11, 2003. Again, a diurnal cycle is seen. The data from this sampling episode show warmer temperatures and lower dissolved oxygen concentrations, ranging from a low of 5.42 mg/l to a high of 6.32 mg/l. The mean of the measurements is 5.87 mg/l, the median is 5.85 mg/l, and the lower 95% confidence interval is 5.82 mg/l.

Similarly, continuous dissolved oxygen measurements using a YSI Datasonde 6600 that measured dissolved oxygen, pH, specific conductivity, and water temperature at 15-minute increments were made in the Willow Creek sampling station from September 30 to October 2, 2002. The data show variation with a low of 10.03 mg/l and a high of 13.74 mg/l. The mean is 12.03 mg/l, the median is 12.11 mg/l, and the 95% lower confidence level is 11.89 mg/l. A Datasonde also was deployed at this station from June 10 through June 12, 2003. Again, a diurnal cycle is seen. The data from this sampling episode show warmer temperatures and lower dissolved oxygen concentrations, ranging from a low of 3.61 mg/l to a high of 12.1 mg/l. The mean of the measurements is 7.09 mg/l, the median is 6.69 mg/l, and the lower 95% confidence interval is 6.69 mg/l (North Coast RWQCB, 2004d).

*Spatial Representation:* The monitoring locations for the Upper Lost River/Clear Lake Reservoir area are:
1. Lost River below Clear Lake Reservoir dam, LRCLDM.
2. Lost River at Walter Flat, WFLAT.
3. Mowitz Creek just downstream of the 136 bridge, MOWCRK.
4. Boles Creek just upstream of the 136 ford, BCFORD.
5. No. Fork Willow Creek below the Great Society Bridge, WCGSB.
6. Fletcher Creek just upstream of the 73 ford, FCFORD.

Two stations are on the Upper Lost River mainstem, one is downstream of the dam and the other at Walter Flat. Station LRCLDM is at a point about 1,000 meters downstream of Clear Lake Reservoir dam. Station WFLAT is at a point about 10 meters downstream of the Walter Flat Bridge, about eight miles downstream of the dam. In addition to the two stations on the Upper Lost River, there were four monitoring locations in streams that lead to Clear Lake Reservoir, the source of the Lost River. One station was on North Fork Willow Creek, the main tributary to Clear Lake Reservoir and the primary spawning stream for the endangered Lost River and shortnose suckers. Two other sites, on Boles and Fletcher Creeks, drain into Willow Creek. The fourth site, on Mowitz Creek, drains directly into Clear Lake Reservoir but does not contribute much water to the reservoir. This site was added late in the investigation because of the opportunity to add to a sparse dataset. All of the sites, except the station below the dam, were accessible only during late spring to early fall because wet weather made the roads impassable. Sampling locations were limited to areas that could be reached by truck. Logistical issues precluded sampling in Clear Lake Reservoir.

*Temporal Representation:* Data from August 2001 through June 2003 at different stations. Continuous dissolved oxygen measurements using a YSI Datasonde 6600 that measured dissolved oxygen, pH, specific conductivity, and water temperature at 15-minute increments were made in the Upper Lost River at Walter Flat, Willow Creek Sampling Station, from September 30 to October 2, 2002. A Datasonde also was deployed at Upper Lost River at Walter Flat station from June 9 through June 11, 2003. Measurements taken at Boles Creek station in October 2002 at a time when there was no surface flow. Measurements taken at August 2001 at the station just downstream of Clear Lake Reservoir dam.

*Environmental Conditions:* There are no point source waste discharges within the watershed. The land use operations that may impact the Upper Lost River watershed as nonpoint sources of water pollution are livestock operations (grazing) and timber harvest.

*Data Quality Assessment:* NCRQWQCB QA procedures followed for the TMDL analysis.

---

***Numeric Line of Evidence*** Pollutant-Water

*Beneficial Use:* WA - Warm Freshwater Habitat

| | |
|---|---|
| *Matrix:* | Water |
| *Water Quality Objective/ Water Quality Criterion:* | Basin Plan: Water shall not contain biostimulatory substances in concentrations that promote aquatic growths to the extent that such growths cause nuisance or adversely affect beneficial uses. |
| *Evaluation Guideline:* | The WQO for Biostimulatory substances includes Phosphorus. The USEPA phosphorus 0.05-mg/l level suggested by the USEPA to control eutrophication in streams that enter lakes (USEPA 1986). |
| *Data Used to Assess Water Quality:* | The TMDL Analysis was completed for Upper Lost River and Clear Lake Reservoir Watershed. Total phosphorus was measured from monthly grab samples at the six sampling stations, for a total of 57 samples. The total phosphorus levels showed variability ranging from below the analytical reporting level to 4.5 mg/l. Of the 57 samples, 26 were below the analytical reporting limit; since phosphorus was present in the system these concentrations were assumed to be half of the reporting limit for statistical analyses. The high measurement, 4.5 mg/l, was from a sample taken in May 2002 at Fletcher Creek. The median of all of the total phosphorus results was 0.068 mg/l, and the 95% upper confidence limit is 0.35 mg/l, a level influenced by the abnormally high concentration at Fletcher Creek in May 2002.<br><br>The two stations on the Upper Lost River (WFLAT and LRCLDM) were analyzed separately from the four upstream stations on streams that drain to Clear Lake Reservoir (MOWCRK, BCFORD, WCGSB, and FCFORD). The 28 data points for the two Upper Lost River stations showed total phosphorus concentrations ranging from below the laboratory reporting limit to 0.37 mg/l, with a median of 0.20 mg/l, and a 95% upper confidence level of 0.23 mg/l (including four nondetects assumed to be half of the reporting limit). The 29 points from the four stations on streams leading to Clear Lake Reservoir showed total phosphorus concentrations ranging from below the laboratory-reporting limit to 4.5 mg/l, with a median of 0.025 mg/l (this is half of the laboratory reporting limit), and a 95% upper confidence level of 0.51 mg/l. Although most of the data points in this dataset are nondetects (22 nondetects out of 29 data points), for the complete dataset analysis, they were assumed to be half of the reporting limit. Total phosphorus levels were higher in the two downstream stations than in the stream stations upstream of Clear Lake Reservoir.<br><br>Median total phosphorus concentrations in the two Upper Lost River stations were above the 0.05-mg/l level suggested by the USEPA to control eutrophication in streams that enter lakes (USEPA 1986). Soil particles from discharged water from Clear Lake Reservoir may transport soil-organic-matter phosphorus and inorganic-soil/rock phosphorus to the Upper Lost River. The levels do not appear to present a eutrophication problem in the Upper Lost River or in Clear Lake Reservoir, probably because the high turbidity reduces sunlight penetration. The USBR (2000) indicated that there has been extensive siltation of Clear Lake Reservoir. Although, phosphorus levels are elevated in comparison to USEPA suggested levels, these suggested levels are not relevant because there is no evidence of excessive algal growth in the reservoir (perhaps due to |

turbidity levels that control light availability) and the system appears to be nitrogen limited.

In the 57 observations in this dataset, the ratio between total nitrogen and total phosphorus ranged from 0 to 74. The value of R-Squared, the proportion of variation in total nitrogen that can be accounted for by variation in total phosphorus, is 0.0001; the correlation between total nitrogen and total phosphorus is -0.0097. There is no correlation between the values. These values are slightly different if the nitrogen nondetect values were reported as zero rather than half of the reporting limit. If the data sets with nondetects and the outlier are removed, there are 21 data points available for analysis of the nitrogen/phosphorus ratio. The N/P ratio for these points is shown in the third graph. A line showing an N/P of 10 is drawn for reference. Of the 21 data points, 18 have an N/P ratio of less than 10 this indicates a system that is nitrogen limited (North Coast RWQCB, 2004d).

*Spatial Representation:*

The monitoring locations for the Upper Lost River/Clear Lake Reservoir area are shown in Map 2 and are listed below with their station designations:

1. Lost River below Clear Lake Reservoir dam, LRCLDM.
2. Lost River at Walter Flat, WFLAT.
3. Mowitz Creek just downstream of the 136 bridge, MOWCRK.
4. Boles Creek just upstream of the 136 ford, BCFORD.
5. No. Fork Willow Creek below the Great Society Bridge, WCGSB.
6. Fletcher Creek just upstream of the 73 ford, FCFORD.

Two stations are on the Upper Lost River mainstem, one is downstream of the dam and the other at Walter Flat. Station LRCLDM is at a point about 1,000 meters downstream of Clear Lake Reservoir dam. Station WFLAT is at a point about 10 meters downstream of the Walter Flat Bridge, about eight miles downstream of the dam. In addition to the two stations on the Upper Lost River, there were four monitoring locations in streams that lead to Clear Lake Reservoir, the source of the Lost River. One station was on North Fork Willow Creek, the main tributary to Clear Lake Reservoir and the primary spawning stream for the endangered Lost River and shortnose suckers. Two other sites, on Boles and Fletcher Creeks, drain into Willow Creek. The fourth site, on Mowitz Creek, drains directly into Clear Lake Reservoir but does not contribute much water to the reservoir. This site was added late in the investigation because of the opportunity to add to a sparse dataset. All of the sites, except the station below the dam, were accessible only during late spring to early fall because wet weather made the roads impassable. Sampling locations were limited to areas that could be reached by truck. Logistical issues precluded sampling in Clear Lake Reservoir.

*Temporal Representation:*

Sampling represents only one full season, late spring to early fall of one year. Sampling included monthly grab samples and instantaneous measurements for one season, continuous temperature monitoring for one season, and two short continuous multiparameter deployments. The sampling periods do not correspond to the time periods that the suckers are in the streams. There were limited spots at which the streams could be accessed; these might not correspond to the points that provide representative data. Drawing conclusions about the impact of water

| | |
|---|---|
| | temperature and nutrients on suckers based on sampling during summer is justified, because those months represent the conditions worse than the fish encounter during their time in the streams. Water temperature in the Upper Lost River/Clear Lake Reservoir watershed was investigated using: Remote continuous water and air temperature monitors (Optic stowaway dataloggers) that took readings every 15 minutes from May through September 2002. Remote sensors that measured air temperature (Optic stowaway dataloggers) and relative humidity (HOBO instruments) every 15 minutes for three days in June 2003. Solar pathfinder measurements to calculate solar radiation that reached stream surfaces. A thermal infrared aerial survey in July 2001and computer simulation modeling using the SSTEMP model. The monitoring instrument at the Boles Creek station was out of the water during that period due to seasonal dewatering and the sampling at Mowitz Creek did not begin until the following month. |
| *Environmental Conditions:* | There are no point source waste discharges within the watershed. The land use operations that may impact the Upper Lost River watershed as nonpoint sources of water pollution are livestock operations (grazing) and timber harvest. |
| *Data Quality Assessment:* | NCRWQCB QA Procedures followed for the TMDL analysis. |

---

| | |
|---|---|
| ***Line of Evidence*** | Pollutant-Water |
| *Beneficial Use* | WA - Warm Freshwater Habitat |
| *Information Used to Assess Water Quality:* | The Upper Lost River/Clear Lake Reservoir area is listed for nutrients and temperature in accordance with Section 303(d) of the federal Clean Water Act (CWA). The listing of the Upper Lost River/Clear Lake Reservoir watershed as impaired because of biostimulatory substances (nutrients) and high water temperature was made in 1996. In accordance with a consent decree, January 2005 is the deadline for adoption or de-listing of the TMDL's for the Upper Lost River/Clear Lake Reservoir area by the State of California. Investigation into the basis of the listings revealed that the listings were apparently conferred from the Klamath River listings and not based on data or information specific to the Upper Lost River and Clear Lake Reservoir watershed. The appropriateness of the nutrients and temperature listings in the Upper Lost River is explored in the TMDL analysis. If the listings had been confirmed a TMDL would have been developed, however, the listings were not confirmed and de-listing for the watershed (including Clear Lake Reservoir, the streams draining to Clear Lake Reservoir and the Upper Lost River between the Clear Lake Reservoir dam and the Oregon border) is recommended by the NCRWQCB staff. |
| *Non-Numeric Objective:* | Basin Plan: Water shall not contain bio-stimulatory substances in concentrations that promote aquatic growths to the extent that such growths cause nuisance or adversely affect beneficial uses. |
| *Evaluation Guideline:* | The WQO for Bio-stimulatory Substances is inclusive of nutrients for the |

| | |
|---|---|
| | NCRWQCB. |
| *Data Used to Assess Water Quality:* | Measurement of nutrient species was planned because the Lost River is listed on the State 303(d) list for nutrients and this information is needed for system description. Ammonia, total Kjeldahl nitrogen (TKN), nitrate and nitrite were analytically determined. Total nitrogen was calculated from TKN, nitrate and nitrite. Total phosphorus and ortho-phosphate were analytically determined. The reasons for the recommendation to de-list the watershed include:<br><br>There is no evidence that the biostimulatory narrative objective is exceeded. The system appears to be nitrogen limited and nitrogen levels are far below levels expected to cause biostimulation in this system. Although, phosphorus levels are elevated in comparison to U.S. EPA suggested levels, these suggested levels are not relevant because there is no evidence of excessive algal growth in the reservoir (perhaps due to turbidity levels that control light availability) and the system appears to be nitrogen limited. Dissolved oxygen levels are above the existing numeric water quality objectives. The nitrogen levels are below the concentration of concern for human health. There is no evidence of impacts from nutrients, dissolved oxygen, or other nutrient related effects on the sensitive species of concern. The beneficial uses appear to be unaffected by water temperature. The natural range of water temperatures and nutrient concentrations above Clear Lake Reservoir do not appear to be affected by anthropogenic activities (North Coast RWQCB, 2004d) |
| ***Line of Evidence*** | Pollutant-Water |
| *Beneficial Use* | MU - Municipal & Domestic, WA - Warm Freshwater Habitat |
| *Information Used to Assess Water Quality:* | The Upper Lost River/Clear Lake Reservoir area is listed as impaired for nutrients and temperature in accordance with Section 303(d) of the federal Clean Water Act (CWA). The listing of the Upper Lost River/Clear Lake Reservoir watershed as impaired because of biostimulatory substances (nutrients) and high water temperature was made in 1996. In accordance with a consent decree, January 2005 is the deadline for adoption or de-listing of the TMDLs for the Upper Lost River/Clear Lake Reservoir area by the State of California. Investigation into the basis of the listings revealed that the listings were apparently conferred from the Klamath River listings and not based on data or information specific to the Upper Lost River and Clear Lake Reservoir watershed. The appropriateness of the nutrients and temperature listings in the Upper Lost River is explored in the TMDL analysis. If the listings had been confirmed a TMDL would have been developed, however, the listings were not confirmed and de-listing for the watershed (including Clear Lake Reservoir, the streams draining to Clear Lake Reservoir and the Upper Lost River between the Clear Lake Reservoir dam and the Oregon border) is recommended by the NCRWQCB staff. |
| *Non-Numeric Objective:* | Basin Plan: Water shall not contain bio-stimulatory substances in |

| | |
|---|---|
| | concentrations that promote aquatic growths to the extent that such growths cause nuisance or adversely affect beneficial uses. |
| *Evaluation Guideline:* | The WQO for Bio-stimulatory Substances is inclusive of nutrients. |
| *Data Used to Assess Water Quality:* | Measurement of nutrient species was planned because the Lost River is listed on the State 303(d) list for nutrients and this information is needed for system description. Ammonia, total Kjeldahl nitrogen (TKN), nitrate and nitrite were analytically determined. Total nitrogen was calculated from TKN, nitrate and nitrite. Total phosphorus and ortho-phosphate were analytically determined. The reasons for the recommendation to de-list the watershed include:<br><br>There is no evidence that the biostimulatory narrative objective is exceeded. The system appears to be nitrogen limited and nitrogen levels are far below levels expected to cause biostimulation in this system. Although, phosphorus levels are elevated in comparison to U.S. EPA suggested levels, these suggested levels are not relevant because there is no evidence of excessive algal growth in the reservoir and the system appears to be nitrogen limited. Dissolved oxygen levels are above the existing numeric water quality objectives. The nitrogen levels are below the concentration of concern for human health. There is no evidence of impacts from nutrients, dissolved oxygen, or other nutrient related effects on the sensitive species of concern. The beneficial uses appear to be unaffected by water temperature. The natural range of water temperatures and nutrient concentrations above Clear Lake Reservoir do not appear to be affected by anthropogenic activities. The temperatures below Clear Lake Reservoir are affected by anthropogenic activities (i.e., the dam and water flow fluctuations) but these activities are not addressed by a TMDL (North Coast RWQCB, 2004d) |

---

| | |
|---|---|
| ***Line of Evidence*** | Pollutant-Water |
| *Beneficial Use* | WA - Warm Freshwater Habitat |
| *Information Used to Assess Water Quality:* | The Upper Lost River/Clear Lake Reservoir area is listed as impaired for nutrients and temperature in accordance with Section 303(d) of the federal Clean Water Act (CWA). The listing of the Upper Lost River/Clear Lake Reservoir watershed as impaired because of biostimulatory substances (nutrients) and high water temperature was made in 1996. In accordance with a consent decree, January 2005 is the deadline for adoption or de-listing of the TMDLs for the Upper Lost River/Clear Lake Reservoir area by the State of California. Investigation into the basis of the listings revealed that the listings were apparently conferred from the Klamath River listings and not based on data or information specific to the Upper Lost River and Clear Lake Reservoir watershed. The appropriateness of the nutrients and temperature listings in the Upper Lost River is explored in the TMDL analysis. If the listings had been confirmed a TMDL would have been developed, however, the listings were not confirmed and de-listing for the watershed (including Clear Lake Reservoir, the streams |

| | |
|---|---|
| | draining to Clear Lake Reservoir and the Upper Lost River between the Clear Lake Reservoir dam and the Oregon border) is recommended by NCWRQCB staff. |
| *Non-Numeric Objective:* | Basin Plan: Table 3.1, Specific Water Quality Objectives for North Coast Region Clear Lake, Upper & Lower Lost River, Tule Lake, Lower Klamath Lake:<br>> 5.0 mg/l, minimum 8.0 mg/l, 50% lower limit (this means that 50% or more of the monthly mean values must be equal to or greater than 8.0 mg/l).<br>Other Streams in Upper Lost River HA:<br>> 7.0 mg/l, minimum 8.0 mg/l, 50% lower limit (this means that 50% or more of the monthly mean values must be equal to or greater than 8.0 mg/l). |
| *Data Used to Assess Water Quality:* | Dissolved oxygen levels are above the existing numeric water quality objectives. There is no evidence of impacts from nutrients, dissolved oxygen, or other nutrient related effects on the sensitive species of concern. The beneficial uses appear to be unaffected by water temperature. The natural range of water temperatures and nutrient concentrations above Clear Lake Reservoir do not appear to be affected by anthropogenic activities. There is no evidence that the biostimulatory narrative objective is exceeded. The system appears to be nitrogen limited and nitrogen levels are far below levels expected to cause biostimulation in this system. Although, phosphorus levels are elevated in comparison to U.S. EPA suggested levels, these suggested levels are not relevant because there is no evidence of excessive algal growth in the reservoir and the system appears to be nitrogen limited. |
| *Spatial Representation:* | Continuous dissolved oxygen measurements made in the Upper Lost River at Walter Flat from September 30 to October 2, 2002. |
| *Temporal Representation:* | Continuous dissolved oxygen measurements using a YSI Datasonde 6600 that measured dissolved oxygen in 15-minute increments were made in the Upper Lost River at Walter Flat from September 30 to October 2, 2002. |

---

| | |
|---|---|
| ***Line of Evidence*** | Pollutant-Water |
| *Beneficial Use* | WA - Warm Freshwater Habitat |
| *Information Used to Assess Water Quality:* | The Upper Lost River/Clear Lake Reservoir area is listed for nutrients and temperature in accordance with Section 303(d) of the federal Clean Water Act (CWA). The listing of the Upper Lost River/Clear Lake Reservoir watershed as impaired because of biostimulatory substances (nutrients) and high water temperature was made in 1996. In accordance with a consent decree, January 2005 is the deadline for adoption or de-listing of the TMDLs for the Upper Lost River/Clear Lake Reservoir area by the State of California. Investigation into the basis of the listings revealed that the listings were apparently conferred from the Klamath River listings and not based on data or information specific to the Upper Lost River and |

| | |
|---|---|
| | Clear Lake Reservoir watershed. The appropriateness of the nutrients and temperature listings in the Upper Lost River is explored in the TMDL analysis. If the listings had been confirmed a TMDL would have been developed, however, the listings were not confirmed and de-listing for the watershed (including Clear Lake Reservoir, the streams draining to Clear Lake Reservoir and the Upper Lost River between the Clear Lake Reservoir dam and the Oregon border) is recommended by the NCRWQCB staff. |
| *Non-Numeric Objective:* | Basin Plan: Water shall not contain biostimulatory substances in concentrations that promote aquatic growths to the extent that such growths cause nuisance or adversely affect beneficial uses. |
| *Evaluation Guideline:* | The WQO for Biostimulatory Substances is inclusive of nutrients. |
| *Data Used to Assess Water Quality:* | Measurement of nutrient species was planned because the Lost River is listed on the State 303(d) list for nutrients and this information is needed for system description. Ammonia, total Kjeldahl nitrogen (TKN), nitrate and nitrite were analytically determined. Total nitrogen was calculated from TKN, nitrate and nitrite. Total phosphorus and ortho-phosphate were analytically determined. The reasons for the recommendation to de-list the watershed include:<br><br>There is no evidence that the biostimulatory narrative objective is exceeded. The system appears to be nitrogen limited and nitrogen levels are far below levels expected to cause biostimulation in this system. Although, phosphorus levels are elevated in comparison to U.S. EPA suggested levels, these suggested levels are not relevant because there is no evidence of excessive algal growth in the reservoir (perhaps due to turbidity levels that control light availability) and the system appears to be nitrogen limited. Dissolved oxygen levels are above the existing numeric water quality objectives. The nitrogen levels are below the concentration of concern for human health. There is no evidence of impacts from nutrients, dissolved oxygen, or other nutrient related effects on the sensitive species of concern. The beneficial uses appear to be unaffected by water temperature. The natural range of water temperatures and nutrient concentrations above Clear Lake<br>Reservoir do not appear to be affected by anthropogenic activities. The temperatures below Clear Lake Reservoir are affected by anthropogenic activities (i.e., the dam and water flow fluctuations) but these activities are not addressed by a TMDL (North Coast RWQCB, 2004d). |

Region 1

| | |
|---|---|
| **Water Segment:** | Klamath River HU, Lost River HA, Clear Lake, Boles HSAs |
| **Pollutant:** | Temperature, water |
| **Decision:** | Delist |
| **Weight of Evidence:** | This pollutant is being considered for removal from the section 303(d) list under section 4.2 of the Listing Policy. Under section 4.2 a single line of evidence is necessary to assess listing status.<br><br>One line of evidence is available in the administrative record to assess temperature consistent with Listing Policy section 6.1.5.9. None of the MWAT values exceeded evaluation guidelines selected to interpret the water quality objective.<br><br>Based on the readily available data and information, the weight of evidence indicates that there is sufficient justification in favor of removing this water segment-pollutant combination from the section 303(d) list. The water temperature of the watershed supports the most sensitive beneficial use, the endangered sucker species.<br><br>This conclusion is based on the staff findings that:<br>1. The data used satisfies the data quality requirements of section 6.1.4 of the Policy.<br>2. The data used satisfies the data quantity requirements of section 6.1.5 of the Policy.<br>3. There were remote continuous water and air temperature monitors that took readings every 15 minutes from May through September 2002. Of the estimated 3,000 MWATs calculated (Temperature measurements from 4 stations taken over a 5 month period considered together), none of the MWATs exceeded the water quality objective and this does not exceed the allowable frequency listed in Table 4.2 of the Listing Policy.<br>4. Pursuant to section 4.11 of the Listing Policy, no additional data and information are available indicating that standards are met. |
| **SWRCB Staff Recommendation:** | After review of the available data and information, SWRCB staff concludes that the water body-pollutant combination should be removed from the section 303(d) list because applicable water quality standards for the pollutant are not exceeded |
| **Lines of Evidence:** | |

| | |
|---|---|
| ***Numeric Line of Evidence*** | Pollutant-Water |
| *Beneficial Use:* | WA - Warm Freshwater Habitat |
| *Matrix:* | Water |
| *Water Quality Objective/ Water Quality Criterion:* | Water Quality Control Plan for the Control of Temperature in the Coastal and Interstate Waters and Enclosed Bays and Estuaries of California (Thermal Plan).<br>Lost River:<br>1. Cold Interstate Waters: A. Elevated temperature waste discharges into cold interstate waters are prohibited.<br>2. Warm Interstate Waters: A. Thermal waste discharges having a maximum temperature greater than 5°F above natural receiving water temperature are prohibited. B. Elevated temperature wastes shall not cause the temperature of warm interstate waters to increase by more than 5°F above natural temperature at any time or place. D. Lost River, Elevated temperature wastes discharged to the Lost River shall not cause the temperature of the receiving water to increase by more than 2°F when the receiving water temperature is less than 62°F, and 0°F when the receiving water temperature exceeds 62°F. |
| *Evaluation Guideline:* | The maximum weekly average temperatures (MWATs) were used from the water body to determine if the Objective was being exceeded. The Lost River Suckers and Shortnose Suckers species are listed under the Endangered Species Act and they are found in the study area. The Critical Thermal Maxima for Shortnose suckers is between the range of 32.1 to 33.3 °C (Castleberry and Cech 1993). The 96-Hour Mean Lethal Concentration (LC50) for Lost River Suckers (LRS) is 31.2 °C for juveniles (with a 95% Confidence Interval range of 30.8 to 31.5 °C for juveniles) and for the Shortnose Suckers (SNS) it is 31.9°C for larva and 31.2 °C for juveniles (with a 95% Confidence Interval range of 30.8 to 31.6 °C for juveniles), (Bellerud and Saiki 1995), (page 34, TMDL). |
| *Data Used to Assess Water Quality:* | The TMDL Analysis was completed for Upper Lost River and Clear Lake Reservoir Watershed. The most sensitive beneficial uses of Clear Lake most likely relate to the protection of the endangered sucker species. The sensitivity analysis using SSTEMP showed that daily average water temperature at the sampling stations in the streams that drain to Clear Lake Reservoir is most sensitive to influence by air temperature, solar radiation, and relative humidity. In the two Upper Lost River stations downstream of Clear Lake Reservoir, water temperature is most sensitive to inflow temperature, that is, the temperature of the water released from the Clear Lake Reservoir. The warmest stream temperatures during the data collection period were found during the week of July 15, 2002. The maximum weekly average temperatures (MWAT) at the sampling stations for that week were: WFLAT, 27.40°C; LRCLDM, 26.64°C; WCGSB, 27.63°C; FCFORD, 22.75°C. These MWATs are well below the Critical Thermal Maxima for Shortnose Suckers (32.1 to 33.3 °C) and also well below the 96-Hour Mean Lethal Concentration for both Long River Suckers and Short Nose Suckers juveniles at 31.2 °C. The water temperature of the watershed supports the most sensitive beneficial use, |

the endangered sucker species (North Coast RWQCB, 2004d)

*Spatial Representation:*

The monitoring locations for the Upper Lost River/Clear Lake Reservoir area are shown in Map 2 and are listed below with their station designations:

1. Lost River below Clear Lake Reservoir dam, LRCLDM.
2. Lost River at Walter Flat, WFLAT.
3. Mowitz Creek just downstream of the 136 bridge, MOWCRK.
4. Boles Creek just upstream of the 136 ford, BCFORD.
5. No. Fork Willow Creek below the Great Society Bridge, WCGSB.
6. Fletcher Creek just upstream of the 73 ford, FCFORD.

Two stations are on the Upper Lost River mainstem; one is downstream of the dam and the other at Walter Flat. Station LRCLDM is at a point about 1,000 meters downstream of Clear Lake Reservoir dam. Station WFLAT is at a point about 10 meters downstream of the Walter Flat Bridge, about eight miles downstream of the dam. In addition to the two stations on the Upper Lost River, there were four monitoring locations in streams that lead to Clear Lake Reservoir, the source of the Lost River. One station was on North Fork Willow Creek, the main tributary to Clear Lake Reservoir and the primary spawning stream for the endangered Lost River and Shortnose suckers. Two other sites, on Boles and Fletcher Creeks, drain into Willow Creek. The fourth site, on Mowitz Creek, drains directly into Clear Lake Reservoir but does not contribute much water to the reservoir. This site was added late in the investigation because of the opportunity to add to a sparse dataset. All of the sites, except the station below the dam, were accessible only during late spring to early fall because wet weather made the roads impassable. Sampling locations were limited to areas that could be reached by truck. Logistical issues precluded sampling in Clear Lake Reservoir.

*Temporal Representation:*

Sampling represents only one full season late spring to early fall. Sampling included monthly grab samples and instantaneous measurements for one season, continuous temperature monitoring for one season, and two short continuous multiparameter deployments. The sampling periods do not correspond to the time periods that the suckers are in the streams. There were limited spots at which the streams could be accessed; these might not correspond to the points that provide representative data. Drawing conclusions about the impact of water temperature and nutrients on suckers based on sampling during summer, however, is justified because those months represent the conditions worse than the fish encounter during their time in the streams. Water temperature in the Upper Lost River/Clear Lake Reservoir watershed was investigated using: Remote continuous water and air temperature monitors (Optic stowaway data loggers) that took readings every 15 minutes from May through September 2002. Remote sensors that measured air temperature (Optic stowaway data loggers) and relative humidity (HOBO instruments) every 15 minutes for three days in June 2003. Solar pathfinder measurements to calculate solar radiation that reached stream surfaces. A thermal infrared aerial survey in July 2001and computer simulation modeling using the SSTEMP model. The monitoring instrument at the Boles Creek station was out of the water during that period due to seasonal dewatering and the sampling at Mowitz Creek did not begin until the following month.

| | |
|---|---|
| *Environmental Conditions:* | There are no point source waste discharges within the watershed. The land use operations that may impact the Upper Lost River watershed as nonpoint sources of water pollution are livestock operations (grazing) and timber harvest. |
| *Data Quality Assessment:* | NCRWQCB QA Procedures followed in the TMDL analysis. |

---

| | |
|---|---|
| ***Line of Evidence*** | Pollutant-Water |
| *Beneficial Use* | WA - Warm Freshwater Habitat |
| *Information Used to Assess Water Quality:* | The Upper Lost River/Clear Lake Reservoir area is listed for nutrients and temperature in accordance with Section 303(d) of the federal Clean Water Act (CWA). The listing of the Upper Lost River/Clear Lake Reservoir watershed as impaired because of bio-stimulatory substances (nutrients) and high water temperature was made in 1996. In accordance with a consent decree, January 2005 is the deadline for adoption or de-listing of the TMDL's for the Upper Lost River/Clear Lake Reservoir area by the State of California. Investigation into the basis of the listings revealed that the listings were apparently conferred from the Klamath River listings and not based on data or information specific to the Upper Lost River and Clear Lake Reservoir watershed. The appropriateness of the nutrients and temperature listings in the Upper Lost River is explored in the TMDL analysis. If the listings had been confirmed a TMDL would have been developed, however, the listings were not confirmed and de-listing for the watershed (including Clear Lake Reservoir, the streams draining to Clear Lake Reservoir and the Upper Lost River between the Clear Lake Reservoir dam and the Oregon border) is recommended by NCRWQCB staff. |
| *Non-Numeric Objective:* | Basin Plan: The natural receiving water temperature of intrastate waters shall not be altered unless it can be demonstrated to the satisfaction of the Regional Water Board that such alteration in temperature does not adversely affect beneficial uses. At no time or place shall the temperature of any COLD water be increased by more than 5°F above natural receiving water temperature. At no time or place shall the temperature of WARM intrastate waters be increased more than 5°F above natural receiving water temperature. |
| *Evaluation Guideline:* | The data collection effort associated with this analysis consisted of three components: collection and review of existing data, water quality grab samples (and associated instantaneous field measurements), and the short-term use of continuous monitoring devices. Neither visual observations nor water quality sampling indicated impairment due to excess nutrients, although the turbidity levels in the reservoir and in the Upper Lost River probably suppress primary production. The high level of turbidity noted in the Upper Lost River is of concern, but was not the subject of this analysis. |
| *Data Used to Assess Water* | Species listed under the federal Endangered Species Act are found in the |

*Quality:*

study area, Lost River Suckers and Shortnose Suckers are classified as endangered species. The most sensitive beneficial uses most likely relate to the protection of the endangered sucker species. These fish can tolerate poor water quality such as low dissolved oxygen, high water temperature, and elevated pH levels, but the fish may not thrive at long-term, continual poor conditions resulting from habitat fragmentation, hydrologic regime alterations, and water diversion. Clear Lake Reservoir appears to possess a healthy population of Lost River and Shortnose suckers compared to other populations in the Klamath and Lost River Basin. The water quality and habitat conditions in the reservoir and its tributaries are better than elsewhere in the Klamath River and Lost River basins. Although the North Coast Regional Water Quality Control Board Water Quality Control Plan (Basin Plan) lists a cold-water fishery beneficial use for the study area, the current or historical presence of cold-water fish could not be confirmed. Computer simulation modeling suggests that decreasing solar radiation by increasing shade over the streams that drain into Clear Lake Reservoir could decrease water temperatures. The potential for increasing the shade due to riparian vegetation, however, is unlikely in all of these streams except for Willow Creek because of the inability of the soils to support increased vegetative growth. The Upper Lost River is more sensitive to the water temperature of the water released from Clear Lake Reservoir than to solar radiation. Even at current shade levels, the water temperature in the watershed supports the most sensitive beneficial use, the endangered sucker species. The relative health of the Clear Lake Reservoir Shortnose and Lost River sucker population is notable. Given the significance of the Clear Lake Reservoir watershed to preserving the Lost River and Shortnose sucker populations, it is necessary to preserve the aquatic habitat from any harmful effects related to land use activities. Willow Creek and its tributaries (primarily Boles Creek) are the only spawning sites for the sucker populations; it is especially important to protect valuable properly functioning riparian conditions in this stream. Regional Water Board staff has seen no information showing that the natural range of water temperature or nutrient concentrations in the streams draining into Clear Lake Reservoir are outside of the natural range for that environment due to anthropogenic causes (North Coast RWQCB, 2004d).

*Spatial Representation:*

There are six monitoring locations total. Two stations are on the Upper Lost River mainstem, one is downstream of the dam and the other at Walter Flat. Station LRCLDM is at a point about 1,000 meters downstream of Clear Lake Reservoir dam. Station WFLAT is at a point about 10 meters downstream of the Walter Flat Bridge, about eight miles downstream of the dam. In addition to the two stations on the Upper Lost River, there were four monitoring locations in streams that lead to Clear Lake Reservoir, the source of the Lost River. One station was on North Fork Willow Creek, the main tributary to Clear Lake Reservoir and the primary spawning stream for the endangered Lost River and Shortnose suckers. Two other sites, on Boles and Fletcher Creeks, drain into Willow Creek. The fourth site, on Mowitz Creek, drains directly into Clear Lake Reservoir but does not contribute much water to the reservoir. This site was added late in the investigation because of the opportunity to add to a sparse dataset. Logistical issues precluded sampling in Clear Lake Reservoir.

| | |
|---|---|
| *Temporal Representation:* | Water temperature in the Upper Lost River/Clear Lake Reservoir watershed was investigated using: Remote continuous water and air temperature monitors (Optic stowaway data loggers) that took readings every 15 minutes from May through September 2002. Remote sensors that measured air temperature (Optic stowaway dataloggers) and relative humidity (HOBO instruments) every 15 minutes for three days in June 2003. Solar pathfinder measurements to calculate solar radiation that reached stream surfaces. A thermal infrared aerial survey in July 2001and computer simulation modeling using the SSTEMP model. All of the sites, except the station below the dam, were accessible only during late spring to early fall because wet weather made the roads impassable. Sampling locations were limited to areas that could be reached by truck. |

Region 1

---

**Water Segment:** Klamath River HU, Salmon River HA

**Pollutant:** Nutrients

**Decision:** Delist

**Weight of Evidence:** This pollutant is being considered for removal from the section 303(d) list under section 4.1 of the Listing Policy. Under this section a single line of evidence is necessary to assess listing status.

There are nine lines of evidence that are available in the administrative record to assess the existing nutrients listing. The Salmon River was added to the 303(d) List for nutrients in 1992. Regional Board staff conducted a water quality monitoring effort to evaluate the impact of nutrients in the Salmon River watershed. Based on these eight lines of evidence that there is no indication that nutrients are impacting the Salmon River HA. NCRWQCB staff recommends that the Salmon River be delisted for nutrients.

Based on the readily available data and information, the weight of evidence indicates that there is sufficient justification in favor of removing this water segment-pollutant combination from the section 303(d) list in the Water Quality Limited Segments category.

This conclusion is based on the staff findings that:
1. The data used satisfies the data quality requirements of section 6.1.4 of the Policy.
2. The data used satisfies the data quantity requirements of section 6.1.5 of the Policy.
3. The narrative nutrient information as well as the observations of attached algae indicates that nutrients are not reaching nuisance levels in the Salmon River HA. Analytical results of nutrient grab samples were generally non-detect and they did not exceed the allowable frequency listed in Table 4.1 of the Listing Policy.
4. Pursuant to section 4.11 of the Listing Policy, no additional data and information are available indicating that standards are met.

**SWRCB Staff Recommendation:** After review of the available data and information, SWRCB staff concludes that the water body-pollutant combination should be removed from the section 303(d) list because applicable water quality standards for the pollutant are not exceeded.

**Lines of Evidence:**

---

| | |
|---|---|
| ***Numeric Line of Evidence*** | Pollutant-Water |
| *Beneficial Use:* | CO - Cold Freshwater Habitat |
| *Matrix:* | Water |
| *Water Quality Objective/ Water Quality Criterion:* | There is no NCRWQCB Basin Plan Water Quality Objective for TOC for Salmon River HA. |
| *Data Used to Assess Water Quality:* | The grab samples were analyzed for TOC in addition to pH, dissolved oxygen, temperatures and specific conductance. There were 22 TOC measurements in total. The average of the samples taken was 1.10. The range of the measurements taken between June and October 2002 was 0.9 to 1.7 (North Coast RWQCB, 2004c). |
| *Spatial Representation:* | There were 5 sampling locations. The sampling locations included the North Fork downstream of Sawyers Bar, the South Fork downstream of Cecilville, the Salmon River downstream of Forks of Salmon and Salmon River near the mouth. In addition, grab samples were collected near the mouth of Wooley Creek; this site was considered a control site, as the sub-watershed is a wilderness area. |
| *Temporal Representation:* | The Salmon River was added to the list for nutrients in 1992. In the summer of 2002 NCRWQCB Staff conducted a water quality monitoring effort to evaluate impairment of the Salmon River by nutrients. The monitoring plan involved collecting grab samples on three consecutive days once per month in June through October 2002 at locations in the Salmon River watershed located immediately downstream of community centers within the watershed. |
| *Data Quality Assessment:* | NCRWQCB QA. Data were collected compliant with a quality assurance plan. Blind duplicate samples were collected as a data quality control measure with acceptable results. |

---

| | |
|---|---|
| ***Numeric Line of Evidence*** | Pollutant-Water |
| *Beneficial Use:* | CO - Cold Freshwater Habitat |
| *Matrix:* | Water |
| *Water Quality Objective/ Water Quality Criterion:* | There is no NCRWQCB Basin Plan Water Quality Objective for Chlorophyll-a applicable to Salmon River HA. |
| *Evaluation Guideline:* | There are no applicable criteria for Chlorophyll-a that could be used for the Salmon River. |
| *Data Used to Assess Water* | The grab samples were analyzed for Chlorophyll-a in addition to pH, |

| | |
|---|---|
| *Quality:* | dissolved oxygen, temperatures and specific conductance. There were 55 measurements the majority of which were non detects (North Coast RWQCB, 2004c). |
| *Spatial Representation:* | There were 5 sampling locations. The sampling locations included the North Fork downstream of Sawyers Bar, the South Fork downstream of Cecilville, the Salmon River downstream of Forks of Salmon and Salmon River near the mouth. In addition, grab samples were collected near the mouth of Wooley Creek; this site was considered a control site, as the sub-watershed is a wilderness area. |
| *Temporal Representation:* | The Salmon River was added to the list for nutrients in 1992. In the summer of 2002 NCRWQCB Staff conducted a water quality monitoring effort to evaluate impairment of the Salmon River by nutrients. The monitoring plan involved collecting grab samples on three consecutive days once per month in June through October 2002 at locations in the Salmon River watershed located immediately downstream of community centers within the watershed. |
| *Data Quality Assessment:* | NCRWQCB QA. Data were collected compliant with a quality assurance plan. Blind duplicate samples were collected as a data quality control measure with acceptable results. |

---

| | |
|---|---|
| ***Numeric Line of Evidence*** | Pollutant-Water |
| *Beneficial Use:* | CO - Cold Freshwater Habitat |
| *Matrix:* | Water |
| *Water Quality Objective/ Water Quality Criterion:* | Basin Plan: Water shall not contain biostimulatory substances in concentrations that promote aquatic growths to the extent that such growths cause nuisance or adversely affect beneficial uses. |
| *Evaluation Guideline:* | Phosphorus is considered in the narrative objective for bio-stimulatory substances. There are no applicable criteria for Phosphorus that could be used for the Salmon River. In 2002, SWRCB staff recommended not listing for elemental phosphorus for Laguna de Santa Rosa because there was no appropriate phosphorus objective or evaluation guideline to interpret the narrative objective that was available to the NCRWQCB. |
| *Data Used to Assess Water Quality:* | The grab samples were analyzed for Phosphorus in addition to pH, dissolved oxygen, temperatures and specific conductance. There were 55 measurements in total the majority of which were non detects. With all non-detect values at the Mainstem Salmon River at USGS Gage Station; All non-detects and a value of 0 on 6/10/2002 at Wooley Creek Station; With all non-detects at Mainstem Salmon River at Forks of Salmon Station; All non-detects at North Fork Salmon at Sawyers Bar Station; and all non-detect values at South Fork Salmon at Cecilville (North Coast RWQCB, 2004c). |

| | |
|---|---|
| *Spatial Representation:* | There were 5 sampling locations. The sampling locations included the North Fork downstream of Sawyers Bar, the South Fork downstream of Cecilville, the Salmon River downstream of Forks of Salmon and Salmon River near the mouth. In addition, grab samples were collected near the mouth of Wooley Creek; this site was considered a control site, as the sub-watershed is a wilderness area. |
| *Temporal Representation:* | The Salmon River was added to the list for nutrients in 1992. In the summer of 2002 NCRWQCB Staff conducted a water quality monitoring effort to evaluate impairment of the Salmon River by nutrients. The monitoring plan involved collecting grab samples on three consecutive days once per month in June through October 2002 at locations in the Salmon River watershed located immediately downstream of community centers within the watershed. |
| *Data Quality Assessment:* | NCRWQCB QA. Data were collected compliant with a quality assurance plan. Blind duplicate samples were collected as a data quality control measure with acceptable results. |

---

| | |
|---|---|
| ***Numeric Line of Evidence*** | Pollutant-Water |
| *Beneficial Use:* | MU - Municipal & Domestic |
| *Matrix:* | Water |
| *Water Quality Objective/ Water Quality Criterion:* | There is no NCRWQCB Basin Plan Water Quality Objective for Ammonia as Nitrogen applicable to Salmon River HA. |
| *Evaluation Guideline:* | There are no applicable criteria for Ammonia as Nitrogen that applies. |
| *Data Used to Assess Water Quality:* | The grab samples were analyzed for Ammonia as Nitrogen in addition to pH, dissolved oxygen, temperatures and specific conductance. There were 55 measurements in total the majority of which were non detects. With non-detect values and a value at 0.052 on 6/10/2002, and another at 0.062 on 7/23/2002 at the mainstem Salmon River at USGS Gage Station; Non-detects and a value of 0.056 on 6/10/2002 and 0.052 on 7/22/2002 at Wooley Creek Station; With all non-detects at mainstem Salmon River at Forks of Salmon Station; All non-detects at North Fork Salmon at Sawyers Bar Station; and all non-detect values at South Fork Salmon at Cecilville (North Coast RWQCB, 2004c). |
| *Spatial Representation:* | There were 5 sampling locations. The sampling locations included the North Fork downstream of Sawyers Bar, the South Fork downstream of Cecilville, the Salmon River downstream of Forks of Salmon and Salmon River near the mouth. In addition, grab samples were collected near the mouth of Wooley Creek; this site was considered a control site, as the sub-watershed is a wilderness area. |

| | |
|---|---|
| *Temporal Representation:* | The Salmon River was added to the list for nutrients in 1992. In the summer of 2002 NCRWQCB Staff conducted a water quality monitoring effort to evaluate impairment of the Salmon River by nutrients. The monitoring plan involved collecting grab samples on three consecutive days once per month in June through October 2002 at locations in the Salmon River watershed located immediately downstream of community centers within the watershed. |
| *Data Quality Assessment:* | NCRWQCB QA. Data were collected compliant with a quality assurance plan. Blind duplicate samples were collected as a data quality control measure with acceptable results. |

---

| | |
|---|---|
| ***Numeric Line of Evidence*** | Pollutant-Water |
| *Beneficial Use:* | MU - Municipal & Domestic |
| *Matrix:* | Water |
| *Water Quality Objective/ Water Quality Criterion:* | There is no NCRWQCB Basin Plan Water Quality Objective for Nitrate/Nitrite as Nitrogen applicable to Salmon River HA. There is a Municipal Beneficial Use for Salmon River HA. |
| *Evaluation Guideline:* | With regards to the Municipal beneficial use applicable to Salmon River. The MCL Criteria for Nitrate/Nitrite as Nitrogen apply. Title 22(www.calregs.com) Table 64431-A lists the MCL--Inorganic Chemicals criteria for Nitrate/Nitrite as Nitrogen as 10.0 mg/L. |
| *Data Used to Assess Water Quality:* | The grab samples were analyzed for Nitrate/Nitrite as Nitrogen in addition to pH, dissolved oxygen, temperatures and specific conductance. There were 55 measurements in total the majority of which were non detects. With all non-detect values at the Mainstem Salmon River at USGS Gage Station; All non-detects at Wooley Creek Station; With non-detects and one value of 0.15 on 6/11/02 at Mainstem Salmon River at Forks of Salmon Station; All non-detects at North Fork Salmon at Sawyers Bar Station; and non-detect values and one value at 0.058 at South Fork Salmon at Cecilville (North Coast RWQCB, 2004c). |
| *Spatial Representation:* | There were 5 sampling locations. The sampling locations included the North Fork downstream of Sawyers Bar, the South Fork downstream of Cecilville, the Salmon River downstream of Forks of Salmon and Salmon River near the mouth. In addition, grab samples were collected near the mouth of Wooley Creek; this site was considered a control site, as the sub-watershed is a wilderness area. |
| *Temporal Representation:* | The Salmon River was added to the list for nutrients in 1992. In the summer of 2002 NCRWQCB Staff conducted a water quality monitoring effort to evaluate impairment of the Salmon River by nutrients. The monitoring plan involved collecting grab samples on three consecutive days once per month in June through October 2002 at locations in the |

| | |
|---|---|
| | Salmon River watershed located immediately downstream of community centers within the watershed. |
| *Data Quality Assessment:* | NCRWQCB QA. Data were collected compliant with a quality assurance plan. Blind duplicate samples were collected as a data quality control measure with acceptable results. |

---

| | |
|---|---|
| ***Numeric Line of Evidence*** | Pollutant-Water |
| *Beneficial Use:* | CO - Cold Freshwater Habitat |
| *Matrix:* | Water |
| *Water Quality Objective/ Water Quality Criterion:* | There is no NCRWQCB Basin Plan Water Quality Objective for Total Kjeldahl Nitrogen (TKN) applicable to Salmon River HA. |
| *Data Used to Assess Water Quality:* | The grab samples were analyzed for TKN in addition to pH, dissolved oxygen, temperatures and specific conductance. There were 55 measurements in total the majority of which were non detects. With non detect values and one value of 0.7 on 7/23/02 at the Mainstem Salmon River at USGS Gage Station; All non-detects at Wooley Creek Station; With non-detects and one value of 0.6 on 7/23/02 at Mainstem Salmon River at Forks of Salmon Station; All non-detects at North Fork Salmon at Sawyers Bar Station; and non-detect values and one value at 0.8 at South Fork Salmon at Cecilville (North Coast RWQCB, 2004c). |
| *Spatial Representation:* | There were 5 sampling locations. The sampling locations included the North Fork downstream of Sawyers Bar, the South Fork downstream of Cecilville, the Salmon River downstream of Forks of Salmon and Salmon River near the mouth. In addition, grab samples were collected near the mouth of Wooley Creek; this site was considered a control site, as the sub-watershed is a wilderness area. |
| *Temporal Representation:* | The Salmon River was added to the list for nutrients in 1992. In the summer of 2002 NCRWQCB Staff conducted a water quality monitoring effort to evaluate impact of the nutrients in the Salmon River. The monitoring plan involved collecting grab samples on three consecutive days once per month in June through October 2002 at locations in the Salmon River watershed located immediately downstream of community centers within the watershed. |
| *Data Quality Assessment:* | NCRWQCB QA. Data were collected compliant with a quality assurance plan. Blind duplicate samples were collected as a data quality control measure with acceptable results. |

---

| | |
|---|---|
| ***Numeric Line of Evidence*** | Pollutant-Nuisance |

| | |
|---|---|
| *Beneficial Use:* | CO - Cold Freshwater Habitat |
| *Matrix:* | -N/A |
| *Water Quality Objective/ Water Quality Criterion:* | Basin Plan: Water shall not contain bio-stimulatory substances in concentrations that promote aquatic growths to the extent that such growths cause nuisance or adversely affect beneficial uses. |
| *Evaluation Guideline:* | The rationale for conducting the survey was to evaluate the "nuisance" growths of aquatic plants, in relation to the narrative objective for bio-stimulatory substances in the Basin Plan. |
| *Data Used to Assess Water Quality:* | In all but a few cases, all nutrient parameters were non detect. Based on the available data, there is no indication that nutrients are impairing the Salmon river watershed. Analytical results of nutrient grab samples were generally non-detect. Observations of attached algae, presence of which represents a primary biological response to nutrient concentrations in streams, indicate that aquatic plants do not reach nuisance levels (North Coast RWQCB, 2004c). |
| *Spatial Representation:* | There were 5 sampling locations. The sampling locations included the North Fork downstream of Sawyers Bar, the South Fork downstream of Cecilville, the Salmon River downstream of Forks of Salmon and Salmon River near the mouth. In addition, grab samples were collected near the mouth of Wooley Creek; this site was considered a control site, as the sub-watershed is a wilderness area. |
| *Temporal Representation:* | The Salmon River was added to the list for nutrients in 1992. In the summer of 2002 NCRWQCB Staff conducted a water quality monitoring effort to evaluate impairment of the Salmon River by nutrients. The monitoring plan involved collecting grab samples on three consecutive days once per month in June through October at locations in the Salmon River watershed located immediately downstream of community centers within the watershed. |
| *Data Quality Assessment:* | NCRWQCB QA. Data were collected compliant with a quality assurance plan. Blind duplicate samples were collected as a data quality control measure. |

---

| | |
|---|---|
| ***Numeric Line of Evidence*** | Pollutant-Nuisance |
| *Beneficial Use:* | CO - Cold Freshwater Habitat |
| *Matrix:* | Water |
| *Water Quality Objective/ Water Quality Criterion:* | Basin Plan: The pH shall conform to those limits listed in Table 3-1. For waters not listed in Table 3-1 and where pH objectives are not prescribed, the pH shall not be depressed below 6.5 nor raised above 8.5. Changes in |

| | |
|---|---|
| | normal ambient pH levels shall not exceed 0.2 units in waters with designated marine (MAR) or saline (SAL) beneficial uses nor 0.5 units within the range specified above in fresh waters with designated COLD or WARM beneficial uses. |
| *Evaluation Guideline:* | Table 3-1 in the NCRWQCB Basin Plan lists the Salmon River HA (All streams) WQO for pH as a minimum at 7.0 and the maximum at 8.5. |
| *Data Used to Assess Water Quality:* | The grab samples were analyzed for pH in addition to dissolved oxygen, temperatures and specific conductance. They were measured using an YSI 600XL Datasonde when grab samples were collected. There were 25 pH measurements in total with an average pH of 7.55. The WQO for Salmon River is attained by all samples except for one measurement taken on 6/11/02 that was below the 7.0 WQO at 6.97 (North Coast RWQCB, 2004c). |
| *Spatial Representation:* | There were 5 sampling locations. The sampling locations included the North Fork downstream of Sawyers Bar, the South Fork downstream of Cecilville, the Salmon River downstream of Forks of Salmon and Salmon River near the mouth. In addition, grab samples were collected near the mouth of Wooley Creek; this site was considered a control site, as the sub-watershed is a wilderness area. |
| *Temporal Representation:* | The Salmon River was added to the list for nutrients in 1992. In the summer of 2002 NCRWQCB Staff conducted a water quality monitoring effort to evaluate impairment of the Salmon River by nutrients. The monitoring plan involved collecting grab samples on three consecutive days once per month in June through October 2002 at locations in the Salmon River watershed located immediately downstream of community centers within the watershed. |
| *Data Quality Assessment:* | NCRWQCB QA. Data were collected compliant with a quality assurance plan. Blind duplicate samples were collected as a data quality control measure with acceptable results. |

---

| | |
|---|---|
| ***Line of Evidence*** | Pollutant-Nuisance |
| *Beneficial Use* | CO - Cold Freshwater Habitat |
| *Information Used to Assess Water Quality:* | The Salmon River, tributary to the Klamath River in Siskiyou County, was included in a nutrient impaired listing of Hydrologic Unit 105.00 (Klamath River Basin) pursuant to the requirements of CWA 303(d). The Klamath River mainstem is the subject of separate analysis and TMDL development for impairments, of which nutrients is one. |
| *Non-Numeric Objective:* | Basin Plan: Water shall not contain bio-stimulatory substances in concentrations that promote aquatic growths to the extent that such growths cause nuisance or adversely affect beneficial uses. |

| | |
|---|---|
| *Evaluation Guideline:* | The rationale for conducting the survey was to evaluate the "nuisance" growths of aquatic plants, in relation to the narrative objective for bio-stimulatory substances in the Basin Plan. |
| *Data Used to Assess Water Quality:* | In all but a few cases, all nutrient parameters were non detect. There is no indication that the Salmon River Watershed is impaired by nutrients. Observations of attached algae indicate that aquatic plants do not reach nuisance levels. Quasi-Quantitative surveys of the percent cover of attached algae in the river at the monitoring location were conducted in July and August 2002. The surveys involved making visual assessments of the percent cover of attached algae and the conditions of the algal community within the immediate vicinity of the monitoring locations (North Coast RWQCB, 2004c). |
| *Spatial Representation:* | There were 5 sampling locations. The sampling locations included the North Fork downstream of Sawyers Bar, the South Fork downstream of Cecilville, the Salmon River downstream of Forks of Salmon and Salmon River near the mouth. In addition, grab samples were collected near the mouth of Wooley Creek; this site was considered a control site, as the sub-watershed is a wilderness area. |
| *Temporal Representation:* | The Salmon River was added to the list for nutrients in 1992. In the summer of 2002 NCRWQCB Staff conducted a water quality monitoring effort to evaluate impairment of the Salmon River by nutrients. The monitoring plan involved collecting grab samples on three consecutive days once per month in June through October at locations in the Salmon River watershed located immediately downstream of community centers within the watershed. |

Region 1

---

**Water Segment:** Russian River HU, Lower Russian River HA, Guerneville HSA

**Pollutant:** Turbidity

**Decision:** Delist

**Weight of Evidence:** This pollutant is being considered for removal from the section 303(d) list under section 4.2 of the Listing Policy. Under section 4.2 a single line of evidence is necessary to assess listing status.

Four lines of evidence are available in the administrative record to assess this pollutant. None of the samples out of 27 samples collected for Pocket Canyon Creek a tributary of the Russian River HU exceeded the 25 NTU turbidity evaluation guideline used to interpret the water quality objective. Only the Pocket Canyon Creek portion that was sampled for the Guernville HSA should be removed from the list. The other lines of evidence collected from Dutch Bill Creek, Lancel Creek, and Jenner Creek did not have enough samples to be considered for a delisting in the Guerneville HSA. These segments should remain listed on the 303(d) List as they are currently listed for sedimentation for this water segment.

Based on the readily available data and information, the weight of evidence indicates that there is sufficient justification in favor of removing this water segment-pollutant combination for Pocket Canyon Creek portion of this HSA only, from the section 303(d) list.

This conclusion is based on the staff findings that:
1. The data used satisfies the data quality requirements of section 6.1.4 of the Policy.
2. The data used satisfies the data quantity requirements of section 6.1.5 of the Policy.
3. None of the 27 samples collected for Pocket Canyon Creek exceeded the turbidity water quality objective and this does not exceed the allowable frequency listed in Table 4.2 of the Listing Policy.
4. Pursuant to section 4.11 of the Listing Policy, no additional data and information are available indicating that standards are met.

**SWRCB Staff Recommendation:** After review of the available data and information, SWRCB staff concludes that the water body-pollutant combination for the Pocket Canyon Creek portion of the Guerneville HSA should be removed from the section 303(d) list because applicable water quality standards for the pollutant are not exceeded. The rest of the segments currently listed under the Russian River HU, Lower Russian River HA, Guerneville HSA should remain on the 303(d) List as they are currently.

**Lines of Evidence:**

| | |
|---|---|
| ***Numeric Line of Evidence*** | Pollutant-Water |
| *Beneficial Use:* | CO - Cold Freshwater Habitat |
| *Matrix:* | Water |
| *Water Quality Objective/ Water Quality Criterion:* | Basin Plan: The suspended sediment load and suspended sediment discharge rate of surface waters shall not be altered in such a manner as to cause nuisance or adversely affect beneficial uses. Turbidity shall not be increased more than 20 percent above naturally occurring background levels. Allowable zones of dilution within which higher percentages can be tolerated may be defined for specific discharges upon the issuance of discharge permits or waiver thereof. Water shall not contain substances in concentrations that result in deposition of material that causes nuisance or adversely affect beneficial uses. |
| *Evaluation Guideline:* | The evaluation guideline that has been used to determine turbidity exceedance is from published-peer reviewed paper, "The Effects of Chronic Turbidity on Density and Growth of Steelheads and Coho Salmon", John W Sigler (1984). The guideline is "In our studies, as little as 25 NTUs of turbidity caused a reduction in fish growth." |
| *Data Used to Assess Water Quality:* | None of the turbidity samples were in exceedance of the turbidity evaluation guideline of 25 NTU. |
| *Spatial Representation:* | All samples were taken at sampling location Lancel Creek a tributary to Dutch Bill Creek which is tributary to the Russian River. The sampling location LAN010 is located at Occidental. |
| *Temporal Representation:* | Samples were taken once a month in April, May, June, September, October and December 2003. |
| *Data Quality Assessment:* | Draft QAPP for Volunteer Water Quality Monitoring Project for the Community Clean Water Institute. |

| | |
|---|---|
| ***Numeric Line of Evidence*** | Pollutant-Water |
| *Beneficial Use:* | CO - Cold Freshwater Habitat, R1 - Water Contact Recreation, R2 - Non-Contact Recreation, RA - Rare & Endangered Species, SP - Fish Spawning, WA - Warm Freshwater Habitat, WI - Wildlife Habitat |
| *Matrix:* | Water |

| | |
|---|---|
| *Water Quality Objective/ Water Quality Criterion:* | Basin Plan: The suspended sediment load and suspended sediment discharge rate of surface waters shall not be altered in such a manner as to cause nuisance or adversely affect beneficial uses. Turbidity shall not be increased more than 20 percent above naturally occurring background levels. Allowable zones of dilution within which higher percentages can be tolerated may be defined for specific discharges upon the issuance of discharge permits or waiver thereof. Water shall not contain substances in concentrations that result in deposition of material that causes nuisance or adversely affect beneficial uses. |
| *Evaluation Guideline:* | The evaluation guideline that has been used to determine turbidity exceedance is from published-peer reviewed paper, "The Effects of Chronic Turbidity on Density and Growth of Steelheads and Coho Salmon", John W Sigler (1984). The guideline is "In our studies, as little as 25 NTUs of turbidity caused a reduction in fish growth." |
| *Data Used to Assess Water Quality:* | There were no exceedances at the JEN020 location. There were 2 exceedances of the evaluation guideline at the RUS010 location. These exceedances were on 1/29/2003 at 42.1 NTU and on 4/30/2003 at 35.3 NTU. The two locations considered for Jenner Creek there were 12 turbidity samples total with 2 exceedances (Sandler, 2004). |
| *Spatial Representation:* | There were two sampling locations. All samples were along Jenner Creek, a tributary to the lower Russian River. JEN020 is located by fish ladder, Jenner. RUS010 is located near a boat house, Jenner. |
| *Temporal Representation:* | Samples were taken once a month, a single measurement on one day at each site during January, February, April, May, August and November 2003. |
| *Data Quality Assessment:* | Draft QAPP for Volunteer Water Quality Monitoring Project for the Community Clean Water Institute. |

---

| | |
|---|---|
| ***Numeric Line of Evidence*** | Pollutant-Water |
| *Beneficial Use:* | CO - Cold Freshwater Habitat |
| *Matrix:* | Water |
| *Water Quality Objective/ Water Quality Criterion:* | Basin Plan: The suspended sediment load and suspended sediment discharge rate of surface waters shall not be altered in such a manner as to cause nuisance or adversely affect beneficial uses. Turbidity shall not be increased more than 20 percent above naturally occurring background levels. Allowable zones of dilution within which higher percentages can be tolerated may be defined for specific discharges upon the issuance of discharge permits or waiver thereof. Water shall not contain substances in concentrations that result in deposition of material that causes nuisance or adversely affect beneficial uses. |

| | |
|---|---|
| *Evaluation Guideline:* | The evaluation guideline that has been used to determine turbidity exceedance is from published-peer reviewed paper, "The Effects of Chronic Turbidity on Density and Growth of Steelheads and Coho Salmon", John W Sigler (1984). The guideline is "In our studies, as little as 25 NTUs of turbidity caused a reduction in fish growth." |
| *Data Used to Assess Water Quality:* | There were no exceedances of the turbidity evaluation guideline. All of the turbidity samples were well below the evaluation guideline (Sandler, 2004). |
| *Spatial Representation:* | All samples were along Dutch Bill Creek. There were five sampling locations. These locations are: DBC010 is located near the fish ladder at Occidental.<br><br>DBC020 is located at Westminister, downstream from Bohemian Ranch, Occidental. DBC030 is located at Camp Meeker dam. DBC050 is located 75 yards downstream from pump station, Occidental. DBC060 is located at Graton Rd. and Main St., at bridge, Occidental. |
| *Temporal Representation:* | Samples were taken once a month, a single measurement on one day at each station during April, May, June, September, October and December 2003.<br><br>Samples were taken at DBC050 and DBC060 once a month, a single measurement on one day at each station during April, May, June, September and December 2003. |
| *Data Quality Assessment:* | Draft QAPP for Volunteer Water Quality Monitoring Project for the Community Clean Water Institute. |

---

| | |
|---|---|
| ***Numeric Line of Evidence*** | Pollutant-Water |
| *Beneficial Use:* | CO - Cold Freshwater Habitat |
| *Matrix:* | Water |
| *Water Quality Objective/ Water Quality Criterion:* | Basin Plan: The suspended sediment load and suspended sediment discharge rate of surface waters shall not be altered in such a manner as to cause nuisance or adversely affect beneficial uses. Turbidity shall not be increased more than 20 percent above naturally occurring background levels. Allowable zones of dilution within which higher percentages can be tolerated may be defined for specific discharges upon the issuance of discharge permits or waiver thereof. Water shall not contain substances in concentrations that result in deposition of material that causes nuisance or adversely affect beneficial uses. |
| *Evaluation Guideline:* | The evaluation guideline that has been used to determine turbidity exceedance is from published-peer reviewed paper, "The Effects of Chronic Turbidity on Density and Growth of Steelheads and Coho |

| | |
|---|---|
| | Salmon", John W Sigler (1984). The guideline is "In our studies, as little as 25 NTUs of turbidity caused a reduction in fish growth." |
| *Data Used to Assess Water Quality:* | All of the samples are below the 25 NTU turbidity evaluation guideline with a range of measurements from 0.4 NTU to 6.54 NTU (Sandler, 2004). |
| *Spatial Representation:* | Sampling was done at three locations in Pocket Creek a tributary to the lower Russian River within the greater Guerneville HSA. PCC020 is located in Guerneville, at 12170 Hwy 116, downstream of Inn and the tank in the creek. PCC030 is located in Guerneville, at 11900 Hwy 116, in the backyard. PCC040 is located in Guerneville, 50 feet upstream from bridge along Hwy 116 at May's Canyon Road. |
| *Temporal Representation:* | Samples were taken once a month on the same days at each station during January, February, March, May, and August through December 2003. |
| *Data Quality Assessment:* | Draft QAPP for Volunteer Water Quality Monitoring Project for the Community Clean Water Institute. |

Region 1

---

**Water Segment:** Russian River HU, Middle Russian River HA, Laguna de Santa Rosa

**Pollutant:** Nitrogen

**Decision:** Delist

**Weight of Evidence:** This pollutant is being considered for removal from the section 303(d) list under section 4.2 of the Listing Policy. Under this section a single line of evidence is necessary to assess listing status. Thirteen lines of evidence are available in the administrative record to assess this pollutant.

Based on the readily available data and information, the weight of evidence indicates that there is sufficient justification in favor of removing this water segment-pollutant combination from the section 303(d) list in the Water Quality Limited Segments category.

This conclusion is based on the staff findings that:
1. The data used satisfies the data quality requirements of section 6.1.4 of the Policy.
2. The data used satisfies the data quantity requirements of section 6.1.5 of the Policy.
3. There were six lines of evidence for Nitrogen in the Laguna de Santa Rosa. There were two lines of evidence for Nitrogen-Nitrate. There was one line of evidence for Nitrite. There were three lines of evidence for Ammonia as Nitrogen. For all of these constituents there is no guideline available to interpret the narrative objective so it cannot be determined if the data exceed the allowable frequency listed in Table 4.1 of the Listing Policy.

The single line of evidence for nitrate, collected by the RWQCB Nutrient TMDL Monitoring Program, shows no exceedance of the MCL 45 mg/L criteria applied through the Municipal and Domestic Beneficial Use for the Laguna De Santa Rosa. This nitrate information does not exceed the allowable frequency listed in table 4.1 of the Listing Policy.

4. Pursuant to section 4.11 of the Listing Policy, no additional data and information are available indicating that standards are met.

**SWRCB Staff Recommendation:** After review of the available data and information, SWRCB staff concludes that the water body-pollutant combination should be removed from the section 303(d) list because applicable water quality standards for the pollutant are not exceeded.

**Lines of Evidence:**

| | |
|---|---|
| ***Numeric Line of Evidence*** | Pollutant-Water |
| *Beneficial Use:* | AG - Agricultural Supply |
| *Matrix:* | Water |
| *Water Quality Objective/ Water Quality Criterion:* | Basin Plan: Water shall not contain biostimulatory substances in concentrations that promote aquatic growths to the extent that such growths cause nuisance or adversely affect beneficial uses. |
| *Evaluation Guideline:* | Data is recorded as TIN:TP ratio. TIN:TP ratio is considered in the narrative objective for biostimulatory substances. However, there is no applicable numeric water quality criterion for TIN:TP ratio. Therefore, it is difficult to determine that the concentration of TIN:TP ratio exceeds standards. |
| *Data Used to Assess Water Quality:* | Twenty-five sampling events were completed by the City of Santa Rosa NPDES Program. The TIN:TP ratios for the 101 samples taken ranged from 2.5 to 29.1667 with an average value of 4.365 and a standard deviation of 3.282. There was a 99% confidence interval of 0.841. Even though there is a narrative objective for biostimulatory substance there is not a numeric objective or criteria to compare to the TIN:TP ratios. Therefore, it is difficult to determine whether the decrease in dissolved oxygen is due solely to the TIN:TP ratio levels (Scoles, 2004). |
| *Spatial Representation:* | Samples were collected at up to 4 sampling sites: Laguna at Todd Road, Upstream at Delta, Laguna upstream of D-Pond Incline pump, and Laguna upstream of Llano Rd. Bridge. |
| *Temporal Representation:* | Samples were collected between 1/2003 and 12/2003. |
| *Data Quality Assessment:* | City of Santa Rosa Quality Assurance Manual. |

| | |
|---|---|
| ***Numeric Line of Evidence*** | Pollutant-Water |
| *Beneficial Use:* | AG - Agricultural Supply |
| *Matrix:* | Water |
| *Water Quality Objective/ Water Quality Criterion:* | Basin Plan: Water shall not contain biostimulatory substances in concentrations that promote aquatic growths to the extent that such growths cause nuisance or adversely affect beneficial uses. |
| *Evaluation Guideline:* | Total Inorganic Nitrogen was measured and is considered in the narrative objective for biostimulatory substances. However, there is no applicable |

| | |
|---|---|
| | numeric water quality criterion for total inorganic nitrogen. Therefore, it is difficult to determine that the concentration of total inorganic nitrogen exceeds standards. |
| *Data Used to Assess Water Quality:* | Sixty sampling events were completed by the City of Santa Rosa NPDES Program. The values of the total inorganic nitrogen ranged from 0.3 to 12.2. Even though there is a narrative objective for biostimulatory substance there is not a numeric objective or criteria to compare to the concentration of total inorganic nitrogen. Therefore, it is difficult to determine whether the decrease in dissolved oxygen is solely due to the total inorganic nitrogen levels (Scoles, 2004). |
| *Spatial Representation:* | Samples were collected from up to 12 sites: Laguna at Llano Road, Laguna at Todd Road, Laguna at Hwy 12, and Laguna at Occidental Bridge, Laguna 100 feet upstream of D-Pond incline Pump, Laguna 150 feet downstream of D-Pond Incline Pump, Laguna at La Franchi, Laguna-approximately 100 feet upstream of Llano Rd. Bridge, Laguna upstream of D-Pond 36, upstream Laguna at Delta, Russian River at Wohler Bridge, Russian River at Mirabel, upstream Roseland Cr. at Llano Rd., downstream Roseland Cr. at Summer Crossing/South of Alpha Bldg., upstream Kelly-downstream confluence of Duer Creek and Kelly Farm Drainage, downstream Duer Creek at Kelly, Colgan Creek upstream confluence with Laguna. |
| *Temporal Representation:* | Samples were collected between 10/1995 and 3/2004. |
| *Data Quality Assessment:* | City of Santa Rosa Quality Assurance Manual. |

---

| | |
|---|---|
| ***Numeric Line of Evidence*** | Pollutant-Water |
| *Beneficial Use:* | AG - Agricultural Supply |
| *Matrix:* | Water |
| *Water Quality Objective/ Water Quality Criterion:* | Basin Plan: Water shall not contain biostimulatory substances in concentrations that promote aquatic growths to the extent that such growths cause nuisance or adversely affect beneficial uses. |
| *Evaluation Guideline:* | Total Organic Nitrogen was measured and is considered in the narrative objective for biostimulatory substances. However, there is no numeric water quality criterion for total organic nitrogen. Therefore, it is difficult to determine that the concentration of total organic nitrogen exceeds standards. |
| *Data Used to Assess Water Quality:* | Twenty-five sampling events were conducted by the City of Santa Rosa NPDES Program. The samples ranged from values of 0.2 mg/L to 2.3 mg/L total organic nitrogen. Even though there is a narrative objective for biostimulatory substance there is not a numeric objective or criteria to compare to the concentration of total organic nitrogen. Therefore, it is |

| | |
|---|---|
| | difficult to determine whether the decrease in dissolved oxygen is solely due to the total organic nitrogen levels (Scoles, G. 2004). |
| *Spatial Representation:* | Sample were collected at up to 4 sites: Laguna at Todd Road, Upstream at Delta, Laguna upstream of D-Pond Incline pump, and Laguna upstream of Llano Rd. Bridge. |
| *Temporal Representation:* | Sample were collected between 1/2003 and 12/2003. |
| *Data Quality Assessment:* | City of Santa Rosa Quality Assurance Manual. |

---

| | |
|---|---|
| ***Numeric Line of Evidence*** | Pollutant-Water |
| *Beneficial Use:* | AG - Agricultural Supply |
| *Matrix:* | Water |
| *Water Quality Objective/ Water Quality Criterion:* | Basin Plan: Water shall not contain biostimulatory substances in concentrations that promote aquatic growths to the extent that such growths cause nuisance or adversely affect beneficial uses. |
| *Evaluation Guideline:* | Data is reported in TIN: 0.80 TP (Bioavailable N:P ratio). TIN: 0.80 TP is considered in the narrative objective for biostimulatory substances. However, there is no applicable numeric water quality criterion for TIN: 0.80 TP. Therefore, it is difficult to determine that the concentration of TIN: 0.80 TP exceeds standards. |
| *Data Used to Assess Water Quality:* | Sixty sampling events were completed by the City of Santa Rosa NPDES Program. The range of measured values for the ratio of TIN: 0.80 TP was from 0.3 to 16.9. Even though there is a narrative objective for biostimulatory substance there is not a numeric objective or criteria to compare to the concentration of TIN: 0.80 TP. Therefore, it is difficult to determine whether the decrease in dissolved oxygen is due solely to the TIN: 0.80 TP levels (Scoles, 2004). |
| *Spatial Representation:* | Samples were collected from up to 12 sites: Laguna at Llano Road, Laguna at Todd Road, Laguna at Hwy 12, and Laguna at Occidental Bridge, Laguna 100 feet upstream of D-Pond incline Pump, Laguna 150 feet downstream of D-Pond Incline Pump, Laguna at La Franchi, Laguna-approximately 100 feet upstream of Llano Rd. Bridge, Laguna upstream of D-Pond 36, upstream Laguna at Delta, Russian River at Wohler Bridge, Russian River at Mirabel, upstream Roseland Cr. at Llano Rd., downstream Roseland Cr. at Summer Crossing/South of Alpha Bldg., upstream Kelly-downstream confluence of Duer Creek and Kelly Farm Drainage, downstream Duer Creek at Kelly, Colgan Creek upstream confluence with Laguna. |
| *Temporal Representation:* | Samples were collected between 10/1995 and 3/2004. |

| | |
|---|---|
| *Data Quality Assessment:* | City of Santa Rosa Quality Assurance Manual. |

---

| | |
|---|---|
| ***Numeric Line of Evidence*** | Pollutant-Water |
| *Beneficial Use:* | AG - Agricultural Supply |
| *Matrix:* | Water |
| *Water Quality Objective/ Water Quality Criterion:* | Basin Plan: Water shall not contain biostimulatory substances in concentrations that promote aquatic growths to the extent that such growths cause nuisance or adversely affect beneficial uses. |
| *Evaluation Guideline:* | Data is reported in TIN: 0.80 TP (Bioavailable N:P ratio). TIN: 0.80 TP is considered in the narrative objective for biostimulatory substances. However, there is no applicable numeric water quality criterion for TIN: 0.80 TP. Therefore, it is difficult to determine that the concentration of TIN: 0.80 TP exceeds standards. |
| *Data Used to Assess Water Quality:* | Eighty-Six sampling events were conducted by the RWQCB Nutrient TMDL Program. The values of the TIN: 0.80 TP recorded ranged from 0.03 up to 20.02. Even though there is a narrative objective for biostimulatory substance there is not a numeric objective or criteria to compare to the measurement of TIN: 0.80 TP. Therefore, it is difficult to determine whether the decrease in dissolved oxygen is due solely to the TIN: 0.80 TP levels (Scoles, 2004). |
| *Spatial Representation:* | Up to four sample sites: Laguna at Guernville Road, Laguna at Occidental Road, Laguna at Stony Point Road and Laguna at Trenton-Healdsburg Road. |
| *Temporal Representation:* | Samples were collected between 7/1997 and 11/2000. |
| *Data Quality Assessment:* | Nutrient TMDL Program. |

---

| | |
|---|---|
| ***Numeric Line of Evidence*** | Pollutant-Water |
| *Beneficial Use:* | AG - Agricultural Supply, MU - Municipal & Domestic, R1 - Water Contact Recreation, R2 - Non-Contact Recreation, WI - Wildlife Habitat |
| *Matrix:* | Water |
| *Water Quality Objective/ Water Quality Criterion:* | Basin Plan: Water shall not contain biostimulatory substances in concentrations that promote aquatic growths to the extent that such growths cause nuisance or adversely affect beneficial uses. |

| | |
|---|---|
| *Evaluation Guideline:* | Nitrate-Nitrogen is considered in the narrative objective for biostimulatory substances. However, there is no numeric water quality criterion for nitrate-nitrogen. Therefore, it is difficult to determine that the concentration of nitrate-nitrogen exceeds standards. |
| *Data Used to Assess Water Quality:* | Sixty sampling events were conducted by the City of Santa Rosa NPDES Program. The sample values ranged from 0.2 mg/L to 9.7 mg/L and the values were presented as monthly averages of weekly observations. Even though there is a narrative objective for biostimulatory substance there is not a numeric objective or criteria to compare to the concentration of nitrate-nitrogen. Therefore, it is difficult to determine whether the decrease in dissolved oxygen is solely to the nitrate-nitrogen levels (Scoles, G. 2004). |
| *Spatial Representation:* | Samples were collected from up to 12 sites: Laguna at Llano Road, Laguna at Todd Road, Laguna at Hwy 12, and Laguna at Occidental Bridge, Laguna 100 feet upstream of D-Pond incline Pump, Laguna 150 feet downstream of D-Pond Incline Pump, Laguna at La Franchi, Laguna-approximately 100 feet upstream of Llano Rd. Bridge, Laguna upstream of D-Pond 36, upstream Laguna at Delta, Russian River at Wohler Bridge, Russian River at Mirabel, upstream Roseland Cr. at Llano Rd., downstream Roseland Cr. at Summer Crossing/South of Alpha Bldg., upstream Kelly-downstream confluence of Duer Creek and Kelly Farm Drainage, downstream Duer Creek at Kelly, Colgan Creek upstream confluence with Laguna. |
| *Temporal Representation:* | Samples were collected between 10/1995 and 3/2004. |
| *Data Quality Assessment:* | City of Santa Rosa QA Manual. |

---

| | |
|---|---|
| ***Numeric Line of Evidence*** | Pollutant-Water |
| *Beneficial Use:* | AG - Agricultural Supply, MU - Municipal & Domestic, R1 - Water Contact Recreation, R2 - Non-Contact Recreation, WI - Wildlife Habitat |
| *Matrix:* | Water |
| *Water Quality Objective/ Water Quality Criterion:* | There is no applicable criteria available for Ammonia-Nitrogen. |
| *Data Used to Assess Water Quality:* | Twenty-five sampling events were completed by the City of Santa Rosa NPDES Program. There were 101 samples taken for Ammonia-Nitrogen, the values ranged from 0.2 mg/L to 1.1mg/L. The number of exceedances of the standard was not possible to calculate due to the lack of an applicable criterion for Ammonia-Nitrogen to compare to the measured values (Scoles, 2004). |
| *Spatial Representation:* | Samples were collected at up to 4 sampling sites: Laguna at Todd Road, Upstream at Delta, Laguna upstream of D-Pond Incline pump, and Laguna |

| | |
|---|---|
| | upstream of Llano Rd. Bridge. |
| *Temporal Representation:* | Samples were collected between 1/2003 and 12/2003. |
| *Data Quality Assessment:* | City of Santa Rosa QA Manual. |

---

| | |
|---|---|
| ***Numeric Line of Evidence*** | Pollutant-Water |
| *Beneficial Use:* | CO - Cold Freshwater Habitat, MU - Municipal & Domestic |
| *Matrix:* | Water |
| *Water Quality Objective/ Water Quality Criterion:* | Basin Plan: Water shall not contain biostimulatory substances in concentrations that promote aquatic growths to the extent that such growths cause nuisance or adversely affect beneficial uses. |
| *Evaluation Guideline:* | Nitrate is considered in the narrative objective for biostimulatory substances. There not a nitrate numeric water quality criterion for the Cold Water Beneficial Use. However, for the beneficial use of Municipal and Domestic Supply (MUN), the MCL Criteria for Nitrates is 45 mg/L (ppm) can be considered. |
| *Data Used to Assess Water Quality:* | Eighty-six sampling events were conducted by the RWQCB Nutrient TMDL Monitoring Program. There were no samples that exceeded the 45 mg/L MCL criteria (Scoles, 2004). |
| *Spatial Representation:* | Samples were collected from up to 4 sample sites: Laguna at Guernville Road, Laguna at Occidental Road, Laguna at Stony Point Road, and Laguna at Trenton-Healdsburg Road. |
| *Temporal Representation:* | Samples were collected between 7/1997 and 11/2000. |
| *Data Quality Assessment:* | RWQCB TMDL Monitoring Program |

---

| | |
|---|---|
| ***Numeric Line of Evidence*** | Pollutant-Water |
| *Beneficial Use:* | CO - Cold Freshwater Habitat, MU - Municipal & Domestic |
| *Matrix:* | Water |
| *Water Quality Objective/ Water Quality Criterion:* | Basin Plan: Water shall not contain biostimulatory substances in concentrations that promote aquatic growths to the extent that such growths cause nuisance or adversely affect beneficial uses. |

| | |
|---|---|
| *Evaluation Guideline:* | Nitrite is considered in the narrative objective for biostimulatory substances. However, there is no applicable numeric water quality criterion for nitrite. Therefore, it is difficult to determine that the concentration of nitrite exceeds standards. |
| *Data Used to Assess Water Quality:* | Eighty-six sampling events were completed by the RWQCB Nutrient TMDL Program. The nitrite values ranged from 0.025mg/L to 0.28 mg/L. Even though there is a narrative objective for biostimulatory substance there is not a numeric objective/criteria to compare the concentration of nitrite. Therefore, it is difficult to determine whether the decrease in dissolved oxygen is due solely to the nitrite levels (Scoles, 2004). |
| *Spatial Representation:* | Up to four sample sites: Laguna at Guernville Road, Laguna at Occidental Road, Laguna at Stony Point Road, and Laguna at Trenton-Healdsburg Road. |
| *Temporal Representation:* | Samples were collected between 7/1997 - 11/2000. |
| *Data Quality Assessment:* | Nutrient TMDL Program. |

---

| | |
|---|---|
| ***Numeric Line of Evidence*** | Pollutant-Water |
| *Beneficial Use:* | AG - Agricultural Supply, CO - Cold Freshwater Habitat |
| *Matrix:* | Water |
| *Water Quality Objective/ Water Quality Criterion:* | There is no applicable criteria available for Ammonia-Nitrogen. |
| *Data Used to Assess Water Quality:* | There were 86 sampling events completed by the RWQCB TMDL Monitoring Program. The range of values measured was from 0.025 mg/L to 3.24 mg/L. There is not a numeric objective or criteria to compare to the concentration of ammonia-nitrogen in the samples. Therefore, it is difficult to determine whether the decrease in dissolved oxygen is due solely to the ammonia-nitrogen concentration levels (Scoles, G. 2004). |
| *Spatial Representation:* | Up to four sample sites: Laguna at Guernville Road, Laguna at Occidental Road, Laguna at Stony Point Road and Laguna at Trenton-Healdsburg Road. |
| *Temporal Representation:* | Samples were collected between 7/1997 and 11/2000. |
| *Data Quality Assessment:* | RWQCB Nutrient TMDL Program. |

---

| | |
|---|---|
| ***Numeric Line of Evidence*** | Pollutant-Water |

| | |
|---|---|
| *Beneficial Use:* | AG - Agricultural Supply, CO - Cold Freshwater Habitat |
| *Matrix:* | Water |
| *Water Quality Objective/ Water Quality Criterion:* | There is no applicable criteria available for Ammonia-Nitrogen. |
| *Data Used to Assess Water Quality:* | Twenty-five sampling events were conducted by the City of Santa Rosa NPDES Program. The values of the measurements ranged from 0.2 mg/L to 1.1 mg/L. The number of exceedances of the standard was not calculated due to the lack of an applicable criterion for Ammonia-Nitrogen to compare to the measured values (Scoles, 2004). |
| *Spatial Representation:* | Samples were collected at up to 4 sites: Laguna at Todd Road, Upstream at Delta, Laguna upstream of D-Pond Incline pump, and Laguna upstream of Llano Rd. Bridge. |
| *Temporal Representation:* | Samples were collected between 1/2003 and 12/2003. |
| *Data Quality Assessment:* | City of Santa Rosa QA Manual. |

---

| | |
|---|---|
| ***Numeric Line of Evidence*** | Pollutant-Water |
| *Beneficial Use:* | AG - Agricultural Supply, CO - Cold Freshwater Habitat |
| *Matrix:* | Water |
| *Water Quality Objective/ Water Quality Criterion:* | There is no applicable criteria available for Ammonia-Nitrogen. |
| *Data Used to Assess Water Quality:* | There were sixty samples events from the City of Santa Rosa NPDES Program. The measured values ranged from 0.1 mg/L to 6.8 mg/L. The number of exceedances of the standard was not calculated due to the lack of an applicable criterion for Ammonia-Nitrogen to compare to the measured values (Scoles, G. 2004). |
| *Spatial Representation:* | Samples were collected from up to 12 sites: Laguna at Llano Road, Laguna at Todd Road, Laguna at Hwy 12, and Laguna at Occidental Bridge, Laguna 100 feet upstream of D-Pond incline Pump, Laguna 150 feet downstream of D-Pond Incline Pump, Laguna at La Franchi, Laguna-approximately 100 feet upstream of Llano Rd. Bridge, Laguna upstream of D-Pond 36, upstream Laguna at Delta, Russian River at Wohler Bridge, Russian River at Mirabel, upstream Roseland Cr. at Llano Rd., downstream Roseland Cr. at Summer Crossing/South of Alpha Bldg., upstream Kelly-downstream confluence of Duer Creek and Kelly Farm Drainage, downstream Duer Creek at Kelly, Colgan Creek upstream confluence with Laguna. |

| | |
|---|---|
| *Temporal Representation:* | Samples were collected between 12/1995 and 3/2004. |
| *Data Quality Assessment:* | City of Santa Rosa QA Manual. |

| | |
|---|---|
| ***Line of Evidence*** | Pollutant-Water |
| *Beneficial Use* | AG - Agricultural Supply |
| *Information Used to Assess Water Quality:* | More information is needed to determine whether eliminating as many of the nitrogen pollution sources as possible would control the Ludwigia abundance, and whether reducing phosphorus will result in improving dissolved oxygen and controlling Ludwigia in the Laguna. |
| *Non-Numeric Objective:* | Basin Plan: Water shall not contain biostimulatory substances in concentrations that promote aquatic growths to the extent that such growths cause nuisance or adversely affect beneficial uses. |
| *Data Used to Assess Water Quality:* | The ratio of N to P in the Laguna for data collected by the Regional Board is part of it's nitrogen TMDL monitoring. The City of Santa Rosa collects nitrogen and phosphorus data as part of its NPDES discharge permit compliance monitoring. For both the Regional Board data set and the City's NPDES data set, total phosphorus was measured, but dissolved P was not measured (Scoles, 2004).<br><br>Since the City's NPDES Nitrogen to Phosphorus (N:P) ratios are derived from monthly averages, an evaluation was completed by the City of Santa Rosa to come up with N:P ratios determined from monthly averaged nitrogen and phosphorus data are representative of N:P ratios from individual measurements. The individual sample data for 2003, which had 101 measurements, were used to calculate individual N:P ratios for comparison to the monthly average values. The average of these individual N:P ratios was 4.4 with a 99 percent confidence interval of ±0.8 compared to the average of the monthly average N:P ratios for the same period of 3.9. No statistically significant difference exists between the monthly and the daily data (Mann Whitney Rank Sum test $p = 0.683$.) The City determined that the N:P ratios based on monthly average values are representative of nutrient conditions in the Laguna. |
| *Spatial Representation:* | The data from the NCRWQCB Nutrient TMDL monitoring were collected in the Laguna at Stony Point, Occidental, Guerneville, and Trenton Healdsburg roads. |
| *Temporal Representation:* | The Nutrient TMDL monitoring program has had no phosphorus samples collected since November 2000. The City of Santa Rosa collected nutrient data during the discharge season between December 1995 and March 2004. |

Region 1

---

**Water Segment:** Russian River HU, Middle Russian River HA, Laguna de Santa Rosa

**Pollutant:** Phosphorus

**Decision:** Delist

**Weight of Evidence:** This pollutant is being considered for removal from the section 303(d) list under section 4.1 of the Listing Policy. Under this section a single line of evidence is necessary to assess listing status. Eight lines of evidence are available in the administrative record to assess this pollutant.

Based on the readily available data and information, the weight of evidence indicates that there is sufficient justification in favor of removing this water segment-pollutant combination from the section 303(d) list in the Water Quality Limited Segments category.

This conclusion is based on the staff findings that:
1. There is no numerical guideline available for phosphorus that complies with the requirements of section 6.1.3 of the Policy.
2. The data used satisfies the data quality requirements of section 6.1.4 of the Policy.
3. The data used satisfies the data quantity requirements of section 6.1.5 of the Policy.
4. There is no guideline available that is applicable to the NCRWQCB to interpret the narrative biostimulatory objective as it is considered for phosphorus. It is not possible to determine if the information exceeds the allowable frequency listed in Table 4.1 of the Listing Policy. The phosphorus listing made by USEPA for this water segment in July of 2003 relied upon the nitrogen and phosphorus targets in the Malibu Creek TMDL which is not appropriate nor is it in accordance with the Listing Policy.
5. Pursuant to section 4.11 of the Listing Policy, no additional data and information are available indicating that standards are met.

**SWRCB Staff Recommendation:** After review of the available data and information, SWRCB staff concludes that the water body-pollutant combination should be removed from the section 303(d) list because applicable water quality standards for the pollutant are not exceeded.

**Lines of Evidence:**

---

***Numeric Line of Evidence*** Pollutant-Water

| | |
|---|---|
| *Beneficial Use:* | CO - Cold Freshwater Habitat |
| *Matrix:* | Water |
| *Water Quality Objective/ Water Quality Criterion:* | Basin Plan: Water shall not contain biostimulatory substances in concentrations that promote aquatic growths to the extent that such growths cause nuisance or adversely affect beneficial uses. |
| *Evaluation Guideline:* | Phosphorus is considered in the narrative objective for biostimulatory substances. The RWQCB initially used a USEPA goal for phosphorus to interpret the data. The use of the phosphorus goal does not address the conditions present in the Laguna de Santa Rosa. There is significant disagreement over phosphorus limitation in the Laguna. The response of water bodies to nutrient enrichment differ among water bodies and one applicable nutrient objective is not available. USEPA and the state are in the process of developing nutrient objectives for the bioregions of California. |
| *Data Used to Assess Water Quality:* | Even though there are 10 water chemistry samples, there is no applicable guideline that can be used to interpret the narrative standard. Even though a phosphorus goal is not applicable in this specific situation, it is clear that the Laguna de Santa Rosa does not meet standards for low dissolved oxygen. It is also clear that nutrient concentrations are a probable cause of the low oxygen concentrations. New monitoring should be completed that identifies the contribution of nutrients and their relationship to the observed low oxygen concentrations (SWRCB, 2003). |
| *Spatial Representation:* | There were 10 targeted sites along the creek. |
| *Temporal Representation:* | The Data was collected over 5-6 Years between 1995 and 2001, and it was collected over four seasons. |
| *Data Quality Assessment:* | This data came from the NCRWQCB 2002 Listing Update. |

---

| | |
|---|---|
| ***Numeric Line of Evidence*** | Pollutant-Water |
| *Beneficial Use:* | CO - Cold Freshwater Habitat |
| *Matrix:* | Water |
| *Water Quality Objective/ Water Quality Criterion:* | Basin Plan: Water shall not contain biostimulatory substances in concentrations that promote aquatic growths to the extent that such growths cause nuisance or adversely affect beneficial uses. |
| *Evaluation Guideline:* | Phosphorus is considered in the narrative objective for biostimulatory substances. In 2002, SWRCB staff recommended not listing for elemental phosphorus because there was not an appropriate phosphorus objective available for Laguna de Santa Rosa. However, USEPA listed Laguna de |

| | |
|---|---|
| | Santa Rosa for phosphorus by determining exceedances using criteria from another Region. Since there is not appropriate criteria, it is difficult to determine whether the concentration of total phosphorus exceeded standards. |
| *Data Used to Assess Water Quality:* | There were 86 sampling events conducted by the RWQCB TMDL Monitoring Program at the 3 to 4 sampling sites between 7/1997 and 11/2000. The data range for values of total phosphorus was between 0.113 mg/L and 1.87 mg/L. Even though there is a narrative objective for biostimulatory substance, there is not a numeric objective or criteria to compare to the concentration of total phosphorus measured. Exceedance of the water quality standard can not be determined (Scoles, G. 2004). |
| *Spatial Representation:* | Three to four sample sites (Laguna at Guernville Road, Laguna at Occidental Road, Laguna at Stony Point Road and Laguna at Trenton-Healdsburg Road. |
| *Temporal Representation:* | Samples were collected between 7/1997 and 11/2000. |
| *Data Quality Assessment:* | Nutrient TMDL Program. |

---

| | |
|---|---|
| ***Numeric Line of Evidence*** | Pollutant-Water |
| *Beneficial Use:* | CO - Cold Freshwater Habitat |
| *Matrix:* | Water |
| *Water Quality Objective/ Water Quality Criterion:* | Basin Plan: Water shall not contain biostimulatory substances in concentrations that promote aquatic growths to the extent that such growths cause nuisance or adversely affect beneficial uses. |
| *Evaluation Guideline:* | Phosphorus is considered in the narrative objective for biostimulatory substances. In 2002, SWRCB staff recommended not listing for elemental phosphorus because there was not an appropriate phosphorus objective available for Laguna de Santa Rosa. However, USEPA listed Laguna de Santa Rosa for phosphorus by determining exceedances using criteria from another Region. Since there is not appropriate criteria, it is difficult to determine whether the concentration of total phosphorus exceeded standards. |
| *Data Used to Assess Water Quality:* | There were sixty sampling events completed by the City of Santa Rosa NPDES Program at up to 12 sample sites between 12/1995 and 3/2004. The data range for values of total phosphorus was between 0.1 mg/L and 3.9 mg/L. Even though there is a narrative objective for biostimulatory substance, there is not a numeric objective or criteria to compare to the concentration of total phosphorus measured. Exceedance of the water quality standard can not be determined (Scoles, 2004). |

| | |
|---|---|
| *Spatial Representation:* | Samples were collected from 2 to 12 sites (Laguna at Llano Road, Laguna at Todd Road, Laguna at Hwy 12, and Laguna at Occidental Bridge, Laguna 100' upstream of D-Pond incline Pump, Laguna 150' downstream of D-Pond Incline Pump, Laguna at La Franchi, Laguna-approx 100' upstream of Llano Rd. Bridge, Laguna upstream of D-Pond 36", upstream Laguna @ Delta, Russian River at Wohler Bridge, Russian River at Mirabel, upstream Roseland Cr. @ Llano Rd., downstream Roseland Cr. @Summer Crossing/South of Alpha Bldg., upstream Kelly-downstream confluence of Duer Creek and Kelly Farm Drainage, downstream Duer Creek at Kelly, Colgan Creek upstream confluence with Laguna. |
| *Temporal Representation:* | Samples were collected during 12/95 through 3/04. |
| *Data Quality Assessment:* | City of Santa Rosa QA Manual. |

| | |
|---|---|
| ***Numeric Line of Evidence*** | Pollutant-Water |
| *Beneficial Use:* | CO - Cold Freshwater Habitat |
| *Matrix:* | Water |
| *Water Quality Objective/ Water Quality Criterion:* | Basin Plan: Water shall not contain biostimulatory substances in concentrations that promote aquatic growths to the extent that such growths cause nuisance or adversely affect beneficial uses. |
| *Evaluation Guideline:* | Data reported in 80% TP (total phosphorus). 80% TP is considered in the narrative objective for biostimulatory substances. There is no numeric water quality criterion for 80% TP. Therefore, it is difficult to determine that the concentration of nitrate-nitrogen exceeds standards. |
| *Data Used to Assess Water Quality:* | Eighty-six sampling events were conducted by the RWQCB TMDL Program. The range of values of 80% TP was between 0.02 and 2.38. Even though there is a narrative objective for biostimulatory substance there is not a numeric objective or criteria to compare the concentration of 80% TP. Therefore, it is difficult to determine whether the decrease in dissolved oxygen is solely due to the 80% TP (SWRCB, 2003). |
| *Spatial Representation:* | Three to four sample sites (Laguna at Guernville Road, Laguna at Occidental Road, Laguna at Stony Point Road and Laguna at Trenton-Healdsburg Road. |
| *Temporal Representation:* | Samples were collected between 7/1997 and 11/2000. |
| *Data Quality Assessment:* | NCRWQCB Nutrient TMDL Program. |

| | |
|---|---|
| ***Numeric Line of Evidence*** | Pollutant-Water |
| *Beneficial Use:* | CO - Cold Freshwater Habitat |
| *Matrix:* | Water |
| *Water Quality Objective/ Water Quality Criterion:* | Basin Plan: Water shall not contain biostimulatory substances in concentrations that promote aquatic growths to the extent that such growths cause nuisance or adversely affect beneficial uses. |
| *Evaluation Guideline:* | Phosphorus is considered in the narrative objective for biostimulatory substances. In 2002, SWRCB staff recommended not listing for elemental phosphorus because there was not an appropriate phosphorus objective available for Laguna de Santa Rosa. However, USEPA listed Laguna de Santa Rosa for phosphorus by determining exceedances using criteria from another Region. Since there is not appropriate criteria, it is difficult to determine whether the concentration of total phosphorus exceeded standards. |
| *Data Used to Assess Water Quality:* | Twenty-five sampling events were completed by the City of Santa Rosa NPDES at up to 5 sample site between 1/2003 and 12/2003. The range of values for total phosphorus measured was between 0.4 mg/L and 1.6 mg/L. Even though there is a narrative objective for biostimulatory substance there is not a numeric objective or criteria to compare to the concentration of total phosphorus (Scoles, G. 2004). |
| *Spatial Representation:* | Samples were collected up to 4 sites: Laguna at Todd Road, upstream at Delta, Laguna upstream of D-Pond Incline pump, and Laguna upstream of Llano Rd. Bridge. |
| *Temporal Representation:* | Samples were collected between 1/2003 and 12/2003. |
| *Data Quality Assessment:* | City of Santa Rosa QA Manual. |

---

| | |
|---|---|
| ***Line of Evidence*** | Pollutant-Water |
| *Beneficial Use* | CO - Cold Freshwater Habitat |
| *Information Used to Assess Water Quality:* | More information is needed to determine whether elevated phosphorus in the Laguna is the cause of the low dissolved oxygen and increased Ludwigia abundance, and whether reducing phosphorus will result in improving dissolved oxygen and controlling Ludwigia in the Laguna. |
| *Non-Numeric Objective:* | Basin Plan: Water shall not contain biostimulatory substances in concentrations that promote aquatic growths to the extent that such growths cause nuisance or adversely affect beneficial uses. |

| | |
|---|---|
| *Evaluation Guideline:* | Phosphorus is considered in the narrative objective for biostimulatory substances. In 2002, SWRCB staff recommended not listing for elemental phosphorus because there was not an appropriate phosphorus objective available for Laguna de Santa Rosa. USEPA listed Laguna de Santa Rosa for phosphorus by determining exceedances using criteria from another Region. Since there is not appropriate criteria, it is difficult to determine whether the concentration of total phosphorus exceeded standards. |
| *Data Used to Assess Water Quality:* | The ratio of N to P in the Laguna for data collected by the Regional Board as part of its nitrogen TMDL monitoring program was presented by the City of Santa Rosa. The City collects nitrogen and phosphorus data as part of its NPDES discharge permit compliance monitoring. For both the Regional Board data set and the City's NPDES data set, total phosphorus was measured, but dissolved P was not measured (Scoles, 2004).<br><br>Since the City's NPDES Nitrogen to Phosphorus (N:P) ratios are derived from monthly averages, an evaluation was completed by the City of Santa Rosa to come up with N:P ratios determined from monthly averaged nitrogen and phosphorus data are representative of N:P ratios from individual measurements. The individual sample data for 2003, which had 101 measurements, were used to calculate individual N:P ratios for comparison to the monthly average values. The average of these individual N:P ratios was 4.4 with a 99 percent confidence interval of ±0.8 compared to the average of the monthly average N:P ratios for the same period of 3.9. No statistically significant difference exists between the monthly and the daily data (Mann Whitney Rank Sum test $p = 0.683$.) The City determined that the N:P ratios based on monthly average values are representative of nutrient conditions in the Laguna. |
| *Spatial Representation:* | The data from the NCRWQCB Nutrient TMDL monitoring were collected in the Laguna at Stony Point, Occidental, Guerneville, and Trenton Healdsburg roads. |
| *Temporal Representation:* | The RWQCB Nutrient TMDL monitoring program samples were collected from July 1997 through November of 2000, no phosphorus samples have been collected since November 2000 for this program. The City of Santa Rosa collected nutrient data during the discharge season between December 1995 and March 2004. |

Region 1

---

**Water Segment:** Klamath River HU, Lost River HA, Clear Lake, Boles HSAs

**Pollutant:** Nutrients

**Decision:** Delist

**Weight of Evidence:** This pollutant is being considered for removal from the section 303(d) list under section 4.1 of the Listing Policy. Under this section a single line of evidence is necessary to assess listing status.

Five lines of evidence are available in the administrative record to assess this pollutant. There is no evidence that the biostimulatory narrative objective is exceeded. The NCWRQCB Staff summary of the Upper Lost River De-Listing Recommendation along with the TMDL Analysis Staff Report support the decision to remove nutrients from the 303(d) List for this water segment.

Based on the readily available data and information, the weight of evidence indicates that there is sufficient justification in favor of removing this water segment-pollutant combination from the section 303(d) list in the Water Quality Limited Segments category.

This conclusion is based on the staff findings that:
1. The sediment quality guideline used complies, with the requirements of section 6.1.3 of the Policy.
2. The data used satisfies the data quality requirements of section 6.1.4 of the Policy.
3. The data used satisfies the data quantity requirements of section 6.1.5 of the Policy.
4. The results of the nutrient analysis on the nitrogen, chlorophyll-a, phosphorus samples show that there is no evidence that the bio-stimulatory narrative objective has been exceeded. The dissolved oxygen samples show that the lowest values sampled are still above the minimum objective. These results do not exceed the allowable frequency listed in Table 4.1 of the Listing Policy.
5. Pursuant to section 4.11 of the Listing Policy, no additional data and information are available indicating that standards are met.

**SWRCB Staff Recommendation:** After review of the available data and information, SWRCB staff concludes that the water body-pollutant combination should be removed from the section 303(d) list because applicable water quality standards for the pollutant are not exceeded.

**Lines of Evidence:**

| | |
|---|---|
| ***Numeric Line of Evidence*** | Pollutant-Nuisance |
| *Beneficial Use:* | WA - Warm Freshwater Habitat |
| *Matrix:* | Water |
| *Water Quality Objective/ Water Quality Criterion:* | Basin Plan: Water shall not contain bio-stimulatory substances in concentrations that promote aquatic growths to the extent that such growths cause nuisance or adversely affect beneficial uses. |
| *Evaluation Guideline:* | The Bio-stimulatory WQO is inclusive of nutrients. |
| *Data Used to Assess Water Quality:* | The TMDL Analysis was completed for Upper Lost River and Clear Lake Reservoir Watershed. The Chlorophyll-a in the water column was measured from monthly grab samples at the six sampling stations, for a total of 57 samples. The water samples were filtered in the field, rinsed with magnesium carbonate, and preserved on dry ice because full-volume samples could not be delivered to analytical laboratory within the recommended holding period. The chlorophyll-a concentrations showed variability ranging from below the analytical reporting limit (0.00050 mg/l) to 0.016 mg/l. Of the 57 samples, 38 were below the analytical reporting limit; for statistical analyses, these concentrations were assumed to be half of the reporting limit. The high measurement, 0.016 mg/l, was from a sample taken in October 2002 at Mowitz Creek. The median of all of the chlorophyll-a results was 0.00025 mg/l (the default value for samples below the reporting limit), and the 95% upper confidence limit is 0.00174 mg/l. The two stations on the Upper Lost River (WFLAT and LRCLDM) were analyzed separately from the four upstream stations on streams that lead to Clear Lake Reservoir (MOWCRK, BCFORD, WCGSB, and FCFORD).<br><br>The 28 data points for the two Upper Lost River stations showed chlorophyll-a concentrations ranging from below the analytical reporting limit to 0.0032 mg/l, with a median of 0.00025 mg/l (the default value for samples below the reporting limit), and an 95% upper confidence limit of 0.00174 mg/l (including 21 nondetects assumed to be half of the reporting limit).<br><br>The 29 points from the four stations on streams leading to Clear Lake Reservoir showed chlorophyll-a concentrations ranging from below the laboratory reporting limit to 0.016 mg/l, with a median of 0.00025 mg/l (this is half of the laboratory reporting limit), and a 95% upper confidence level of 0.00279 mg/l. Although most of the data points in this dataset are nondetects (17 non-detects out of 29 data points), for the statistical analysis, they were assumed to be half of the reporting limit.<br><br>Using the 57 observations in the complete dataset, the relationship between total phosphorus and chlorophyll-a was weak. Neither visual observations nor water column chlorophyll-a measurements indicated impairment due to excess phosphorus. The lack of Chlorophyll-a in the |

water samples obtained for this analysis indicates that either the level of nutrients is too low to support excess algal growth or that some other factor is suppressing the algal growth. In either case, the beneficial uses of the Upper Lost River/Clear Lake Reservoir system are not impaired by nutrient concentrations (North Coast RWQCB, 2004d)

*Spatial Representation:*

The monitoring locations for the Upper Lost River/Clear Lake Reservoir area are:
1. Lost River below Clear Lake Reservoir dam, LRCLDM.
2. Lost River at Walter Flat, WFLAT.
3. Mowitz Creek just downstream of the 136 bridge, MOWCRK.
4. Boles Creek just upstream of the 136 ford, BCFORD.
5. No. Fork Willow Creek below the Great Society Bridge, WCGSB.
6. Fletcher Creek just upstream of the 73 ford, FCFORD.

Two stations are on the Upper Lost River mainstem, one is downstream of the dam and the other at Walter Flat. Station LRCLDM is at a point about 1,000 meters downstream of Clear Lake Reservoir dam. Station WFLAT is at a point about 10 meters downstream of the Walter Flat Bridge, about eight miles downstream of the dam. In addition to the two stations on the Upper Lost River, there were four monitoring locations in streams that lead to Clear Lake Reservoir, the source of the Lost River. One station was on North Fork Willow Creek, the main tributary to Clear Lake Reservoir and the primary spawning stream for the endangered Lost River and shortnose suckers. Two other sites, on Boles and Fletcher Creeks, drain into Willow Creek. The fourth site, on Mowitz Creek, drains directly into Clear Lake Reservoir but does not contribute much water to the reservoir. This site was added late in the investigation because of the opportunity to add to a sparse dataset. All of the sites, except the station below the dam, were accessible only during late spring to early fall because wet weather made the roads impassable. Sampling locations were limited to areas that could be reached by truck. Logistical issues precluded sampling in Clear Lake Reservoir.

*Temporal Representation:*

Sampling represents only one full season, late spring to early fall of one year. Sampling included monthly grab samples and instantaneous measurements for one season, continuous temperature monitoring for one season, and two short continuous multiparameter deployments. The sampling periods do not correspond to the time periods that the suckers are in the streams. There were limited spots at which the streams could be accessed; these might not correspond to the points that provide representative data. Drawing conclusions about the impact of water temperature and nutrients on suckers based on sampling during summer, however, is justified because those months represent the conditions worse than the fish encounter during their time in the streams.

*Environmental Conditions:*

There are no point source waste discharges within the watershed. The land use operations that may impact the Upper Lost River watershed as nonpoint sources of water pollution are livestock operations (grazing) and timber harvest.

*Data Quality Assessment:*

NCRWQCB QA Procedures followed for the TMDL analysis.

| | |
|---|---|
| ***Numeric Line of Evidence*** | Pollutant-Water |
| *Beneficial Use:* | MU - Municipal & Domestic, WA - Warm Freshwater Habitat |
| *Matrix:* | Water |
| *Water Quality Objective/ Water Quality Criterion:* | Basin Plan: Water shall not contain bio-stimulatory substances in concentrations that promote aquatic growths to the extent that such growths cause nuisance or adversely affect beneficial uses. |
| *Evaluation Guideline:* | The WQO for Bio-stimulatory substances includes Nitrogen. The USEPA concentration of 10 mg/l NO3-N set by the USEPA (1986) to protect human health consuming domestic water supplies. |
| *Data Used to Assess Water Quality:* | Nitrogen concentration was measured from monthly grab samples at the six sampling stations, for a total of 57 samples. The system appears to be nitrogen limited with nitrogen levels far below levels expected to cause bio-stimulation in this system. There is no evidence that the bio-stimulatory narrative is exceeded. The total nitrogen concentrations were similar between the two Upper Lost River stations and the four stations upstream of Clear Lake Reservoir. The total nitrogen concentrations are well below the 10 mg/l NO3-N set by the U.S. EPA (1986) to protect human health consuming domestic water supplies. In other words, the nitrogen levels are below the concentration of concern for human health.<br><br>The analytical laboratory measured ammonia, nitrate, nitrite and TKN. Total nitrogen was calculated from the sum of TKN, nitrate, and nitrite. The total nitrogen levels showed some variability ranging from below the analytical reporting limit of 0.05 mg/l to 1.85 mg/l. Of the 57 samples, 17 were below the analytical reporting limit. Since nitrogen was present in the system these were assumed to be half of the reporting limit for statistical analyses. The highest concentration of total nitrogen, 1.85 mg/l, consisted entirely of TKN (ammonia and organic nitrogen). It was from a sample taken in August 2002 at Boles Creek during a time when the creek had no surface flow. The median of all of the total nitrogen results was 0.69 mg/l, and the 95% upper confidence level was 0.77 mg/l.<br><br>The two stations on the Upper Lost River (WFLAT and LRCLDM) were analyzed separately from the four upstream stations on streams that drain to Clear Lake Reservoir (MOWCRK, BCFORD, WCGSB, and FCFORD). The 28 data points for the two Upper Lost River stations showed total nitrogen concentrations ranging from below the laboratory-reporting limit to 1.65 mg/l, with a median of 0.76 (including 8 non-detects assumed to be half of the reporting limit for statistical analysis purposes). The 29 points from the four stations on streams leading to Clear Lake Reservoir showed total nitrogen concentrations ranging from below the laboratory-reporting limit to 1.85 mg/l, with a median of 0.57 (including 10 non-detects assumed to be half of the reporting limit for statistical analysis purposes). Ammonia concentrations are low or below the laboratory reporting level at the six sampling stations. |

Analysis of all six stations grouped together shows that of 57 samples, 37 were below the analytical reporting limit. If the non-detects are included at a concentration equal to half of the reporting limit, the median concentration of ammonia is 0.025 mg/l (the default level for the nondetect samples), and the range is from below the reporting limit to 0.23 mg/l NH4-N.

Separating the four upstream stations from the two Upper Lost River stations does not show a significant difference in ammonia concentrations. If the nondetects are included at a concentration equal to half of the laboratory reporting limit, both upstream stations and downstream stations have a median ammonia concentration of 0.025 NH4-N. There is a large proportion of samples with ammonia concentrations below the laboratory-reporting limit (29 total samples with 17 non-detects in the upstream stations and 20 non-detects out of 28 total samples in the downstream sites), so analysis of these data is difficult. Calculations of the percentage of ammonia present as the toxic un-ionized ammonia were not necessary because the concentration of total ammonia at all of the stations is well below the level needed to protect the sensitive life stages of the sucker population (North Coast RWQCB, 2004d).

*Spatial Representation:*

The monitoring locations for the Upper Lost River/Clear Lake Reservoir area are:

1. Lost River below Clear Lake Reservoir dam, LRCLDM.
2. Lost River at Walter Flat, WFLAT.
3. Mowitz Creek just downstream of the 136 bridge, MOWCRK.
4. Boles Creek just upstream of the 136 ford, BCFORD.
5. No. Fork Willow Creek below the Great Society Bridge, WCGSB.
6. Fletcher Creek just upstream of the 73 ford, FCFORD.

Two stations are on the Upper Lost River mainstem, one is downstream of the dam and the other at Walter Flat. Station LRCLDM is at a point about 1,000 meters downstream of Clear Lake Reservoir dam. Station WFLAT is at a point about 10 meters downstream of the Walter Flat Bridge, about eight miles downstream of the dam. In addition to the two stations on the Upper Lost River, there were four monitoring locations in streams that lead to Clear Lake Reservoir, the source of the Lost River. One station was on North Fork Willow Creek, the main tributary to Clear Lake Reservoir and the primary spawning stream for the endangered Lost River and shortnose suckers. Two other sites, on Boles and Fletcher Creeks, drain into Willow Creek. The fourth site, on Mowitz Creek, drains directly into Clear Lake Reservoir but does not contribute much water to the reservoir. This site was added late in the investigation because of the opportunity to add to a sparse dataset. All of the sites, except the station below the dam, were accessible only during late spring to early fall because wet weather made the roads impassable. Sampling locations were limited to areas that could be reached by truck. Logistical issues precluded sampling in Clear Lake Reservoir.

*Temporal Representation:*

Sampling represents only one full season, late spring to early fall of one year. Sampling included monthly grab samples and instantaneous measurements for one season, continuous temperature monitoring for one season, and two short continuous multi-parameter deployments. The sampling periods do not correspond to the time periods that the suckers

| | |
|---|---|
| | are in the streams. There were limited spots at which the streams could be accessed; these might not correspond to the points that provide representative data. Drawing conclusions about the impact of water temperature and nutrients on suckers based on sampling during summer, however, is justified because those months represent the conditions worse than the fish encounter during their time in the streams. Water temperature in the Upper Lost River/Clear Lake Reservoir watershed was investigated using: Remote continuous water and air temperature monitors (Optic stowaway data loggers) that took readings every 15 minutes from May through September 2002. Remote sensors that measured air temperature (Optic stowaway data loggers) and relative humidity (HOBO instruments) every 15 minutes for three days in June 2003. Solar pathfinder measurements to calculate solar radiation that reached stream surfaces. A thermal infrared aerial survey in July 2001and computer simulation modeling using the SSTEMP model. The monitoring instrument at the Boles Creek station was out of the water during that period due to seasonal dewatering and the sampling at Mowitz Creek did not begin until the following month. |
| *Environmental Conditions:* | There are no point source waste discharges within the watershed. The land use operations that may impact the Upper Lost River watershed as nonpoint sources of water pollution are livestock operations (grazing) and timber harvest. |
| *Data Quality Assessment:* | NCRWQCB QA procedures followed in the TMDL analysis. |

---

| | |
|---|---|
| ***Numeric Line of Evidence*** | Pollutant-Water |
| *Beneficial Use:* | WA - Warm Freshwater Habitat |
| *Matrix:* | Water |
| *Water Quality Objective/ Water Quality Criterion:* | Basin Plan: Dissolved Oxygen, Table3.1 Specific Water Quality Objectives for North Coast Region Clear Lake, Upper & Lower Lost River, Tule Lake, Lower Klamath Lake:<br>> 5.0 mg/l, minimum 8.0 mg/l, 50% lower limit (this means that 50% or more of the monthly mean values must be equal to or greater than 8.0 mg/l).<br>Other Streams in Upper Lost River HA:<br>> 7.0 mg/l, minimum 8.0 mg/l, 50% lower limit (this means that 50% or more of the monthly mean values must be equal to or greater than 8.0 mg/l). |
| *Evaluation Guideline:* | Specific WQOs in the Basin Plan Table 3.1. |
| *Data Used to Assess Water Quality:* | The TMDL Analysis was completed for Upper Lost River and Clear Lake Reservoir Watershed. The Upper Lost River/Clear Lake Reservoir area is not listed for dissolved oxygen. This parameter, however, can be impacted by excessive biomass growth related to high nutrient concentrations. Diurnal cycles of algal respiration can lead to water that is |

photosynthetically supersaturated with dissolved oxygen in late afternoons and depressed in very early mornings by overnight respiration.

The most sensitive beneficial use that could be impacted by low dissolved oxygen concentrations is the ESA-listed sucker species. The amount of dissolved oxygen in water at 100% saturation is partly dependent on the altitude; the sampling stations in this analysis ranged in altitude from 4,163 to 4,921 feet above sea level. The water at this altitude can hold less dissolved oxygen, at 100% saturation, than water at lower elevations. Dissolved oxygen data at the six sampling stations consisted of instantaneous measurements at the time that grab samples were obtained and of two brief periods of continuous measurement. The Basin Plan objectives for dissolved oxygen in the Upper Lost River/Clear Lake Reservoir area are 5.0 mg/l as a minimum and 8.0 as a 50% lower limit.

There were 57 instantaneous measurements of dissolved oxygen ranging from 6.1 mg/l to 13.02 mg/l. The mean value of these measurements is 8.83 mg/l, with a median of 8.53 mg/l, and a lower 95% confidence level of 8.44 mg/l. The high value of 13.02 mg/l was obtained at the Boles Creek station in October 2002 at a time when there was no surface flow; this value was taken at 14:30 and may represent a photosynthetically supersaturated condition. Field notes state that heavy algal growth was noted in the pool upstream of the dewatered area where samples were taken. The lowest values were still above the minimum required by the Basin Plan. The lowest value, 6.1 mg/l was obtained at 17:30 in June 2003 at Walter Flat. The next lowest value, 6.55 mg/l was obtained at 08:30 in August 2001 at the station just downstream of Clear Lake Reservoir dam.

Continuous dissolved oxygen measurements using a YSI Datasonde 6600 that measured dissolved oxygen, pH, specific conductivity, and water temperature at 15-minute increments were made in the Upper Lost River at Walter Flat from September 30 to October 2, 2002. The data show a diurnal variation with a low of 9.59 mg/l and a high of 12.11 mg/l. The mean is 10.47 mg/l, the median is 10.34 mg/l, and the 95% lower confidence level is 10.38 mg/l. A Datasonde also was deployed at this station from June 9 through June 11, 2003. Again, a diurnal cycle is seen. The data from this sampling episode show warmer temperatures and lower dissolved oxygen concentrations, ranging from a low of 5.42 mg/l to a high of 6.32 mg/l. The mean of the measurements is 5.87 mg/l, the median is 5.85 mg/l, and the lower 95% confidence interval is 5.82 mg/l.

Similarly, continuous dissolved oxygen measurements using a YSI Datasonde 6600 that measured dissolved oxygen, pH, specific conductivity, and water temperature at 15-minute increments were made in the Willow Creek sampling station from September 30 to October 2, 2002. The data show variation with a low of 10.03 mg/l and a high of 13.74 mg/l. The mean is 12.03 mg/l, the median is 12.11 mg/l, and the 95% lower confidence level is 11.89 mg/l. A Datasonde also was deployed at this station from June 10 through June 12, 2003. Again, a diurnal cycle is seen. The data from this sampling episode show warmer temperatures and lower dissolved oxygen concentrations, ranging from a low of 3.61 mg/l to a high of 12.1 mg/l. The mean of the measurements is 7.09 mg/l, the median is 6.69 mg/l, and the lower 95% confidence interval is 6.69 mg/l (North Coast RWQCB, 2004d).

*Spatial Representation:* The monitoring locations for the Upper Lost River/Clear Lake Reservoir area are:
1. Lost River below Clear Lake Reservoir dam, LRCLDM.
2. Lost River at Walter Flat, WFLAT.
3. Mowitz Creek just downstream of the 136 bridge, MOWCRK.
4. Boles Creek just upstream of the 136 ford, BCFORD.
5. No. Fork Willow Creek below the Great Society Bridge, WCGSB.
6. Fletcher Creek just upstream of the 73 ford, FCFORD.

Two stations are on the Upper Lost River mainstem, one is downstream of the dam and the other at Walter Flat. Station LRCLDM is at a point about 1,000 meters downstream of Clear Lake Reservoir dam. Station WFLAT is at a point about 10 meters downstream of the Walter Flat Bridge, about eight miles downstream of the dam. In addition to the two stations on the Upper Lost River, there were four monitoring locations in streams that lead to Clear Lake Reservoir, the source of the Lost River. One station was on North Fork Willow Creek, the main tributary to Clear Lake Reservoir and the primary spawning stream for the endangered Lost River and shortnose suckers. Two other sites, on Boles and Fletcher Creeks, drain into Willow Creek. The fourth site, on Mowitz Creek, drains directly into Clear Lake Reservoir but does not contribute much water to the reservoir. This site was added late in the investigation because of the opportunity to add to a sparse dataset. All of the sites, except the station below the dam, were accessible only during late spring to early fall because wet weather made the roads impassable. Sampling locations were limited to areas that could be reached by truck. Logistical issues precluded sampling in Clear Lake Reservoir.

*Temporal Representation:* Data from August 2001 through June 2003 at different stations. Continuous dissolved oxygen measurements using a YSI Datasonde 6600 that measured dissolved oxygen, pH, specific conductivity, and water temperature at 15-minute increments were made in the Upper Lost River at Walter Flat, Willow Creek Sampling Station, from September 30 to October 2, 2002. A Datasonde also was deployed at Upper Lost River at Walter Flat station from June 9 through June 11, 2003. Measurements taken at Boles Creek station in October 2002 at a time when there was no surface flow. Measurements taken at August 2001 at the station just downstream of Clear Lake Reservoir dam.

*Environmental Conditions:* There are no point source waste discharges within the watershed. The land use operations that may impact the Upper Lost River watershed as nonpoint sources of water pollution are livestock operations (grazing) and timber harvest.

*Data Quality Assessment:* NCRQWQCB QA procedures followed for the TMDL analysis.

---

***Numeric Line of Evidence*** Pollutant-Water

*Beneficial Use:* WA - Warm Freshwater Habitat

| | |
|---|---|
| *Matrix:* | Water |
| *Water Quality Objective/ Water Quality Criterion:* | Basin Plan: Water shall not contain biostimulatory substances in concentrations that promote aquatic growths to the extent that such growths cause nuisance or adversely affect beneficial uses. |
| *Evaluation Guideline:* | The WQO for Biostimulatory substances includes Phosphorus. The USEPA phosphorus 0.05-mg/l level suggested by the USEPA to control eutrophication in streams that enter lakes (USEPA 1986). |
| *Data Used to Assess Water Quality:* | The TMDL Analysis was completed for Upper Lost River and Clear Lake Reservoir Watershed. Total phosphorus was measured from monthly grab samples at the six sampling stations, for a total of 57 samples. The total phosphorus levels showed variability ranging from below the analytical reporting level to 4.5 mg/l. Of the 57 samples, 26 were below the analytical reporting limit; since phosphorus was present in the system these concentrations were assumed to be half of the reporting limit for statistical analyses. The high measurement, 4.5 mg/l, was from a sample taken in May 2002 at Fletcher Creek. The median of all of the total phosphorus results was 0.068 mg/l, and the 95% upper confidence limit is 0.35 mg/l, a level influenced by the abnormally high concentration at Fletcher Creek in May 2002.<br><br>The two stations on the Upper Lost River (WFLAT and LRCLDM) were analyzed separately from the four upstream stations on streams that drain to Clear Lake Reservoir (MOWCRK, BCFORD, WCGSB, and FCFORD). The 28 data points for the two Upper Lost River stations showed total phosphorus concentrations ranging from below the laboratory reporting limit to 0.37 mg/l, with a median of 0.20 mg/l, and a 95% upper confidence level of 0.23 mg/l (including four nondetects assumed to be half of the reporting limit). The 29 points from the four stations on streams leading to Clear Lake Reservoir showed total phosphorus concentrations ranging from below the laboratory-reporting limit to 4.5 mg/l, with a median of 0.025 mg/l (this is half of the laboratory reporting limit), and a 95% upper confidence level of 0.51 mg/l. Although most of the data points in this dataset are nondetects (22 nondetects out of 29 data points), for the complete dataset analysis, they were assumed to be half of the reporting limit. Total phosphorus levels were higher in the two downstream stations than in the stream stations upstream of Clear Lake Reservoir.<br><br>Median total phosphorus concentrations in the two Upper Lost River stations were above the 0.05-mg/l level suggested by the USEPA to control eutrophication in streams that enter lakes (USEPA 1986). Soil particles from discharged water from Clear Lake Reservoir may transport soil-organic-matter phosphorus and inorganic-soil/rock phosphorus to the Upper Lost River. The levels do not appear to present a eutrophication problem in the Upper Lost River or in Clear Lake Reservoir, probably because the high turbidity reduces sunlight penetration. The U.S. BOR (2000) indicated that there has been extensive siltation of Clear Lake Reservoir. Although, phosphorus levels are elevated in comparison to U.S. EPA suggested levels, these suggested levels are not relevant because there is no evidence of excessive algal growth in the reservoir (perhaps |

due to turbidity levels that control light availability) and the system appears to be nitrogen limited.

In the 57 observations in this dataset, the ratio between total nitrogen and total phosphorus ranged from 0 to 74. The value of R-Squared, the proportion of variation in total nitrogen that can be accounted for by variation in total phosphorus, is 0.0001; the correlation between total nitrogen and total phosphorus is -0.0097. There is no correlation between the values. These values are slightly different if the nitrogen nondetect values were reported as zero rather than half of the reporting limit. If the data sets with nondetects and the outlier are removed, there are 21 data points available for analysis of the nitrogen/phosphorus ratio. The N/P ratio for these points is shown in the third graph. A line showing an N/P of 10 is drawn for reference. Of the 21 data points, 18 have an N/P ratio of less than 10 this indicates a system that is nitrogen limited (North Coast RWQCB, 2004d).

*Spatial Representation:*

The monitoring locations for the Upper Lost River/Clear Lake Reservoir area are shown in Map 2 and are listed below with their station designations:

1. Lost River below Clear Lake Reservoir dam, LRCLDM.
2. Lost River at Walter Flat, WFLAT.
3. Mowitz Creek just downstream of the 136 bridge, MOWCRK.
4. Boles Creek just upstream of the 136 ford, BCFORD.
5. No. Fork Willow Creek below the Great Society Bridge, WCGSB.
6. Fletcher Creek just upstream of the 73 ford, FCFORD.

Two stations are on the Upper Lost River mainstem, one is downstream of the dam and the other at Walter Flat. Station LRCLDM is at a point about 1,000 meters downstream of Clear Lake Reservoir dam. Station WFLAT is at a point about 10 meters downstream of the Walter Flat Bridge, about eight miles downstream of the dam. In addition to the two stations on the Upper Lost River, there were four monitoring locations in streams that lead to Clear Lake Reservoir, the source of the Lost River. One station was on North Fork Willow Creek, the main tributary to Clear Lake Reservoir and the primary spawning stream for the endangered Lost River and shortnose suckers. Two other sites, on Boles and Fletcher Creeks, drain into Willow Creek. The fourth site, on Mowitz Creek, drains directly into Clear Lake Reservoir but does not contribute much water to the reservoir. This site was added late in the investigation because of the opportunity to add to a sparse dataset. All of the sites, except the station below the dam, were accessible only during late spring to early fall because wet weather made the roads impassable. Sampling locations were limited to areas that could be reached by truck. Logistical issues precluded sampling in Clear Lake Reservoir.

*Temporal Representation:*

Sampling represents only one full season, late spring to early fall of one year. Sampling included monthly grab samples and instantaneous measurements for one season, continuous temperature monitoring for one season, and two short continuous multiparameter deployments. The sampling periods do not correspond to the time periods that the suckers are in the streams. There were limited spots at which the streams could be accessed; these might not correspond to the points that provide representative data. Drawing conclusions about the impact of water

| | |
|---|---|
| | temperature and nutrients on suckers based on sampling during summer is justified, because those months represent the conditions worse than the fish encounter during their time in the streams. Water temperature in the Upper Lost River/Clear Lake Reservoir watershed was investigated using: Remote continuous water and air temperature monitors (Optic stowaway dataloggers) that took readings every 15 minutes from May through September 2002. Remote sensors that measured air temperature (Optic stowaway dataloggers) and relative humidity (HOBO instruments) every 15 minutes for three days in June 2003. Solar pathfinder measurements to calculate solar radiation that reached stream surfaces. A thermal infrared aerial survey in July 2001and computer simulation modeling using the SSTEMP model. The monitoring instrument at the Boles Creek station was out of the water during that period due to seasonal dewatering and the sampling at Mowitz Creek did not begin until the following month. |
| *Environmental Conditions:* | There are no point source waste discharges within the watershed. The land use operations that may impact the Upper Lost River watershed as nonpoint sources of water pollution are livestock operations (grazing) and timber harvest. |
| *Data Quality Assessment:* | NCRWQCB QA Procedures followed for the TMDL analysis. |

---

| | |
|---|---|
| ***Line of Evidence*** | Pollutant-Water |
| *Beneficial Use* | WA - Warm Freshwater Habitat |
| *Information Used to Assess Water Quality:* | The Upper Lost River/Clear Lake Reservoir area is listed for nutrients and temperature in accordance with Section 303(d) of the federal Clean Water Act (CWA). The listing of the Upper Lost River/Clear Lake Reservoir watershed as impaired because of biostimulatory substances (nutrients) and high water temperature was made in 1996. In accordance with a consent decree, January 2005 is the deadline for adoption or de-listing of the TMDL's for the Upper Lost River/Clear Lake Reservoir area by the State of California. Investigation into the basis of the listings revealed that the listings were apparently conferred from the Klamath River listings and not based on data or information specific to the Upper Lost River and Clear Lake Reservoir watershed. The appropriateness of the nutrients and temperature listings in the Upper Lost River is explored in the TMDL analysis. If the listings had been confirmed a TMDL would have been developed, however, the listings were not confirmed and de-listing for the watershed (including Clear Lake Reservoir, the streams draining to Clear Lake Reservoir and the Upper Lost River between the Clear Lake Reservoir dam and the Oregon border) is recommended by the NCRWQCB staff. |
| *Non-Numeric Objective:* | Basin Plan: Water shall not contain bio-stimulatory substances in concentrations that promote aquatic growths to the extent that such growths cause nuisance or adversely affect beneficial uses. |
| *Evaluation Guideline:* | The WQO for Bio-stimulatory Substances is inclusive of nutrients for the |

| | |
|---|---|
| | NCRWQCB. |
| *Data Used to Assess Water Quality:* | Measurement of nutrient species was planned because the Lost River is listed on the State 303(d) list for nutrients and this information is needed for system description. Ammonia, total Kjeldahl nitrogen (TKN), nitrate and nitrite were analytically determined. Total nitrogen was calculated from TKN, nitrate and nitrite. Total phosphorus and ortho-phosphate were analytically determined. The reasons for the recommendation to de-list the watershed include:<br><br>There is no evidence that the biostimulatory narrative objective is exceeded. The system appears to be nitrogen limited and nitrogen levels are far below levels expected to cause biostimulation in this system. Although, phosphorus levels are elevated in comparison to U.S. EPA suggested levels, these suggested levels are not relevant because there is no evidence of excessive algal growth in the reservoir (perhaps due to turbidity levels that control light availability) and the system appears to be nitrogen limited. Dissolved oxygen levels are above the existing numeric water quality objectives. The nitrogen levels are below the concentration of concern for human health. There is no evidence of impacts from nutrients, dissolved oxygen, or other nutrient related effects on the sensitive species of concern. The beneficial uses appear to be unaffected by water temperature. The natural range of water temperatures and nutrient concentrations above Clear Lake Reservoir do not appear to be affected by anthropogenic activities (North Coast RWQCB, 2004d). |

---

| | |
|---|---|
| ***Line of Evidence*** | Pollutant-Water |
| *Beneficial Use* | MU - Municipal & Domestic, WA - Warm Freshwater Habitat |
| *Information Used to Assess Water Quality:* | The Upper Lost River/Clear Lake Reservoir area is listed as impaired for nutrients and temperature in accordance with Section 303(d) of the federal Clean Water Act (CWA). The listing of the Upper Lost River/Clear Lake Reservoir watershed as impaired because of biostimulatory substances (nutrients) and high water temperature was made in 1996. In accordance with a consent decree, January 2005 is the deadline for adoption or de-listing of the TMDLs for the Upper Lost River/Clear Lake Reservoir area by the State of California. Investigation into the basis of the listings revealed that the listings were apparently conferred from the Klamath River listings and not based on data or information specific to the Upper Lost River and Clear Lake Reservoir watershed. The appropriateness of the nutrients and temperature listings in the Upper Lost River is explored in the TMDL analysis. If the listings had been confirmed a TMDL would have been developed, however, the listings were not confirmed and de-listing for the watershed (including Clear Lake Reservoir, the streams draining to Clear Lake Reservoir and the Upper Lost River between the Clear Lake Reservoir dam and the Oregon border) is recommended by the NCRWQCB staff. |
| *Non-Numeric Objective:* | Basin Plan: Water shall not contain bio-stimulatory substances in |

| | |
|---|---|
| | concentrations that promote aquatic growths to the extent that such growths cause nuisance or adversely affect beneficial uses. |
| *Evaluation Guideline:* | The WQO for Bio-stimulatory Substances is inclusive of nutrients. |
| *Data Used to Assess Water Quality:* | Measurement of nutrient species was planned because the Lost River is listed on the State 303(d) list for nutrients and this information is needed for system description. Ammonia, total Kjeldahl nitrogen (TKN), nitrate and nitrite were analytically determined. Total nitrogen was calculated from TKN, nitrate and nitrite. Total phosphorus and ortho-phosphate were analytically determined. The reasons for the recommendation to de-list the watershed include:<br><br>There is no evidence that the biostimulatory narrative objective is exceeded. The system appears to be nitrogen limited and nitrogen levels are far below levels expected to cause biostimulation in this system. Although, phosphorus levels are elevated in comparison to U.S. EPA suggested levels, these suggested levels are not relevant because there is no evidence of excessive algal growth in the reservoir and the system appears to be nitrogen limited. Dissolved oxygen levels are above the existing numeric water quality objectives. The nitrogen levels are below the concentration of concern for human health. There is no evidence of impacts from nutrients, dissolved oxygen, or other nutrient related effects on the sensitive species of concern. The beneficial uses appear to be unaffected by water temperature. The natural range of water temperatures and nutrient concentrations above Clear Lake Reservoir do not appear to be affected by anthropogenic activities. The temperatures below Clear Lake Reservoir are affected by anthropogenic activities (i.e., the dam and water flow fluctuations) but these activities are not addressed by a TMDL (North Coast RWQCB, 2004d). |

---

| | |
|---|---|
| ***Line of Evidence*** | Pollutant-Water |
| *Beneficial Use* | WA - Warm Freshwater Habitat |
| *Information Used to Assess Water Quality:* | The Upper Lost River/Clear Lake Reservoir area is listed as impaired for nutrients and temperature in accordance with Section 303(d) of the federal Clean Water Act (CWA). The listing of the Upper Lost River/Clear Lake Reservoir watershed as impaired because of biostimulatory substances (nutrients) and high water temperature was made in 1996. In accordance with a consent decree, January 2005 is the deadline for adoption or de-listing of the TMDLs for the Upper Lost River/Clear Lake Reservoir area by the State of California. Investigation into the basis of the listings revealed that the listings were apparently conferred from the Klamath River listings and not based on data or information specific to the Upper Lost River and Clear Lake Reservoir watershed. The appropriateness of the nutrients and temperature listings in the Upper Lost River is explored in the TMDL analysis. If the listings had been confirmed a TMDL would have been developed, however, the listings were not confirmed and de-listing for the watershed (including Clear Lake Reservoir, the streams |

| | |
|---|---|
| | draining to Clear Lake Reservoir and the Upper Lost River between the Clear Lake Reservoir dam and the Oregon border) is recommended by NCWRQCB staff. |
| *Non-Numeric Objective:* | Basin Plan: Table 3.1, Specific Water Quality Objectives for North Coast Region Clear Lake, Upper & Lower Lost River, Tule Lake, Lower Klamath Lake:<br>> 5.0 mg/l, minimum 8.0 mg/l, 50% lower limit (this means that 50% or more of the monthly mean values must be equal to or greater than 8.0 mg/l).<br>Other Streams in Upper Lost River HA:<br>> 7.0 mg/l, minimum 8.0 mg/l, 50% lower limit (this means that 50% or more of the monthly mean values must be equal to or greater than 8.0 mg/l). |
| *Data Used to Assess Water Quality:* | Dissolved oxygen levels are above the existing numeric water quality objectives. There is no evidence of impacts from nutrients, dissolved oxygen, or other nutrient related effects on the sensitive species of concern. The beneficial uses appear to be unaffected by water temperature. The natural range of water temperatures and nutrient concentrations above Clear Lake Reservoir do not appear to be affected by anthropogenic activities. There is no evidence that the biostimulatory narrative objective is exceeded. The system appears to be nitrogen limited and nitrogen levels are far below levels expected to cause biostimulation in this system. Although, phosphorus levels are elevated in comparison to U.S. EPA suggested levels, these suggested levels are not relevant because there is no evidence of excessive algal growth in the reservoir and the system appears to be nitrogen limited. |
| *Spatial Representation:* | Continuous dissolved oxygen measurements made in the Upper Lost River at Walter Flat from September 30 to October 2, 2002. |
| *Temporal Representation:* | Continuous dissolved oxygen measurements using a YSI Datasonde 6600 that measured dissolved oxygen in 15-minute increments were made in the Upper Lost River at Walter Flat from September 30 to October 2, 2002. |

---

| | |
|---|---|
| ***Line of Evidence*** | Pollutant-Water |
| *Beneficial Use* | WA - Warm Freshwater Habitat |
| *Information Used to Assess Water Quality:* | The Upper Lost River/Clear Lake Reservoir area is listed for nutrients and temperature in accordance with Section 303(d) of the federal Clean Water Act (CWA). The listing of the Upper Lost River/Clear Lake Reservoir watershed as impaired because of biostimulatory substances (nutrients) and high water temperature was made in 1996. In accordance with a consent decree, January 2005 is the deadline for adoption or de-listing of the TMDLs for the Upper Lost River/Clear Lake Reservoir area by the State of California. Investigation into the basis of the listings revealed that the listings were apparently conferred from the Klamath River listings and not based on data or information specific to the Upper Lost River and |

| | |
|---|---|
| | Clear Lake Reservoir watershed. The appropriateness of the nutrients and temperature listings in the Upper Lost River is explored in the TMDL analysis. If the listings had been confirmed a TMDL would have been developed, however, the listings were not confirmed and de-listing for the watershed (including Clear Lake Reservoir, the streams draining to Clear Lake Reservoir and the Upper Lost River between the Clear Lake Reservoir dam and the Oregon border) is recommended by the NCRWQCB staff. |
| *Non-Numeric Objective:* | Basin Plan: Water shall not contain biostimulatory substances in concentrations that promote aquatic growths to the extent that such growths cause nuisance or adversely affect beneficial uses. |
| *Evaluation Guideline:* | The WQO for Biostimulatory Substances is inclusive of nutrients. |
| *Data Used to Assess Water Quality:* | Measurement of nutrient species was planned because the Lost River is listed on the State 303(d) list for nutrients and this information is needed for system description. Ammonia, total Kjeldahl nitrogen (TKN), nitrate and nitrite were analytically determined. Total nitrogen was calculated from TKN, nitrate and nitrite. Total phosphorus and ortho-phosphate were analytically determined. The reasons for the recommendation to de-list the watershed include:<br><br>There is no evidence that the biostimulatory narrative objective is exceeded. The system appears to be nitrogen limited and nitrogen levels are far below levels expected to cause biostimulation in this system. Although, phosphorus levels are elevated in comparison to U.S. EPA suggested levels, these suggested levels are not relevant because there is no evidence of excessive algal growth in the reservoir (perhaps due to turbidity levels that control light availability) and the system appears to be nitrogen limited. Dissolved oxygen levels are above the existing numeric water quality objectives. The nitrogen levels are below the concentration of concern for human health. There is no evidence of impacts from nutrients, dissolved oxygen, or other nutrient related effects on the sensitive species of concern. The beneficial uses appear to be unaffected by water temperature. The natural range of water temperatures and nutrient concentrations above Clear Lake Reservoir do not appear to be affected by anthropogenic activities. The temperatures below Clear Lake Reservoir are affected by anthropogenic activities (i.e., the dam and water flow fluctuations) but these activities are not addressed by a TMDL (North Coast RWQCB, 2004d). |

Region 1

| | |
|---|---|
| **Water Segment:** | Klamath River HU, Lost River HA, Clear Lake, Boles HSAs |
| **Pollutant:** | Temperature, water |
| **Decision:** | Delist |
| **Weight of Evidence:** | This pollutant is being considered for removal from the section 303(d) list under section 4.2 of the Listing Policy. Under section 4.2 a single line of evidence is necessary to assess listing status.<br><br>One line of evidence is available in the administrative record to assess temperature consistent with Listing Policy section 6.1.5.9. None of the MWAT values exceeded evaluation guidelines selected to interpret the water quality objective.<br><br>Based on the readily available data and information, the weight of evidence indicates that there is sufficient justification in favor of removing this water segment-pollutant combination from the section 303(d) list. The water temperature of the watershed supports the most sensitive beneficial use, the endangered sucker species.<br><br>This conclusion is based on the staff findings that:<br>1. The data used satisfies the data quality requirements of section 6.1.4 of the Policy.<br>2. The data used satisfies the data quantity requirements of section 6.1.5 of the Policy.<br>3. There were remote continuous water and air temperature monitors that took readings every 15 minutes from May through September 2002. Of the estimated 3,000 MWATs calculated (Temperature measurements from 4 stations taken over a 5 month period considered together), none of the MWATs exceeded the water quality objective and this does not exceed the allowable frequency listed in Table 4.2 of the Listing Policy.<br>4. Pursuant to section 4.11 of the Listing Policy, no additional data and information are available indicating that standards are met. |
| **SWRCB Staff Recommendation:** | After review of the available data and information, SWRCB staff concludes that the water body-pollutant combination should be removed from the section 303(d) list because applicable water quality standards for the pollutant are not exceeded |
| **Lines of Evidence:** | |

| | |
|---|---|
| ***Numeric Line of Evidence*** | Pollutant-Water |
| *Beneficial Use:* | WA - Warm Freshwater Habitat |
| *Matrix:* | Water |
| *Water Quality Objective/ Water Quality Criterion:* | Water Quality Control Plan for the Control of Temperature in the Coastal and Interstate Waters and Enclosed Bays and Estuaries of California (Thermal Plan).<br>Lost River:<br>1. Cold Interstate Waters: A. Elevated temperature waste discharges into cold interstate waters are prohibited.<br>2. Warm Interstate Waters: A. Thermal waste discharges having a maximum temperature greater than 5°F above natural receiving water temperature are prohibited. B. Elevated temperature wastes shall not cause the temperature of warm interstate waters to increase by more than 5°F above natural temperature at any time or place. D. Lost River, Elevated temperature wastes discharged to the Lost River shall not cause the temperature of the receiving water to increase by more than 2°F when the receiving water temperature is less than 62°F, and 0°F when the receiving water temperature exceeds 62°F. |
| *Evaluation Guideline:* | The maximum weekly average temperatures (MWATs) were used from the water body to determine if the Objective was being exceeded. The Lost River Suckers and Shortnose Suckers species are listed under the Endangered Species Act and they are found in the study area. The Critical Thermal Maxima for Shortnose suckers is between the range of 32.1 to 33.3 °C (Castleberry and Cech 1993). The 96-Hour Mean Lethal Concentration (LC50) for Lost River Suckers (LRS) is 31.2 °C for juveniles (with a 95% Confidence Interval range of 30.8 to 31.5 °C for juveniles) and for the Shortnose Suckers (SNS) it is 31.9°C for larva and 31.2 °C for juveniles (with a 95% Confidence Interval range of 30.8 to 31.6 °C for juveniles), (Bellerud and Saiki 1995), (page 34, TMDL). |
| *Data Used to Assess Water Quality:* | The TMDL Analysis was completed for Upper Lost River and Clear Lake Reservoir Watershed. The most sensitive beneficial uses of Clear Lake most likely relate to the protection of the endangered sucker species. The sensitivity analysis using SSTEMP showed that daily average water temperature at the sampling stations in the streams that drain to Clear Lake Reservoir is most sensitive to influence by air temperature, solar radiation, and relative humidity. In the two Upper Lost River stations downstream of Clear Lake Reservoir, water temperature is most sensitive to inflow temperature, that is, the temperature of the water released from the Clear Lake Reservoir. The warmest stream temperatures during the data collection period were found during the week of July 15, 2002. The maximum weekly average temperatures (MWAT) at the sampling stations for that week were: WFLAT, 27.40°C; LRCLDM, 26.64°C; WCGSB, 27.63°C; FCFORD, 22.75°C. These MWATs are well below the Critical Thermal Maxima for Shortnose Suckers (32.1 to 33.3 °C) and also well below the 96-Hour Mean Lethal Concentration for both Long River Suckers and Short Nose Suckers juveniles at 31.2 °C. The water temperature of the watershed supports the most sensitive beneficial use, |

the endangered sucker species (North Coast RWQCB, 2004d)

*Spatial Representation:*

The monitoring locations for the Upper Lost River/Clear Lake Reservoir area are shown in Map 2 and are listed below with their station designations:

1. Lost River below Clear Lake Reservoir dam, LRCLDM.
2. Lost River at Walter Flat, WFLAT.
3. Mowitz Creek just downstream of the 136 bridge, MOWCRK.
4. Boles Creek just upstream of the 136 ford, BCFORD.
5. No. Fork Willow Creek below the Great Society Bridge, WCGSB.
6. Fletcher Creek just upstream of the 73 ford, FCFORD.

Two stations are on the Upper Lost River mainstem; one is downstream of the dam and the other at Walter Flat. Station LRCLDM is at a point about 1,000 meters downstream of Clear Lake Reservoir dam. Station WFLAT is at a point about 10 meters downstream of the Walter Flat Bridge, about eight miles downstream of the dam. In addition to the two stations on the Upper Lost River, there were four monitoring locations in streams that lead to Clear Lake Reservoir, the source of the Lost River. One station was on North Fork Willow Creek, the main tributary to Clear Lake Reservoir and the primary spawning stream for the endangered Lost River and Shortnose suckers. Two other sites, on Boles and Fletcher Creeks, drain into Willow Creek. The fourth site, on Mowitz Creek, drains directly into Clear Lake Reservoir but does not contribute much water to the reservoir. This site was added late in the investigation because of the opportunity to add to a sparse dataset. All of the sites, except the station below the dam, were accessible only during late spring to early fall because wet weather made the roads impassable. Sampling locations were limited to areas that could be reached by truck. Logistical issues precluded sampling in Clear Lake Reservoir.

*Temporal Representation:*

Sampling represents only one full season late spring to early fall. Sampling included monthly grab samples and instantaneous measurements for one season, continuous temperature monitoring for one season, and two short continuous multiparameter deployments. The sampling periods do not correspond to the time periods that the suckers are in the streams. There were limited spots at which the streams could be accessed; these might not correspond to the points that provide representative data. Drawing conclusions about the impact of water temperature and nutrients on suckers based on sampling during summer, however, is justified because those months represent the conditions worse than the fish encounter during their time in the streams. Water temperature in the Upper Lost River/Clear Lake Reservoir watershed was investigated using: Remote continuous water and air temperature monitors (Optic stowaway data loggers) that took readings every 15 minutes from May through September 2002. Remote sensors that measured air temperature (Optic stowaway data loggers) and relative humidity (HOBO instruments) every 15 minutes for three days in June 2003. Solar pathfinder measurements to calculate solar radiation that reached stream surfaces. A thermal infrared aerial survey in July 2001and computer simulation modeling using the SSTEMP model. The monitoring instrument at the Boles Creek station was out of the water during that period due to seasonal dewatering and the sampling at Mowitz Creek did not begin until the following month.

| | |
|---|---|
| *Environmental Conditions:* | There are no point source waste discharges within the watershed. The land use operations that may impact the Upper Lost River watershed as nonpoint sources of water pollution are livestock operations (grazing) and timber harvest. |
| *Data Quality Assessment:* | NCRWQCB QA Procedures followed in the TMDL analysis. |

---

| | |
|---|---|
| ***Line of Evidence*** | Pollutant-Water |
| *Beneficial Use* | WA - Warm Freshwater Habitat |
| *Information Used to Assess Water Quality:* | The Upper Lost River/Clear Lake Reservoir area is listed for nutrients and temperature in accordance with Section 303(d) of the federal Clean Water Act (CWA). The listing of the Upper Lost River/Clear Lake Reservoir watershed as impaired because of bio-stimulatory substances (nutrients) and high water temperature was made in 1996. In accordance with a consent decree, January 2005 is the deadline for adoption or de-listing of the TMDL's for the Upper Lost River/Clear Lake Reservoir area by the State of California. Investigation into the basis of the listings revealed that the listings were apparently conferred from the Klamath River listings and not based on data or information specific to the Upper Lost River and Clear Lake Reservoir watershed. The appropriateness of the nutrients and temperature listings in the Upper Lost River is explored in the TMDL analysis. If the listings had been confirmed a TMDL would have been developed, however, the listings were not confirmed and de-listing for the watershed (including Clear Lake Reservoir, the streams draining to Clear Lake Reservoir and the Upper Lost River between the Clear Lake Reservoir dam and the Oregon border) is recommended by NCRWQCB staff. |
| *Non-Numeric Objective:* | Basin Plan: The natural receiving water temperature of intrastate waters shall not be altered unless it can be demonstrated to the satisfaction of the Regional Water Board that such alteration in temperature does not adversely affect beneficial uses. At no time or place shall the temperature of any COLD water be increased by more than 5°F above natural receiving water temperature. At no time or place shall the temperature of WARM intrastate waters be increased more than 5°F above natural receiving water temperature. |
| *Evaluation Guideline:* | The data collection effort associated with this analysis consisted of three components: collection and review of existing data, water quality grab samples (and associated instantaneous field measurements), and the short-term use of continuous monitoring devices. Neither visual observations nor water quality sampling indicated impairment due to excess nutrients, although the turbidity levels in the reservoir and in the Upper Lost River probably suppress primary production. The high level of turbidity noted in the Upper Lost River is of concern, but was not the subject of this analysis. |
| *Data Used to Assess Water* | Species listed under the federal Endangered Species Act are found in the |

| | |
|---|---|
| *Quality:* | study area, Lost River Suckers and Shortnose Suckers are classified as endangered species. The most sensitive beneficial uses most likely relate to the protection of the endangered sucker species. These fish can tolerate poor water quality such as low dissolved oxygen, high water temperature, and elevated pH levels, but the fish may not thrive at long-term, continual poor conditions resulting from habitat fragmentation, hydrologic regime alterations, and water diversion. Clear Lake Reservoir appears to possess a healthy population of Lost River and Shortnose suckers compared to other populations in the Klamath and Lost River Basin. The water quality and habitat conditions in the reservoir and its tributaries are better than elsewhere in the Klamath River and Lost River basins. Although the North Coast Regional Water Quality Control Board Water Quality Control Plan (Basin Plan) lists a cold-water fishery beneficial use for the study area, the current or historical presence of cold-water fish could not be confirmed. Computer simulation modeling suggests that decreasing solar radiation by increasing shade over the streams that drain into Clear Lake Reservoir could decrease water temperatures. The potential for increasing the shade due to riparian vegetation, however, is unlikely in all of these streams except for Willow Creek because of the inability of the soils to support increased vegetative growth. The Upper Lost River is more sensitive to the water temperature of the water released from Clear Lake Reservoir than to solar radiation. Even at current shade levels, the water temperature in the watershed supports the most sensitive beneficial use, the endangered sucker species. The relative health of the Clear Lake Reservoir Shortnose and Lost River sucker population is notable. Given the significance of the Clear Lake Reservoir watershed to preserving the Lost River and Shortnose sucker populations, it is necessary to preserve the aquatic habitat from any harmful effects related to land use activities. Willow Creek and its tributaries (primarily Boles Creek) are the only spawning sites for the sucker populations; it is especially important to protect valuable properly functioning riparian conditions in this stream. Regional Water Board staff has seen no information showing that the natural range of water temperature or nutrient concentrations in the streams draining into Clear Lake Reservoir are outside of the natural range for that environment due to anthropogenic causes (North Coast RWQCB, 2004d). |
| *Spatial Representation:* | There are six monitoring locations total. Two stations are on the Upper Lost River mainstem, one is downstream of the dam and the other at Walter Flat. Station LRCLDM is at a point about 1,000 meters downstream of Clear Lake Reservoir dam. Station WFLAT is at a point about 10 meters downstream of the Walter Flat Bridge, about eight miles downstream of the dam. In addition to the two stations on the Upper Lost River, there were four monitoring locations in streams that lead to Clear Lake Reservoir, the source of the Lost River. One station was on North Fork Willow Creek, the main tributary to Clear Lake Reservoir and the primary spawning stream for the endangered Lost River and Shortnose suckers. Two other sites, on Boles and Fletcher Creeks, drain into Willow Creek. The fourth site, on Mowitz Creek, drains directly into Clear Lake Reservoir but does not contribute much water to the reservoir. This site was added late in the investigation because of the opportunity to add to a sparse dataset. Logistical issues precluded sampling in Clear Lake Reservoir. |

| | |
|---|---|
| *Temporal Representation:* | Water temperature in the Upper Lost River/Clear Lake Reservoir watershed was investigated using: Remote continuous water and air temperature monitors (Optic stowaway data loggers) that took readings every 15 minutes from May through September 2002. Remote sensors that measured air temperature (Optic stowaway dataloggers) and relative humidity (HOBO instruments) every 15 minutes for three days in June 2003. Solar pathfinder measurements to calculate solar radiation that reached stream surfaces. A thermal infrared aerial survey in July 2001and computer simulation modeling using the SSTEMP model. All of the sites, except the station below the dam, were accessible only during late spring to early fall because wet weather made the roads impassable. Sampling locations were limited to areas that could be reached by truck. |

Region 1

---

**Water Segment:** Klamath River HU, Salmon River HA

**Pollutant:** Nutrients

**Decision:** Delist

**Weight of Evidence:** This pollutant is being considered for removal from the section 303(d) list under section 4.1 of the Listing Policy. Under this section a single line of evidence is necessary to assess listing status.

There are nine lines of evidence that are available in the administrative record to assess the existing nutrients listing. The Salmon River was added to the 303(d) List for nutrients in 1992. Regional Board staff conducted a water quality monitoring effort to evaluate the impact of nutrients in the Salmon River watershed. Based on these eight lines of evidence that there is no indication that nutrients are impacting the Salmon River HA. NCRWQCB staff recommends that the Salmon River be delisted for nutrients.

Based on the readily available data and information, the weight of evidence indicates that there is sufficient justification in favor of removing this water segment-pollutant combination from the section 303(d) list in the Water Quality Limited Segments category.

This conclusion is based on the staff findings that:
1. The data used satisfies the data quality requirements of section 6.1.4 of the Policy.
2. The data used satisfies the data quantity requirements of section 6.1.5 of the Policy.
3. The narrative nutrient information as well as the observations of attached algae indicates that nutrients are not reaching nuisance levels in the Salmon River HA. Analytical results of nutrient grab samples were generally non-detect and they did not exceed the allowable frequency listed in Table 4.1 of the Listing Policy.
4. Pursuant to section 4.11 of the Listing Policy, no additional data and information are available indicating that standards are met.

**SWRCB Staff Recommendation:** After review of the available data and information, SWRCB staff concludes that the water body-pollutant combination should be removed from the section 303(d) list because applicable water quality standards for the pollutant are not exceeded.

**Lines of Evidence:**

---

| | |
|---|---|
| ***Numeric Line of Evidence*** | Pollutant-Water |
| *Beneficial Use:* | CO - Cold Freshwater Habitat |
| *Matrix:* | Water |
| *Water Quality Objective/ Water Quality Criterion:* | There is no NCRWQCB Basin Plan Water Quality Objective for TOC for Salmon River HA. |
| *Data Used to Assess Water Quality:* | The grab samples were analyzed for TOC in addition to pH, dissolved oxygen, temperatures and specific conductance. There were 22 TOC measurements in total. The average of the samples taken was 1.10. The range of the measurements taken between June and October 2002 was 0.9 to 1.7 (North Coast RWQCB, 2004c) |
| *Spatial Representation:* | There were 5 sampling locations. The sampling locations included the North Fork downstream of Sawyers Bar, the South Fork downstream of Cecilville, the Salmon River downstream of Forks of Salmon and Salmon River near the mouth. In addition, grab samples were collected near the mouth of Wooley Creek; this site was considered a control site, as the sub-watershed is a wilderness area. |
| *Temporal Representation:* | The Salmon River was added to the list for nutrients in 1992. In the summer of 2002 NCRWQCB Staff conducted a water quality monitoring effort to evaluate impairment of the Salmon River by nutrients. The monitoring plan involved collecting grab samples on three consecutive days once per month in June through October 2002 at locations in the Salmon River watershed located immediately downstream of community centers within the watershed. |
| *Data Quality Assessment:* | NCRWQCB QA. Data were collected compliant with a quality assurance plan. Blind duplicate samples were collected as a data quality control measure with acceptable results. |

---

| | |
|---|---|
| ***Numeric Line of Evidence*** | Pollutant-Water |
| *Beneficial Use:* | CO - Cold Freshwater Habitat |
| *Matrix:* | Water |
| *Water Quality Objective/ Water Quality Criterion:* | There is no NCRWQCB Basin Plan Water Quality Objective for Chlorophyll-a applicable to Salmon River HA. |
| *Evaluation Guideline:* | There are no applicable criteria for Chlorophyll-a that could be used for the Salmon River. |
| *Data Used to Assess Water* | The grab samples were analyzed for Chlorophyll-a in addition to pH, |

| | |
|---|---|
| *Quality:* | dissolved oxygen, temperatures and specific conductance. There were 55 measurements the majority of which were non detects (North Coast RWQCB, 2004c) |
| *Spatial Representation:* | There were 5 sampling locations. The sampling locations included the North Fork downstream of Sawyers Bar, the South Fork downstream of Cecilville, the Salmon River downstream of Forks of Salmon and Salmon River near the mouth. In addition, grab samples were collected near the mouth of Wooley Creek; this site was considered a control site, as the sub-watershed is a wilderness area. |
| *Temporal Representation:* | The Salmon River was added to the list for nutrients in 1992. In the summer of 2002 NCRWQCB Staff conducted a water quality monitoring effort to evaluate impairment of the Salmon River by nutrients. The monitoring plan involved collecting grab samples on three consecutive days once per month in June through October 2002 at locations in the Salmon River watershed located immediately downstream of community centers within the watershed. |
| *Data Quality Assessment:* | NCRWQCB QA. Data were collected compliant with a quality assurance plan. Blind duplicate samples were collected as a data quality control measure with acceptable results. |

---

| | |
|---|---|
| ***Numeric Line of Evidence*** | Pollutant-Water |
| *Beneficial Use:* | CO - Cold Freshwater Habitat |
| *Matrix:* | Water |
| *Water Quality Objective/ Water Quality Criterion:* | Basin Plan: Water shall not contain biostimulatory substances in concentrations that promote aquatic growths to the extent that such growths cause nuisance or adversely affect beneficial uses. |
| *Evaluation Guideline:* | Phosphorus is considered in the narrative objective for bio-stimulatory substances. There are no applicable criteria for Phosphorus that could be used for the Salmon River. In 2002, SWRCB staff recommended not listing for elemental phosphorus for Laguna de Santa Rosa because there was no appropriate phosphorus objective or evaluation guideline to interpret the narrative objective that was available to the NCRWQCB. |
| *Data Used to Assess Water Quality:* | The grab samples were analyzed for Phosphorus in addition to pH, dissolved oxygen, temperatures and specific conductance. There were 55 measurements in total the majority of which were non detects. With all non-detect values at the Mainstem Salmon River at USGS Gage Station; All non-detects and a value of 0 on 6/10/2002 at Wooley Creek Station; With all non-detects at Mainstem Salmon River at Forks of Salmon Station; All non-detects at North Fork Salmon at Sawyers Bar Station; and all non-detect values at South Fork Salmon at Cecilville (North Coast RWQCB, 2004c) |

| | |
|---|---|
| *Spatial Representation:* | There were 5 sampling locations. The sampling locations included the North Fork downstream of Sawyers Bar, the South Fork downstream of Cecilville, the Salmon River downstream of Forks of Salmon and Salmon River near the mouth. In addition, grab samples were collected near the mouth of Wooley Creek; this site was considered a control site, as the sub-watershed is a wilderness area. |
| *Temporal Representation:* | The Salmon River was added to the list for nutrients in 1992. In the summer of 2002 NCRWQCB Staff conducted a water quality monitoring effort to evaluate impairment of the Salmon River by nutrients. The monitoring plan involved collecting grab samples on three consecutive days once per month in June through October 2002 at locations in the Salmon River watershed located immediately downstream of community centers within the watershed. |
| *Data Quality Assessment:* | NCRWQCB QA. Data were collected compliant with a quality assurance plan. Blind duplicate samples were collected as a data quality control measure with acceptable results. |

---

| | |
|---|---|
| ***Numeric Line of Evidence*** | Pollutant-Water |
| *Beneficial Use:* | MU - Municipal & Domestic |
| *Matrix:* | Water |
| *Water Quality Objective/ Water Quality Criterion:* | There is no NCRWQCB Basin Plan Water Quality Objective for Ammonia as Nitrogen applicable to Salmon River HA. |
| *Evaluation Guideline:* | There are no applicable criteria for Ammonia as Nitrogen that applies. |
| *Data Used to Assess Water Quality:* | The grab samples were analyzed for Ammonia as Nitrogen in addition to pH, dissolved oxygen, temperatures and specific conductance. There were 55 measurements in total the majority of which were non detects. With non-detect values and a value at 0.052 on 6/10/2002, and another at 0.062 on 7/23/2002 at the mainstem Salmon River at USGS Gage Station; Non-detects and a value of 0.056 on 6/10/2002 and 0.052 on 7/22/2002 at Wooley Creek Station; With all non-detects at mainstem Salmon River at Forks of Salmon Station; All non-detects at North Fork Salmon at Sawyers Bar Station; and all non-detect values at South Fork Salmon at Cecilville (North Coast RWQCB, 2004c). |
| *Spatial Representation:* | There were 5 sampling locations. The sampling locations included the North Fork downstream of Sawyers Bar, the South Fork downstream of Cecilville, the Salmon River downstream of Forks of Salmon and Salmon River near the mouth. In addition, grab samples were collected near the mouth of Wooley Creek; this site was considered a control site, as the sub-watershed is a wilderness area. |

| | |
|---|---|
| *Temporal Representation:* | The Salmon River was added to the list for nutrients in 1992. In the summer of 2002 NCRWQCB Staff conducted a water quality monitoring effort to evaluate impairment of the Salmon River by nutrients. The monitoring plan involved collecting grab samples on three consecutive days once per month in June through October 2002 at locations in the Salmon River watershed located immediately downstream of community centers within the watershed. |
| *Data Quality Assessment:* | NCRWQCB QA. Data were collected compliant with a quality assurance plan. Blind duplicate samples were collected as a data quality control measure with acceptable results. |

---

| | |
|---|---|
| ***Numeric Line of Evidence*** | Pollutant-Water |
| *Beneficial Use:* | MU - Municipal & Domestic |
| *Matrix:* | Water |
| *Water Quality Objective/ Water Quality Criterion:* | There is no NCRWQCB Basin Plan Water Quality Objective for Nitrate/Nitrite as Nitrogen applicable to Salmon River HA. There is a Municipal Beneficial Use for Salmon River HA. |
| *Evaluation Guideline:* | With regards to the Municipal beneficial use applicable to Salmon River. The MCL Criteria for Nitrate/Nitrite as Nitrogen apply. Title 22(www.calregs.com) Table 64431-A lists the MCL--Inorganic Chemicals criteria for Nitrate/Nitrite as Nitrogen as 10.0 mg/L. |
| *Data Used to Assess Water Quality:* | The grab samples were analyzed for Nitrate/Nitrite as Nitrogen in addition to pH, dissolved oxygen, temperatures and specific conductance. There were 55 measurements in total the majority of which were non detects. With all non-detect values at the Mainstem Salmon River at USGS Gage Station; All non-detects at Wooley Creek Station; With non-detects and one value of 0.15 on 6/11/02 at Mainstem Salmon River at Forks of Salmon Station; All non-detects at North Fork Salmon at Sawyers Bar Station; and non-detect values and one value at 0.058 at South Fork Salmon at Cecilville (North Coast RWQCB, 2004c). |
| *Spatial Representation:* | There were 5 sampling locations. The sampling locations included the North Fork downstream of Sawyers Bar, the South Fork downstream of Cecilville, the Salmon River downstream of Forks of Salmon and Salmon River near the mouth. In addition, grab samples were collected near the mouth of Wooley Creek; this site was considered a control site, as the sub-watershed is a wilderness area. |
| *Temporal Representation:* | The Salmon River was added to the list for nutrients in 1992. In the summer of 2002 NCRWQCB Staff conducted a water quality monitoring effort to evaluate impairment of the Salmon River by nutrients. The monitoring plan involved collecting grab samples on three consecutive days once per month in June through October 2002 at locations in the |

| | |
|---|---|
| | Salmon River watershed located immediately downstream of community centers within the watershed. |
| *Data Quality Assessment:* | NCRWQCB QA. Data were collected compliant with a quality assurance plan. Blind duplicate samples were collected as a data quality control measure with acceptable results. |

---

| | |
|---|---|
| ***Numeric Line of Evidence*** | Pollutant-Water |
| *Beneficial Use:* | CO - Cold Freshwater Habitat |
| *Matrix:* | Water |
| *Water Quality Objective/ Water Quality Criterion:* | There is no NCRWQCB Basin Plan Water Quality Objective for Total Kjeldahl Nitrogen (TKN) applicable to Salmon River HA. |
| *Data Used to Assess Water Quality:* | The grab samples were analyzed for TKN in addition to pH, dissolved oxygen, temperatures and specific conductance. There were 55 measurements in total the majority of which were non detects. With non detect values and one value of 0.7 on 7/23/02 at the Mainstem Salmon River at USGS Gage Station; All non-detects at Wooley Creek Station; With non-detects and one value of 0.6 on 7/23/02 at Mainstem Salmon River at Forks of Salmon Station; All non-detects at North Fork Salmon at Sawyers Bar Station; and non-detect values and one value at 0.8 at South Fork Salmon at Cecilville (North Coast RWQCB, 2004c). |
| *Spatial Representation:* | There were 5 sampling locations. The sampling locations included the North Fork downstream of Sawyers Bar, the South Fork downstream of Cecilville, the Salmon River downstream of Forks of Salmon and Salmon River near the mouth. In addition, grab samples were collected near the mouth of Wooley Creek; this site was considered a control site, as the sub-watershed is a wilderness area. |
| *Temporal Representation:* | The Salmon River was added to the list for nutrients in 1992. In the summer of 2002 NCRWQCB Staff conducted a water quality monitoring effort to evaluate impact of the nutrients in the Salmon River. The monitoring plan involved collecting grab samples on three consecutive days once per month in June through October 2002 at locations in the Salmon River watershed located immediately downstream of community centers within the watershed. |
| *Data Quality Assessment:* | NCRWQCB QA. Data were collected compliant with a quality assurance plan. Blind duplicate samples were collected as a data quality control measure with acceptable results. |

---

| | |
|---|---|
| ***Numeric Line of Evidence*** | Pollutant-Nuisance |

| | |
|---|---|
| *Beneficial Use:* | CO - Cold Freshwater Habitat |
| *Matrix:* | -N/A |
| *Water Quality Objective/ Water Quality Criterion:* | Basin Plan: Water shall not contain bio-stimulatory substances in concentrations that promote aquatic growths to the extent that such growths cause nuisance or adversely affect beneficial uses. |
| *Evaluation Guideline:* | The rationale for conducting the survey was to evaluate the "nuisance" growths of aquatic plants, in relation to the narrative objective for bio-stimulatory substances in the Basin Plan. |
| *Data Used to Assess Water Quality:* | In all but a few cases, all nutrient parameters were non detect. Based on the available data, there is no indication that nutrients are impairing the Salmon river watershed. Analytical results of nutrient grab samples were generally non-detect. Observations of attached algae, presence of which represents a primary biological response to nutrient concentrations in streams, indicate that aquatic plants do not reach nuisance levels (North Coast RWQCB, 2004c). |
| *Spatial Representation:* | There were 5 sampling locations. The sampling locations included the North Fork downstream of Sawyers Bar, the South Fork downstream of Cecilville, the Salmon River downstream of Forks of Salmon and Salmon River near the mouth. In addition, grab samples were collected near the mouth of Wooley Creek; this site was considered a control site, as the sub-watershed is a wilderness area. |
| *Temporal Representation:* | The Salmon River was added to the list for nutrients in 1992. In the summer of 2002 NCRWQCB Staff conducted a water quality monitoring effort to evaluate impairment of the Salmon River by nutrients. The monitoring plan involved collecting grab samples on three consecutive days once per month in June through October at locations in the Salmon River watershed located immediately downstream of community centers within the watershed. |
| *Data Quality Assessment:* | NCRWQCB QA. Data were collected compliant with a quality assurance plan. Blind duplicate samples were collected as a data quality control measure. |

---

| | |
|---|---|
| ***Numeric Line of Evidence*** | Pollutant-Nuisance |
| *Beneficial Use:* | CO - Cold Freshwater Habitat |
| *Matrix:* | Water |
| *Water Quality Objective/ Water Quality Criterion:* | Basin Plan: The pH shall conform to those limits listed in Table 3-1. For waters not listed in Table 3-1 and where pH objectives are not prescribed, the pH shall not be depressed below 6.5 nor raised above 8.5. Changes in |

| | |
|---|---|
| | normal ambient pH levels shall not exceed 0.2 units in waters with designated marine (MAR) or saline (SAL) beneficial uses nor 0.5 units within the range specified above in fresh waters with designated COLD or WARM beneficial uses. |
| *Evaluation Guideline:* | Table 3-1 in the NCRWQCB Basin Plan lists the Salmon River HA (All streams) WQO for pH as a minimum at 7.0 and the maximum at 8.5. |
| *Data Used to Assess Water Quality:* | The grab samples were analyzed for pH in addition to dissolved oxygen, temperatures and specific conductance. They were measured using an YSI 600XL Datasonde when grab samples were collected. There were 25 pH measurements in total with an average pH of 7.55. The WQO for Salmon River is attained by all samples except for one measurement taken on 6/11/02 that was below the 7.0 WQO at 6.97 (North Coast RWQCB, 2004c). |
| *Spatial Representation:* | There were 5 sampling locations. The sampling locations included the North Fork downstream of Sawyers Bar, the South Fork downstream of Cecilville, the Salmon River downstream of Forks of Salmon and Salmon River near the mouth. In addition, grab samples were collected near the mouth of Wooley Creek; this site was considered a control site, as the sub-watershed is a wilderness area. |
| *Temporal Representation:* | The Salmon River was added to the list for nutrients in 1992. In the summer of 2002 NCRWQCB Staff conducted a water quality monitoring effort to evaluate impairment of the Salmon River by nutrients. The monitoring plan involved collecting grab samples on three consecutive days once per month in June through October 2002 at locations in the Salmon River watershed located immediately downstream of community centers within the watershed. |
| *Data Quality Assessment:* | NCRWQCB QA. Data were collected compliant with a quality assurance plan. Blind duplicate samples were collected as a data quality control measure with acceptable results. |

---

| | |
|---|---|
| ***Line of Evidence*** | Pollutant-Nuisance |
| *Beneficial Use* | CO - Cold Freshwater Habitat |
| *Information Used to Assess Water Quality:* | The Salmon River, tributary to the Klamath River in Siskiyou County, was included in a nutrient impaired listing of Hydrologic Unit 105.00 (Klamath River Basin) pursuant to the requirements of CWA 303(d). The Klamath River mainstem is the subject of separate analysis and TMDL development for impairments, of which nutrients is one. |
| *Non-Numeric Objective:* | Basin Plan: Water shall not contain bio-stimulatory substances in concentrations that promote aquatic growths to the extent that such growths cause nuisance or adversely affect beneficial uses. |

| | |
|---|---|
| *Evaluation Guideline:* | The rationale for conducting the survey was to evaluate the "nuisance" growths of aquatic plants, in relation to the narrative objective for bio-stimulatory substances in the Basin Plan. |
| *Data Used to Assess Water Quality:* | In all but a few cases, all nutrient parameters were non detect. There is no indication that the Salmon River Watershed is impaired by nutrients. Observations of attached algae indicate that aquatic plants do not reach nuisance levels. Quasi-Quantitative surveys of the percent cover of attached algae in the river at the monitoring location were conducted in July and August 2002. The surveys involved making visual assessments of the percent cover of attached algae and the conditions of the algal community within the immediate vicinity of the monitoring locations (North Coast RWQCB, 2004c). |
| *Spatial Representation:* | There were 5 sampling locations. The sampling locations included the North Fork downstream of Sawyers Bar, the South Fork downstream of Cecilville, the Salmon River downstream of Forks of Salmon and Salmon River near the mouth. In addition, grab samples were collected near the mouth of Wooley Creek; this site was considered a control site, as the sub-watershed is a wilderness area. |
| *Temporal Representation:* | The Salmon River was added to the list for nutrients in 1992. In the summer of 2002 NCRWQCB Staff conducted a water quality monitoring effort to evaluate impairment of the Salmon River by nutrients. The monitoring plan involved collecting grab samples on three consecutive days once per month in June through October at locations in the Salmon River watershed located immediately downstream of community centers within the watershed. |

Region 1

---

**Water Segment:** Russian River HU, Lower Russian River HA, Guerneville HSA

**Pollutant:** Turbidity

**Decision:** Delist

**Weight of Evidence:** This pollutant is being considered for removal from the section 303(d) list under section 4.2 of the Listing Policy. Under section 4.2 a single line of evidence is necessary to assess listing status.

Four lines of evidence are available in the administrative record to assess this pollutant. None of the samples out of 27 samples collected for Pocket Canyon Creek a tributary of the Russian River HU exceeded the 25 NTU turbidity evaluation guideline used to interpret the water quality objective. Only the Pocket Canyon Creek portion that was sampled for the Guernville HSA should be removed from the list. The other lines of evidence collected from Dutch Bill Creek, Lancel Creek, and Jenner Creek did not have enough samples to be considered for a delisting in the Guerneville HSA. These segments should remain listed on the 303(d) List as they are currently listed for sedimentation for this water segment.

Based on the readily available data and information, the weight of evidence indicates that there is sufficient justification in favor of removing this water segment-pollutant combination for Pocket Canyon Creek portion of this HSA only, from the section 303(d) list.

This conclusion is based on the staff findings that:
1. The data used satisfies the data quality requirements of section 6.1.4 of the Policy.
2. The data used satisfies the data quantity requirements of section 6.1.5 of the Policy.
3. None of the 27 samples collected for Pocket Canyon Creek exceeded the turbidity water quality objective and this does not exceed the allowable frequency listed in Table 4.2 of the Listing Policy.
4. Pursuant to section 4.11 of the Listing Policy, no additional data and information are available indicating that standards are met.

**SWRCB Staff Recommendation:** After review of the available data and information, SWRCB staff concludes that the water body-pollutant combination for the Pocket Canyon Creek portion of the Guerneville HSA should be removed from the section 303(d) list because applicable water quality standards for the pollutant are not exceeded. The rest of the segments currently listed under the Russian River HU, Lower Russian River HA, Guerneville HSA should remain on the 303(d) List as they are currently.

**Lines of Evidence:**

| | |
|---|---|
| ***Numeric Line of Evidence*** | Pollutant-Water |
| *Beneficial Use:* | CO - Cold Freshwater Habitat |
| *Matrix:* | Water |
| *Water Quality Objective/ Water Quality Criterion:* | Basin Plan: The suspended sediment load and suspended sediment discharge rate of surface waters shall not be altered in such a manner as to cause nuisance or adversely affect beneficial uses. Turbidity shall not be increased more than 20 percent above naturally occurring background levels. Allowable zones of dilution within which higher percentages can be tolerated may be defined for specific discharges upon the issuance of discharge permits or waiver thereof. Water shall not contain substances in concentrations that result in deposition of material that causes nuisance or adversely affect beneficial uses. |
| *Evaluation Guideline:* | The evaluation guideline that has been used to determine turbidity exceedance is from published-peer reviewed paper, "The Effects of Chronic Turbidity on Density and Growth of Steelheads and Coho Salmon", John W Sigler (1984). The guideline is "In our studies, as little as 25 NTUs of turbidity caused a reduction in fish growth." |
| *Data Used to Assess Water Quality:* | None of the turbidity samples were in exceedance of the turbidity evaluation guideline of 25 NTU. |
| *Spatial Representation:* | All samples were taken at sampling location Lancel Creek a tributary to Dutch Bill Creek which is tributary to the Russian River. The sampling location LAN010 is located at Occidental. |
| *Temporal Representation:* | Samples were taken once a month in April, May, June, September, October and December 2003. |
| *Data Quality Assessment:* | Draft QAPP for Volunteer Water Quality Monitoring Project for the Community Clean Water Institute. |

| | |
|---|---|
| ***Numeric Line of Evidence*** | Pollutant-Water |
| *Beneficial Use:* | CO - Cold Freshwater Habitat, R1 - Water Contact Recreation, R2 - Non-Contact Recreation, RA - Rare & Endangered Species, SP - Fish Spawning, WA - Warm Freshwater Habitat, WI - Wildlife Habitat |
| *Matrix:* | Water |

| | |
|---|---|
| *Water Quality Objective/ Water Quality Criterion:* | Basin Plan: The suspended sediment load and suspended sediment discharge rate of surface waters shall not be altered in such a manner as to cause nuisance or adversely affect beneficial uses. Turbidity shall not be increased more than 20 percent above naturally occurring background levels. Allowable zones of dilution within which higher percentages can be tolerated may be defined for specific discharges upon the issuance of discharge permits or waiver thereof. Water shall not contain substances in concentrations that result in deposition of material that causes nuisance or adversely affect beneficial uses. |
| *Evaluation Guideline:* | The evaluation guideline that has been used to determine turbidity exceedance is from published-peer reviewed paper, "The Effects of Chronic Turbidity on Density and Growth of Steelheads and Coho Salmon", John W Sigler (1984). The guideline is "In our studies, as little as 25 NTUs of turbidity caused a reduction in fish growth." |
| *Data Used to Assess Water Quality:* | There were no exceedances at the JEN020 location. There were 2 exceedances of the evaluation guideline at the RUS010 location. These exceedances were on 1/29/2003 at 42.1 NTU and on 4/30/2003 at 35.3 NTU. The two locations considered for Jenner Creek there were 12 turbidity samples total with 2 exceedances (Sandler, 2004). |
| *Spatial Representation:* | There were two sampling locations. All samples were along Jenner Creek, a tributary to the lower Russian River. JEN020 is located by fish ladder, Jenner. RUS010 is located near a boat house, Jenner. |
| *Temporal Representation:* | Samples were taken once a month, a single measurement on one day at each site during January, February, April, May, August and November 2003. |
| *Data Quality Assessment:* | Draft QAPP for Volunteer Water Quality Monitoring Project for the Community Clean Water Institute. |

---

| | |
|---|---|
| ***Numeric Line of Evidence*** | Pollutant-Water |
| *Beneficial Use:* | CO - Cold Freshwater Habitat |
| *Matrix:* | Water |
| *Water Quality Objective/ Water Quality Criterion:* | Basin Plan: The suspended sediment load and suspended sediment discharge rate of surface waters shall not be altered in such a manner as to cause nuisance or adversely affect beneficial uses. Turbidity shall not be increased more than 20 percent above naturally occurring background levels. Allowable zones of dilution within which higher percentages can be tolerated may be defined for specific discharges upon the issuance of discharge permits or waiver thereof. Water shall not contain substances in concentrations that result in deposition of material that causes nuisance or adversely affect beneficial uses. |

| | |
|---|---|
| *Evaluation Guideline:* | The evaluation guideline that has been used to determine turbidity exceedance is from published-peer reviewed paper, "The Effects of Chronic Turbidity on Density and Growth of Steelheads and Coho Salmon", John W Sigler (1984). The guideline is "In our studies, as little as 25 NTUs of turbidity caused a reduction in fish growth." |
| *Data Used to Assess Water Quality:* | There were no exceedances of the turbidity evaluation guideline. All of the turbidity samples were well below the evaluation guideline (Sandler, 2004). |
| *Spatial Representation:* | All samples were along Dutch Bill Creek. There were five sampling locations. These locations are: DBC010 is located near the fish ladder at Occidental.<br><br>DBC020 is located at Westminister, downstream from Bohemian Ranch, Occidental. DBC030 is located at Camp Meeker dam. DBC050 is located 75 yards downstream from pump station, Occidental. DBC060 is located at Graton Rd. and Main St., at bridge, Occidental. |
| *Temporal Representation:* | Samples were taken once a month, a single measurement on one day at each station during April, May, June, September, October and December 2003.<br><br>Samples were taken at DBC050 and DBC060 once a month, a single measurement on one day at each station during April, May, June, September and December 2003. |
| *Data Quality Assessment:* | Draft QAPP for Volunteer Water Quality Monitoring Project for the Community Clean Water Institute. |

---

| | |
|---|---|
| ***Numeric Line of Evidence*** | Pollutant-Water |
| *Beneficial Use:* | CO - Cold Freshwater Habitat |
| *Matrix:* | Water |
| *Water Quality Objective/ Water Quality Criterion:* | Basin Plan: The suspended sediment load and suspended sediment discharge rate of surface waters shall not be altered in such a manner as to cause nuisance or adversely affect beneficial uses. Turbidity shall not be increased more than 20 percent above naturally occurring background levels. Allowable zones of dilution within which higher percentages can be tolerated may be defined for specific discharges upon the issuance of discharge permits or waiver thereof. Water shall not contain substances in concentrations that result in deposition of material that causes nuisance or adversely affect beneficial uses. |
| *Evaluation Guideline:* | The evaluation guideline that has been used to determine turbidity exceedance is from published-peer reviewed paper, "The Effects of Chronic Turbidity on Density and Growth of Steelheads and Coho |

| | |
|---|---|
| | Salmon", John W Sigler (1984). The guideline is "In our studies, as little as 25 NTUs of turbidity caused a reduction in fish growth." |
| *Data Used to Assess Water Quality:* | All of the samples are below the 25 NTU turbidity evaluation guideline with a range of measurements from 0.4 NTU to 6.54 NTU (Sandler, 2004). |
| *Spatial Representation:* | Sampling was done at three locations in Pocket Creek a tributary to the lower Russian River within the greater Guerneville HSA. PCC020 is located in Guerneville, at 12170 Hwy 116, downstream of Inn and the tank in the creek.<br><br>PCC030 is located in Guerneville, at 11900 Hwy 116, in the backyard. PCC040 is located in Guerneville, 50 feet upstream from bridge along Hwy 116 at May's Canyon Road. |
| *Temporal Representation:* | Samples were taken once a month on the same days at each station during January, February, March, May, and August through December 2003. |
| *Data Quality Assessment:* | Draft QAPP for Volunteer Water Quality Monitoring Project for the Community Clean Water Institute. |

Region 1

---

**Water Segment:** Russian River HU, Middle Russian River HA, Laguna de Santa Rosa

**Pollutant:** Nitrogen

**Decision:** Delist

**Weight of Evidence:** This pollutant is being considered for removal from the section 303(d) list under section 4.2 of the Listing Policy. Under this section a single line of evidence is necessary to assess listing status. Thirteen lines of evidence are available in the administrative record to assess this pollutant.

Based on the readily available data and information, the weight of evidence indicates that there is sufficient justification in favor of removing this water segment-pollutant combination from the section 303(d) list in the Water Quality Limited Segments category.

This conclusion is based on the staff findings that:
1. The data used satisfies the data quality requirements of section 6.1.4 of the Policy.
2. The data used satisfies the data quantity requirements of section 6.1.5 of the Policy.
3. There were six lines of evidence for Nitrogen in the Laguna de Santa Rosa. There were two lines of evidence for Nitrogen-Nitrate. There was one line of evidence for Nitrite. There were three lines of evidence for Ammonia as Nitrogen. For all of these constituents there is no guideline available to interpret the narrative objective so it cannot be determined if the data exceed the allowable frequency listed in Table 4.1 of the Listing Policy.

The single line of evidence for nitrate, collected by the RWQCB Nutrient TMDL Monitoring Program, shows no exceedance of the MCL 45 mg/L criteria applied through the Municipal and Domestic Beneficial Use for the Laguna De Santa Rosa. This nitrate information does not exceed the allowable frequency listed in table 4.1 of the Listing Policy.

4. Pursuant to section 4.11 of the Listing Policy, no additional data and information are available indicating that standards are met.

**SWRCB Staff Recommendation:** After review of the available data and information, SWRCB staff concludes that the water body-pollutant combination should be removed from the section 303(d) list because applicable water quality standards for the pollutant are not exceeded.

**Lines of Evidence:**

| | |
|---|---|
| ***Numeric Line of Evidence*** | Pollutant-Water |
| *Beneficial Use:* | AG - Agricultural Supply |
| *Matrix:* | Water |
| *Water Quality Objective/ Water Quality Criterion:* | Basin Plan: Water shall not contain biostimulatory substances in concentrations that promote aquatic growths to the extent that such growths cause nuisance or adversely affect beneficial uses. |
| *Evaluation Guideline:* | Data is recorded as TIN:TP ratio. TIN:TP ratio is considered in the narrative objective for biostimulatory substances. However, there is no applicable numeric water quality criterion for TIN:TP ratio. Therefore, it is difficult to determine that the concentration of TIN:TP ratio exceeds standards. |
| *Data Used to Assess Water Quality:* | Twenty-five sampling events were completed by the City of Santa Rosa NPDES Program. The TIN:TP ratios for the 101 samples taken ranged from 2.5 to 29.1667 with an average value of 4.365 and a standard deviation of 3.282. There was a 99% confidence interval of 0.841. Even though there is a narrative objective for biostimulatory substance there is not a numeric objective or criteria to compare to the TIN:TP ratios. Therefore, it is difficult to determine whether the decrease in dissolved oxygen is due solely to the TIN:TP ratio levels (Scoles, 2004). |
| *Spatial Representation:* | Samples were collected at up to 4 sampling sites: Laguna at Todd Road, Upstream at Delta, Laguna upstream of D-Pond Incline pump, and Laguna upstream of Llano Rd. Bridge. |
| *Temporal Representation:* | Samples were collected between 1/2003 and 12/2003. |
| *Data Quality Assessment:* | City of Santa Rosa Quality Assurance Manual. |

| | |
|---|---|
| ***Numeric Line of Evidence*** | Pollutant-Water |
| *Beneficial Use:* | AG - Agricultural Supply |
| *Matrix:* | Water |
| *Water Quality Objective/ Water Quality Criterion:* | Basin Plan: Water shall not contain biostimulatory substances in concentrations that promote aquatic growths to the extent that such growths cause nuisance or adversely affect beneficial uses. |
| *Evaluation Guideline:* | Total Inorganic Nitrogen was measured and is considered in the narrative objective for biostimulatory substances. However, there is no applicable |

| | |
|---|---|
| | numeric water quality criterion for total inorganic nitrogen. Therefore, it is difficult to determine that the concentration of total inorganic nitrogen exceeds standards. |
| *Data Used to Assess Water Quality:* | Sixty sampling events were completed by the City of Santa Rosa NPDES Program. The values of the total inorganic nitrogen ranged from 0.3 to 12.2. Even though there is a narrative objective for biostimulatory substance there is not a numeric objective or criteria to compare to the concentration of total inorganic nitrogen. Therefore, it is difficult to determine whether the decrease in dissolved oxygen is solely due to the total inorganic nitrogen levels (Scoles, G. 2004). |
| *Spatial Representation:* | Samples were collected from up to 12 sites: Laguna at Llano Road, Laguna at Todd Road, Laguna at Hwy 12, and Laguna at Occidental Bridge, Laguna 100 feet upstream of D-Pond incline Pump, Laguna 150 feet downstream of D-Pond Incline Pump, Laguna at La Franchi, Laguna-approximately 100 feet upstream of Llano Rd. Bridge, Laguna upstream of D-Pond 36, upstream Laguna at Delta, Russian River at Wohler Bridge, Russian River at Mirabel, upstream Roseland Cr. at Llano Rd., downstream Roseland Cr. at Summer Crossing/South of Alpha Bldg., upstream Kelly-downstream confluence of Duer Creek and Kelly Farm Drainage, downstream Duer Creek at Kelly, Colgan Creek upstream confluence with Laguna. |
| *Temporal Representation:* | Samples were collected between 10/1995 and 3/2004. |
| *Data Quality Assessment:* | City of Santa Rosa Quality Assurance Manual. |

---

| | |
|---|---|
| ***Numeric Line of Evidence*** | Pollutant-Water |
| *Beneficial Use:* | AG - Agricultural Supply |
| *Matrix:* | Water |
| *Water Quality Objective/ Water Quality Criterion:* | Basin Plan: Water shall not contain biostimulatory substances in concentrations that promote aquatic growths to the extent that such growths cause nuisance or adversely affect beneficial uses. |
| *Evaluation Guideline:* | Total Organic Nitrogen was measured and is considered in the narrative objective for biostimulatory substances. However, there is no numeric water quality criterion for total organic nitrogen. Therefore, it is difficult to determine that the concentration of total organic nitrogen exceeds standards. |
| *Data Used to Assess Water Quality:* | Twenty-five sampling events were conducted by the City of Santa Rosa NPDES Program. The samples ranged from values of 0.2 mg/L to 2.3 mg/L total organic nitrogen. Even though there is a narrative objective for biostimulatory substance there is not a numeric objective or criteria to compare to the concentration of total organic nitrogen. Therefore, it is |

| | |
|---|---|
| | difficult to determine whether the decrease in dissolved oxygen is solely due to the total organic nitrogen levels (Scoles, G. 2004). |
| *Spatial Representation:* | Sample were collected at up to 4 sites: Laguna at Todd Road, Upstream at Delta, Laguna upstream of D-Pond Incline pump, and Laguna upstream of Llano Rd. Bridge. |
| *Temporal Representation:* | Sample were collected between 1/2003 and 12/2003. |
| *Data Quality Assessment:* | City of Santa Rosa Quality Assurance Manual. |

---

| | |
|---|---|
| ***Numeric Line of Evidence*** | Pollutant-Water |
| *Beneficial Use:* | AG - Agricultural Supply |
| *Matrix:* | Water |
| *Water Quality Objective/ Water Quality Criterion:* | Basin Plan: Water shall not contain biostimulatory substances in concentrations that promote aquatic growths to the extent that such growths cause nuisance or adversely affect beneficial uses. |
| *Evaluation Guideline:* | Data is reported in TIN: 0.80 TP (Bioavailable N:P ratio). TIN: 0.80 TP is considered in the narrative objective for biostimulatory substances. However, there is no applicable numeric water quality criterion for TIN: 0.80 TP. Therefore, it is difficult to determine that the concentration of TIN: 0.80 TP exceeds standards. |
| *Data Used to Assess Water Quality:* | Sixty sampling events were completed by the City of Santa Rosa NPDES Program. The range of measured values for the ratio of TIN: 0.80 TP was from 0.3 to 16.9. Even though there is a narrative objective for biostimulatory substance there is not a numeric objective or criteria to compare to the concentration of TIN: 0.80 TP. Therefore, it is difficult to determine whether the decrease in dissolved oxygen is due solely to the TIN: 0.80 TP levels (Scoles, 2004). |
| *Spatial Representation:* | Samples were collected from up to 12 sites: Laguna at Llano Road, Laguna at Todd Road, Laguna at Hwy 12, and Laguna at Occidental Bridge, Laguna 100 feet upstream of D-Pond incline Pump, Laguna 150 feet downstream of D-Pond Incline Pump, Laguna at La Franchi, Laguna-approximately 100 feet upstream of Llano Rd. Bridge, Laguna upstream of D-Pond 36, upstream Laguna at Delta, Russian River at Wohler Bridge, Russian River at Mirabel, upstream Roseland Cr. at Llano Rd., downstream Roseland Cr. at Summer Crossing/South of Alpha Bldg., upstream Kelly-downstream confluence of Duer Creek and Kelly Farm Drainage, downstream Duer Creek at Kelly, Colgan Creek upstream confluence with Laguna. |
| *Temporal Representation:* | Samples were collected between 10/1995 and 3/2004. |

| | |
|---|---|
| *Data Quality Assessment:* | City of Santa Rosa Quality Assurance Manual. |

---

| | |
|---|---|
| ***Numeric Line of Evidence*** | Pollutant-Water |
| *Beneficial Use:* | AG - Agricultural Supply |
| *Matrix:* | Water |
| *Water Quality Objective/ Water Quality Criterion:* | Basin Plan: Water shall not contain biostimulatory substances in concentrations that promote aquatic growths to the extent that such growths cause nuisance or adversely affect beneficial uses. |
| *Evaluation Guideline:* | Data is reported in TIN: 0.80 TP (Bioavailable N:P ratio). TIN: 0.80 TP is considered in the narrative objective for biostimulatory substances. However, there is no applicable numeric water quality criterion for TIN: 0.80 TP. Therefore, it is difficult to determine that the concentration of TIN: 0.80 TP exceeds standards. |
| *Data Used to Assess Water Quality:* | Eighty-Six sampling events were conducted by the RWQCB Nutrient TMDL Program. The values of the TIN: 0.80 TP recorded ranged from 0.03 up to 20.02. Even though there is a narrative objective for biostimulatory substance there is not a numeric objective or criteria to compare to the measurement of TIN: 0.80 TP. Therefore, it is difficult to determine whether the decrease in dissolved oxygen is due solely to the TIN: 0.80 TP levels (Scoles, 2004). |
| *Spatial Representation:* | Up to four sample sites: Laguna at Guernville Road, Laguna at Occidental Road, Laguna at Stony Point Road and Laguna at Trenton-Healdsburg Road. |
| *Temporal Representation:* | Samples were collected between 7/1997 and 11/2000. |
| *Data Quality Assessment:* | Nutrient TMDL Program. |

---

| | |
|---|---|
| ***Numeric Line of Evidence*** | Pollutant-Water |
| *Beneficial Use:* | AG - Agricultural Supply, MU - Municipal & Domestic, R1 - Water Contact Recreation, R2 - Non-Contact Recreation, WI - Wildlife Habitat |
| *Matrix:* | Water |
| *Water Quality Objective/ Water Quality Criterion:* | Basin Plan: Water shall not contain biostimulatory substances in concentrations that promote aquatic growths to the extent that such growths cause nuisance or adversely affect beneficial uses. |

| | |
|---|---|
| *Evaluation Guideline:* | Nitrate-Nitrogen is considered in the narrative objective for biostimulatory substances. However, there is no numeric water quality criterion for nitrate-nitrogen. Therefore, it is difficult to determine that the concentration of nitrate-nitrogen exceeds standards. |
| *Data Used to Assess Water Quality:* | Sixty sampling events were conducted by the City of Santa Rosa NPDES Program. The sample values ranged from 0.2 mg/L to 9.7 mg/L and the values were presented as monthly averages of weekly observations. Even though there is a narrative objective for biostimulatory substance there is not a numeric objective or criteria to compare to the concentration of nitrate-nitrogen. Therefore, it is difficult to determine whether the decrease in dissolved oxygen is solely to the nitrate-nitrogen levels (Scoles, 2004). |
| *Spatial Representation:* | Samples were collected from up to 12 sites: Laguna at Llano Road, Laguna at Todd Road, Laguna at Hwy 12, and Laguna at Occidental Bridge, Laguna 100 feet upstream of D-Pond incline Pump, Laguna 150 feet downstream of D-Pond Incline Pump, Laguna at La Franchi, Laguna-approximately 100 feet upstream of Llano Rd. Bridge, Laguna upstream of D-Pond 36, upstream Laguna at Delta, Russian River at Wohler Bridge, Russian River at Mirabel, upstream Roseland Cr. at Llano Rd., downstream Roseland Cr. at Summer Crossing/South of Alpha Bldg., upstream Kelly-downstream confluence of Duer Creek and Kelly Farm Drainage, downstream Duer Creek at Kelly, Colgan Creek upstream confluence with Laguna. |
| *Temporal Representation:* | Samples were collected between 10/1995 and 3/2004. |
| *Data Quality Assessment:* | City of Santa Rosa QA Manual. |

---

| | |
|---|---|
| ***Numeric Line of Evidence*** | Pollutant-Water |
| *Beneficial Use:* | AG - Agricultural Supply, MU - Municipal & Domestic, R1 - Water Contact Recreation, R2 - Non-Contact Recreation, WI - Wildlife Habitat |
| *Matrix:* | Water |
| *Water Quality Objective/ Water Quality Criterion:* | There is no applicable criteria available for Ammonia-Nitrogen. |
| *Data Used to Assess Water Quality:* | Twenty-five sampling events were completed by the City of Santa Rosa NPDES Program. There were 101 samples taken for Ammonia-Nitrogen, the values ranged from 0.2 mg/L to 1.1mg/L. The number of exceedances of the standard was not possible to calculate due to the lack of an applicable criterion for Ammonia-Nitrogen to compare to the measured values (Scoles, 2004). |
| *Spatial Representation:* | Samples were collected at up to 4 sampling sites: Laguna at Todd Road, Upstream at Delta, Laguna upstream of D-Pond Incline pump, and Laguna |

| | |
|---|---|
| | upstream of Llano Rd. Bridge. |
| *Temporal Representation:* | Samples were collected between 1/2003 and 12/2003. |
| *Data Quality Assessment:* | City of Santa Rosa QA Manual. |

---

| | |
|---|---|
| ***Numeric Line of Evidence*** | Pollutant-Water |
| *Beneficial Use:* | CO - Cold Freshwater Habitat, MU - Municipal & Domestic |
| *Matrix:* | Water |
| *Water Quality Objective/ Water Quality Criterion:* | Basin Plan: Water shall not contain biostimulatory substances in concentrations that promote aquatic growths to the extent that such growths cause nuisance or adversely affect beneficial uses. |
| *Evaluation Guideline:* | Nitrate is considered in the narrative objective for biostimulatory substances. There not a nitrate numeric water quality criterion for the Cold Water Beneficial Use. However, for the beneficial use of Municipal and Domestic Supply (MUN), the MCL Criteria for Nitrates is 45 mg/L (ppm) can be considered. |
| *Data Used to Assess Water Quality:* | Eighty-six sampling events were conducted by the RWQCB Nutrient TMDL Monitoring Program. There were no samples that exceeded the 45 mg/L MCL criteria (Scoles, 2004). |
| *Spatial Representation:* | Samples were collected from up to 4 sample sites: Laguna at Guernville Road, Laguna at Occidental Road, Laguna at Stony Point Road, and Laguna at Trenton-Healdsburg Road. |
| *Temporal Representation:* | Samples were collected between 7/1997 and 11/2000. |
| *Data Quality Assessment:* | RWQCB TMDL Monitoring Program |

---

| | |
|---|---|
| ***Numeric Line of Evidence*** | Pollutant-Water |
| *Beneficial Use:* | CO - Cold Freshwater Habitat, MU - Municipal & Domestic |
| *Matrix:* | Water |
| *Water Quality Objective/ Water Quality Criterion:* | Basin Plan: Water shall not contain biostimulatory substances in concentrations that promote aquatic growths to the extent that such growths cause nuisance or adversely affect beneficial uses. |

| | |
|---|---|
| *Evaluation Guideline:* | Nitrite is considered in the narrative objective for biostimulatory substances. However, there is no applicable numeric water quality criterion for nitrite. Therefore, it is difficult to determine that the concentration of nitrite exceeds standards. |
| *Data Used to Assess Water Quality:* | Eighty-six sampling events were completed by the RWQCB Nutrient TMDL Program. The nitrite values ranged from 0.025mg/L to 0.28 mg/L. Even though there is a narrative objective for biostimulatory substance there is not a numeric objective/criteria to compare the concentration of nitrite. Therefore, it is difficult to determine whether the decrease in dissolved oxygen is due solely to the nitrite levels (Scoles, G. 2004). |
| *Spatial Representation:* | Up to four sample sites: Laguna at Guernville Road, Laguna at Occidental Road, Laguna at Stony Point Road, and Laguna at Trenton-Healdsburg Road. |
| *Temporal Representation:* | Samples were collected between 7/1997 - 11/2000. |
| *Data Quality Assessment:* | Nutrient TMDL Program. |

---

| | |
|---|---|
| ***Numeric Line of Evidence*** | Pollutant-Water |
| *Beneficial Use:* | AG - Agricultural Supply, CO - Cold Freshwater Habitat |
| *Matrix:* | Water |
| *Water Quality Objective/ Water Quality Criterion:* | There is no applicable criteria available for Ammonia-Nitrogen. |
| *Data Used to Assess Water Quality:* | There were 86 sampling events completed by the RWQCB TMDL Monitoring Program. The range of values measured was from 0.025 mg/L to 3.24 mg/L. There is not a numeric objective or criteria to compare to the concentration of ammonia-nitrogen in the samples. Therefore, it is difficult to determine whether the decrease in dissolved oxygen is due solely to the ammonia-nitrogen concentration levels (Scoles, 2004). |
| *Spatial Representation:* | Up to four sample sites: Laguna at Guernville Road, Laguna at Occidental Road, Laguna at Stony Point Road and Laguna at Trenton-Healdsburg Road. |
| *Temporal Representation:* | Samples were collected between 7/1997 and 11/2000. |
| *Data Quality Assessment:* | RWQCB Nutrient TMDL Program. |

---

| | |
|---|---|
| ***Numeric Line of Evidence*** | Pollutant-Water |

| | |
|---|---|
| *Beneficial Use:* | AG - Agricultural Supply, CO - Cold Freshwater Habitat |
| *Matrix:* | Water |
| *Water Quality Objective/ Water Quality Criterion:* | There is no applicable criteria available for Ammonia-Nitrogen. |
| *Data Used to Assess Water Quality:* | Twenty-five sampling events were conducted by the City of Santa Rosa NPDES Program. The values of the measurements ranged from 0.2 mg/L to 1.1 mg/L. The number of exceedances of the standard was not calculated due to the lack of an applicable criterion for Ammonia-Nitrogen to compare to the measured values (Scoles, 2004). |
| *Spatial Representation:* | Samples were collected at up to 4 sites: Laguna at Todd Road, Upstream at Delta, Laguna upstream of D-Pond Incline pump, and Laguna upstream of Llano Rd. Bridge. |
| *Temporal Representation:* | Samples were collected between 1/2003 and 12/2003. |
| *Data Quality Assessment:* | City of Santa Rosa QA Manual. |

---

| | |
|---|---|
| ***Numeric Line of Evidence*** | Pollutant-Water |
| *Beneficial Use:* | AG - Agricultural Supply, CO - Cold Freshwater Habitat |
| *Matrix:* | Water |
| *Water Quality Objective/ Water Quality Criterion:* | There is no applicable criteria available for Ammonia-Nitrogen. |
| *Data Used to Assess Water Quality:* | There were sixty samples events from the City of Santa Rosa NPDES Program. The measured values ranged from 0.1 mg/L to 6.8 mg/L. The number of exceedances of the standard was not calculated due to the lack of an applicable criterion for Ammonia-Nitrogen to compare to the measured values (Scoles, 2004). |
| *Spatial Representation:* | Samples were collected from up to 12 sites: Laguna at Llano Road, Laguna at Todd Road, Laguna at Hwy 12, and Laguna at Occidental Bridge, Laguna 100 feet upstream of D-Pond incline Pump, Laguna 150 feet downstream of D-Pond Incline Pump, Laguna at La Franchi, Laguna-approximately 100 feet upstream of Llano Rd. Bridge, Laguna upstream of D-Pond 36, upstream Laguna at Delta, Russian River at Wohler Bridge, Russian River at Mirabel, upstream Roseland Cr. at Llano Rd., downstream Roseland Cr. at Summer Crossing/South of Alpha Bldg., upstream Kelly-downstream confluence of Duer Creek and Kelly Farm Drainage, downstream Duer Creek at Kelly, Colgan Creek upstream confluence with Laguna. |

| | |
|---|---|
| *Temporal Representation:* | Samples were collected between 12/1995 and 3/2004. |
| *Data Quality Assessment:* | City of Santa Rosa QA Manual. |

| | |
|---|---|
| ***Line of Evidence*** | Pollutant-Water |
| *Beneficial Use* | AG - Agricultural Supply |
| *Information Used to Assess Water Quality:* | More information is needed to determine whether eliminating as many of the nitrogen pollution sources as possible would control the Ludwigia abundance, and whether reducing phosphorus will result in improving dissolved oxygen and controlling Ludwigia in the Laguna. |
| *Non-Numeric Objective:* | Basin Plan: Water shall not contain biostimulatory substances in concentrations that promote aquatic growths to the extent that such growths cause nuisance or adversely affect beneficial uses. |
| *Data Used to Assess Water Quality:* | The ratio of N to P in the Laguna for data collected by the Regional Board is part of it's nitrogen TMDL monitoring. The City of Santa Rosa collects nitrogen and phosphorus data as part of its NPDES discharge permit compliance monitoring. For both the Regional Board data set and the City's NPDES data set, total phosphorus was measured, but dissolved P was not measured (Scoles, 2004).<br><br>Since the City's NPDES Nitrogen to Phosphorus (N:P) ratios are derived from monthly averages, an evaluation was completed by the City of Santa Rosa to come up with N:P ratios determined from monthly averaged nitrogen and phosphorus data are representative of N:P ratios from individual measurements. The individual sample data for 2003, which had 101 measurements, were used to calculate individual N:P ratios for comparison to the monthly average values. The average of these individual N:P ratios was 4.4 with a 99 percent confidence interval of ±0.8 compared to the average of the monthly average N:P ratios for the same period of 3.9. No statistically significant difference exists between the monthly and the daily data (Mann Whitney Rank Sum test $p = 0.683$.) The City determined that the N:P ratios based on monthly average values are representative of nutrient conditions in the Laguna. |
| *Spatial Representation:* | The data from the NCRWQCB Nutrient TMDL monitoring were collected in the Laguna at Stony Point, Occidental, Guerneville, and Trenton Healdsburg roads. |
| *Temporal Representation:* | The Nutrient TMDL monitoring program has had no phosphorus samples collected since November 2000. The City of Santa Rosa collected nutrient data during the discharge season between December 1995 and March 2004. |

Region 1

---

**Water Segment:** Russian River HU, Middle Russian River HA, Laguna de Santa Rosa

**Pollutant:** Phosphorus

**Decision:** Delist

**Weight of Evidence:** This pollutant is being considered for removal from the section 303(d) list under section 4.1 of the Listing Policy. Under this section a single line of evidence is necessary to assess listing status. Eight lines of evidence are available in the administrative record to assess this pollutant.

Based on the readily available data and information, the weight of evidence indicates that there is sufficient justification in favor of removing this water segment-pollutant combination from the section 303(d) list in the Water Quality Limited Segments category.

This conclusion is based on the staff findings that:
1. There is no numerical guideline available for phosphorus that complies with the requirements of section 6.1.3 of the Policy.
2. The data used satisfies the data quality requirements of section 6.1.4 of the Policy.
3. The data used satisfies the data quantity requirements of section 6.1.5 of the Policy.
4. There is no guideline available that is applicable to the NCRWQCB to interpret the narrative biostimulatory objective as it is considered for phosphorus. It is not possible to determine if the information exceeds the allowable frequency listed in Table 4.1 of the Listing Policy. The phosphorus listing made by USEPA for this water segment in July of 2003 relied upon the nitrogen and phosphorus targets in the Malibu Creek TMDL which is not appropriate nor is it in accordance with the Listing Policy.
5. Pursuant to section 4.11 of the Listing Policy, no additional data and information are available indicating that standards are met.

**SWRCB Staff Recommendation:** After review of the available data and information, SWRCB staff concludes that the water body-pollutant combination should be removed from the section 303(d) list because applicable water quality standards for the pollutant are not exceeded.

**Lines of Evidence:**

---

***Numeric Line of Evidence*** Pollutant-Water

| | |
|---|---|
| *Beneficial Use:* | CO - Cold Freshwater Habitat |
| *Matrix:* | Water |
| *Water Quality Objective/ Water Quality Criterion:* | Basin Plan: Water shall not contain biostimulatory substances in concentrations that promote aquatic growths to the extent that such growths cause nuisance or adversely affect beneficial uses. |
| *Evaluation Guideline:* | Phosphorus is considered in the narrative objective for biostimulatory substances. The RWQCB initially used a USEPA goal for phosphorus to interpret the data. The use of the phosphorus goal does not address the conditions present in the Laguna de Santa Rosa. There is significant disagreement over phosphorus limitation in the Laguna. The response of water bodies to nutrient enrichment differ among water bodies and one applicable nutrient objective is not available. USEPA and the state are in the process of developing nutrient objectives for the bioregions of California. |
| *Data Used to Assess Water Quality:* | Even though there are 10 water chemistry samples, there is no applicable guideline that can be used to interpret the narrative standard. Even though a phosphorus goal is not applicable in this specific situation, it is clear that the Laguna de Santa Rosa does not meet standards for low dissolved oxygen. It is also clear that nutrient concentrations are a probable cause of the low oxygen concentrations. New monitoring should be completed that identifies the contribution of nutrients and their relationship to the observed low oxygen concentrations (SWRCB, 2003). |
| *Spatial Representation:* | There were 10 targeted sites along the creek. |
| *Temporal Representation:* | The Data was collected over 5-6 Years between 1995 and 2001, and it was collected over four seasons. |
| *Data Quality Assessment:* | This data came from the NCRWQCB 2002 Listing Update. |

---

| | |
|---|---|
| ***Numeric Line of Evidence*** | Pollutant-Water |
| *Beneficial Use:* | CO - Cold Freshwater Habitat |
| *Matrix:* | Water |
| *Water Quality Objective/ Water Quality Criterion:* | Basin Plan: Water shall not contain biostimulatory substances in concentrations that promote aquatic growths to the extent that such growths cause nuisance or adversely affect beneficial uses. |
| *Evaluation Guideline:* | Phosphorus is considered in the narrative objective for biostimulatory substances. In 2002, SWRCB staff recommended not listing for elemental phosphorus because there was not an appropriate phosphorus objective available for Laguna de Santa Rosa. However, USEPA listed Laguna de |

| | |
|---|---|
| | Santa Rosa for phosphorus by determining exceedances using criteria from another Region. Since there is not appropriate criteria, it is difficult to determine whether the concentration of total phosphorus exceeded standards. |
| *Data Used to Assess Water Quality:* | There were 86 sampling events conducted by the RWQCB TMDL Monitoring Program at the 3 to 4 sampling sites between 7/1997 and 11/2000. The data range for values of total phosphorus was between 0.113 mg/L and 1.87 mg/L. Even though there is a narrative objective for biostimulatory substance, there is not a numeric objective or criteria to compare to the concentration of total phosphorus measured. Exceedance of the water quality standard can not be determined (Scoles, 2004). |
| *Spatial Representation:* | Three to four sample sites (Laguna at Guernville Road, Laguna at Occidental Road, Laguna at Stony Point Road and Laguna at Trenton-Healdsburg Road. |
| *Temporal Representation:* | Samples were collected between 7/1997 and 11/2000. |
| *Data Quality Assessment:* | Nutrient TMDL Program. |

---

| | |
|---|---|
| ***Numeric Line of Evidence*** | Pollutant-Water |
| *Beneficial Use:* | CO - Cold Freshwater Habitat |
| *Matrix:* | Water |
| *Water Quality Objective/ Water Quality Criterion:* | Basin Plan: Water shall not contain biostimulatory substances in concentrations that promote aquatic growths to the extent that such growths cause nuisance or adversely affect beneficial uses. |
| *Evaluation Guideline:* | Phosphorus is considered in the narrative objective for biostimulatory substances. In 2002, SWRCB staff recommended not listing for elemental phosphorus because there was not an appropriate phosphorus objective available for Laguna de Santa Rosa. However, USEPA listed Laguna de Santa Rosa for phosphorus by determining exceedances using criteria from another Region. Since there is not appropriate criteria, it is difficult to determine whether the concentration of total phosphorus exceeded standards. |
| *Data Used to Assess Water Quality:* | There were sixty sampling events completed by the City of Santa Rosa NPDES Program at up to 12 sample sites between 12/1995 and 3/2004. The data range for values of total phosphorus was between 0.1 mg/L and 3.9 mg/L. Even though there is a narrative objective for biostimulatory substance, there is not a numeric objective or criteria to compare to the concentration of total phosphorus measured. Exceedance of the water quality standard can not be determined (Scoles, 2004). |

| | |
|---|---|
| *Spatial Representation:* | Samples were collected from 2 to 12 sites (Laguna at Llano Road, Laguna at Todd Road, Laguna at Hwy 12, and Laguna at Occidental Bridge, Laguna 100' upstream of D-Pond incline Pump, Laguna 150' downstream of D-Pond Incline Pump, Laguna at La Franchi, Laguna-approx 100' upstream of Llano Rd. Bridge, Laguna upstream of D-Pond 36", upstream Laguna @ Delta, Russian River at Wohler Bridge, Russian River at Mirabel, upstream Roseland Cr. @ Llano Rd., downstream Roseland Cr. @Summer Crossing/South of Alpha Bldg., upstream Kelly-downstream confluence of Duer Creek and Kelly Farm Drainage, downstream Duer Creek at Kelly, Colgan Creek upstream confluence with Laguna. |
| *Temporal Representation:* | Samples were collected during 12/95 through 3/04. |
| *Data Quality Assessment:* | City of Santa Rosa QA Manual. |

---

| | |
|---|---|
| ***Numeric Line of Evidence*** | Pollutant-Water |
| *Beneficial Use:* | CO - Cold Freshwater Habitat |
| *Matrix:* | Water |
| *Water Quality Objective/ Water Quality Criterion:* | Basin Plan: Water shall not contain biostimulatory substances in concentrations that promote aquatic growths to the extent that such growths cause nuisance or adversely affect beneficial uses. |
| *Evaluation Guideline:* | Data reported in 80% TP (total phosphorus). 80% TP is considered in the narrative objective for biostimulatory substances. There is no numeric water quality criterion for 80% TP. Therefore, it is difficult to determine that the concentration of nitrate-nitrogen exceeds standards. |
| *Data Used to Assess Water Quality:* | Eighty-six sampling events were conducted by the RWQCB TMDL Program. The range of values of 80% TP was between 0.02 and 2.38. Even though there is a narrative objective for biostimulatory substance there is not a numeric objective or criteria to compare the concentration of 80% TP. Therefore, it is difficult to determine whether the decrease in dissolved oxygen is solely due to the 80% TP (SWRCB, 2003). |
| *Spatial Representation:* | Three to four sample sites (Laguna at Guernville Road, Laguna at Occidental Road, Laguna at Stony Point Road and Laguna at Trenton-Healdsburg Road. |
| *Temporal Representation:* | Samples were collected between 7/1997 and 11/2000. |
| *Data Quality Assessment:* | NCRWQCB Nutrient TMDL Program. |

---

| | |
|---|---|
| ***Numeric Line of Evidence*** | Pollutant-Water |
| *Beneficial Use:* | CO - Cold Freshwater Habitat |
| *Matrix:* | Water |
| *Water Quality Objective/ Water Quality Criterion:* | Basin Plan: Water shall not contain biostimulatory substances in concentrations that promote aquatic growths to the extent that such growths cause nuisance or adversely affect beneficial uses. |
| *Evaluation Guideline:* | Phosphorus is considered in the narrative objective for biostimulatory substances. In 2002, SWRCB staff recommended not listing for elemental phosphorus because there was not an appropriate phosphorus objective available for Laguna de Santa Rosa. However, USEPA listed Laguna de Santa Rosa for phosphorus by determining exceedances using criteria from another Region. Since there is not appropriate criteria, it is difficult to determine whether the concentration of total phosphorus exceeded standards. |
| *Data Used to Assess Water Quality:* | Twenty-five sampling events were completed by the City of Santa Rosa NPDES at up to 5 sample site between 1/2003 and 12/2003. The range of values for total phosphorus measured was between 0.4 mg/L and 1.6 mg/L. Even though there is a narrative objective for biostimulatory substance there is not a numeric objective or criteria to compare to the concentration of total phosphorus (Scoles, 2004). |
| *Spatial Representation:* | Samples were collected up to 4 sites: Laguna at Todd Road, upstream at Delta, Laguna upstream of D-Pond Incline pump, and Laguna upstream of Llano Rd. Bridge. |
| *Temporal Representation:* | Samples were collected between 1/2003 and 12/2003. |
| *Data Quality Assessment:* | City of Santa Rosa QA Manual. |

---

| | |
|---|---|
| ***Line of Evidence*** | Pollutant-Water |
| *Beneficial Use* | CO - Cold Freshwater Habitat |
| *Information Used to Assess Water Quality:* | More information is needed to determine whether elevated phosphorus in the Laguna is the cause of the low dissolved oxygen and increased Ludwigia abundance, and whether reducing phosphorus will result in improving dissolved oxygen and controlling Ludwigia in the Laguna. |
| *Non-Numeric Objective:* | Basin Plan: Water shall not contain biostimulatory substances in concentrations that promote aquatic growths to the extent that such growths cause nuisance or adversely affect beneficial uses. |

| | |
|---|---|
| *Evaluation Guideline:* | Phosphorus is considered in the narrative objective for biostimulatory substances. In 2002, SWRCB staff recommended not listing for elemental phosphorus because there was not an appropriate phosphorus objective available for Laguna de Santa Rosa. USEPA listed Laguna de Santa Rosa for phosphorus by determining exceedances using criteria from another Region. Since there is not appropriate criteria, it is difficult to determine whether the concentration of total phosphorus exceeded standards. |
| *Data Used to Assess Water Quality:* | The ratio of N to P in the Laguna for data collected by the Regional Board as part of its nitrogen TMDL monitoring program was presented by the City of Santa Rosa. The City collects nitrogen and phosphorus data as part of its NPDES discharge permit compliance monitoring. For both the Regional Board data set and the City's NPDES data set, total phosphorus was measured, but dissolved P was not measured (Scoles, G. 2004).<br><br>Since the City's NPDES Nitrogen to Phosphorus (N:P) ratios are derived from monthly averages, an evaluation was completed by the City of Santa Rosa to come up with N:P ratios determined from monthly averaged nitrogen and phosphorus data are representative of N:P ratios from individual measurements. The individual sample data for 2003, which had 101 measurements, were used to calculate individual N:P ratios for comparison to the monthly average values. The average of these individual N:P ratios was 4.4 with a 99 percent confidence interval of ±0.8 compared to the average of the monthly average N:P ratios for the same period of 3.9. No statistically significant difference exists between the monthly and the daily data (Mann Whitney Rank Sum test p = 0.683.) The City determined that the N:P ratios based on monthly average values are representative of nutrient conditions in the Laguna. |
| *Spatial Representation:* | The data from the NCRWQCB Nutrient TMDL monitoring were collected in the Laguna at Stony Point, Occidental, Guerneville, and Trenton Healdsburg roads. |
| *Temporal Representation:* | The RWQCB Nutrient TMDL monitoring program samples were collected from July 1997 through November of 2000, no phosphorus samples have been collected since November 2000 for this program. The City of Santa Rosa collected nutrient data during the discharge season between December 1995 and March 2004. |