



**California Regional Water Quality Control Board**  
**North Coast Region**  
**Dennis Leonardi, Chairman**

Alan C. Lloyd, Ph.D.  
 Agency Secretary

[www.waterboards.ca.gov/northcoast](http://www.waterboards.ca.gov/northcoast)  
 5550 Skylane Boulevard, Suite A, Santa Rosa, California 95403  
 Phone: (877) 721-9203 (toll free) • Office: (707) 576-2220 • FAX: (707) 523-0135



Arnold  
 Schwarzenegger  
 Governor

2nd  
 OM

695

47

97

January 31, 2006

To: Selica Potter,  
 Acting Clerk to the Board  
 State Water Resources Control Board  
 Executive Office  
 1001 I Street, 24th Floor  
 Sacramento, CA 95814  
 Fax: (916) 341-5620  
 Email: [commentletters@waterboards.ca.gov](mailto:commentletters@waterboards.ca.gov)



303 (d) Deadline:  
 1/31/06

From: Cat Kuhlman  
 Executive Officer

**Subject: Follow-up Comments for the 2004-2006 303(d) List Update: Santa Rosa Creek Specific Conductance, Laguna de Santa Rosa Mercury, Lost River Temperature, and Laguna de Santa Rosa Nutrients**

This information is being provided to assist SWRCB staff in preparing a corrected "Revision of the Clean Water Act Section 303(d) List of Water Quality Limited Segments" report (303(d) Update report) for the anticipated 303(d) List Update. In addition to the comments contained herein, please refer to my previous comment letter of December 1, 2005, to the acting Clerk of the Board (Attachment 1).

New Data


A comment letter addressing the factual basis for the Laguna de Santa Rosa nutrient impairment listings has been sent to the Chair of the SWRCB under separate cover (Attachment 2). In addition to maintaining the Laguna de Santa Rosa nutrient listing, the report language for three other waterbody pollutant pairs would benefit from consideration and inclusion of the following information.

**The Lower Lost River:**

Lower Lost River Temperature Data (Attachment 3)

**California Environmental Protection Agency**

Recycled Paper



The Lost River in California is currently identified on the 2002 Clean Water Act Section 303(d) list as impaired for temperature. The listed area includes the Clear Lake, Boles, Mt. Dome and Tule Lake hydrologic subareas (HSAs 105.91, 105.92, 105.93, and 105.94). Staff of the Regional Water Quality Control Board, North Coast Region have completed an analysis of the Upper Lost River, which includes the Clear Lake and Boles HSAs, and have submitted a report (North Coast Regional Water Quality Control Board, Upper Lost River and Clear Lake Reservoir Watershed Total Maximum Daily Load Analysis Water Temperature and Nutrients, June 2004) and delisting proposal for the nutrient and temperature listings of these HSAs.

Staff have assembled available water temperature data for the Lower Lost River in the Mt. Dome and Tule Lake HSAs. A summary of the data records available is attached to this letter. The summary presents the locations where water temperature data have been collected and the period of record of these data. In all, in this area of California, there are five locations where continuous temperature records of any length have been collected. Records are available for some portions of the summer in up to three seasons at these locations.

With reference to the Water Quality Control Policy for Developing California's Clean Water Act Section 303(d) List (SWRCB, 2004), in considering a delisting decision, the available data are not adequate in quantity to apply the binomial distribution approach described in Section 4.1 and Table 4.2 of the Policy. In addition, if this waterbody were being considered for listing using the Policy, the available data are not adequate in quantity to apply the binomial distribution approach for a listing consideration.

#### **Santa Rosa Creek:**

##### **Santa Rosa Creek Specific Conductance**

The correct applicable standard is the Russian River Downstream Objective, which is exceeded in three of six samples.

#### **Laguna de Santa Rosa:**

##### **Laguna de Santa Rosa Mercury**

The OEHHA screening values are consistent with USEPA criteria recommendation of 3.0 mg/kg (See <http://www.epa.gov/waterscience/criteria/nrwqc-2004.pdf> for the USEPA Criteria Document (2004)). The USEPA criteria value is more generally accepted for evaluation of mercury in fish tissue for all beneficial uses.

##### **Laguna de Santa Rosa Nutrients**

The weight of evidence clearly supports maintaining the listing of Laguna de Santa Rosa for nutrient impairments. See attached letter to SWRCB Chair Doduc (Attachment 2).

***California Environmental Protection Agency***

Thank you for your consideration.



Cc: SWRCB members

David Smith  
USEPA Region 9  
75 Hawthorne Street  
San Francisco, CA 94105

Craig J. Wilson  
Division of Water Quality  
State Water Resources Control Board



**California Regional Water Quality Control Board**  
**North Coast Region**  
**Dennis Leonardi, Chairman**



Alan C. Lloyd, Ph.D.  
Agency Secretary

[www.waterboards.ca.gov/northcoast](http://www.waterboards.ca.gov/northcoast)  
5550 Skylane Boulevard, Suite A, Santa Rosa, California 95403  
Phone: (877) 721-9203 (toll free) • Office: (707) 576-2220 • FAX: (707) 523-0135

Arnold  
Schwarzenegger  
Governor

To: Tam Doduc, Chair,  
State Water Resources Control Board  
P.O. Box 100  
Sacramento CA, 95812

From: *jr* Cat Kuhlman   
Executive Officer

Subject: **Additional Comments for the 2004-2006 303(d) List Update**

The North Coast Regional Water Quality Control Board strongly supports the continued 303(d) listing of the Laguna de Santa Rosa for nitrogen and phosphorus. In a letter to you dated January 5, 2006, the City of Santa Rosa provided additional information that the City contends supports the delisting of the Laguna de Santa Rosa for nitrogen and phosphorus.

In the January 5<sup>th</sup> letter, the City of Santa Rosa states that because there are no numeric standards for nitrogen and phosphorus for the Laguna de Santa Rosa, the listing of the Laguna for these pollutants is not appropriate. This argument questions the legitimacy of narrative standards and the authority of Regional Boards to enforce narrative standards to protect beneficial uses and prevent nuisance. Specifically, the North Coast Region's Water Quality Control Plan (Basin Plan) states the following:

“Waters shall not contain biostimulatory substances in concentrations that promote aquatic growths to the extent that such growths cause nuisance or adversely affect beneficial uses”

Narrative water quality objectives were established in full conformance with the Porter-Cologne Water Quality Control Act and federal regulations (40 CFR 122.44(d)(1)). Further, the use of narrative objectives in regulatory decisions is commonplace in permitting actions throughout the state, most notably for preventing toxicity, where narrative standards require that all waters be maintained free from toxicity in toxic amounts. We believe there is significant information to indicate that nuisance aquatic growths are a serious problem in the Laguna. One invasive species (*Ludwigia*-water primrose) is spreading rapidly. Over 50 news articles and commentaries have appeared in the Sonoma County Press Democrat since 2003 describing the public's concern about the uncontrolled growth of *Ludwigia*, its effect on the Laguna and its effect on mosquito control efforts. There are comments in the record linking the aquatic weed growth to potential outbreaks of West Nile Virus. The public health and economic implications for the failure to limit the growth of *Ludwigia* are severe. Last year, local agencies removed 5,300 tons of the invasive weed from two limited areas of the Laguna. Over the next five years, local agencies will spend over \$1.9 million to eradicate *Ludwigia* from the Laguna.

**California Environmental Protection Agency**

Recycled Paper

The City of Santa Rosa discounts the testimony of individuals speaking in opposition to the delisting by claiming that the speakers' arguments are emotional and irrelevant because the speakers did not present scientific data to support their claim that the "*Ludwigia* problem" in the Laguna is caused by nitrogen and phosphorus. While space limits a complete discussion of the complex interaction between nutrients, sedimentation, temperature, flow, and shading in the growth of aquatic macrophytes in water bodies, it is scientifically unsupportable that nitrogen and phosphorus in the water column and the sediment are not at least a contributing factor in the uncontrolled spread of *Ludwigia* and the impairment of the beneficial uses of the Laguna. There is more than adequate scientific evidence to support the assertion that *Ludwigia* clearly responds to excess nutrient loading. We provide the full abstract for a recent paper presented at the August 11, 2005 meeting of the Ecological Society of America as one source of evidence (See Attachment 1).

The City also questions the rationale used by the U.S. EPA in 2003 to support the listing of the Laguna de Santa Rosa for nitrogen, stating that the nitrogen objective of 1.0 mg/l is outdated and not region-specific. Regional Water Board staff has not taken a position regarding the applicability of this nitrogen criterion. Instead, Regional Water Board staff acknowledges that nutrient concentrations within a waterbody alone are not effective in assessing the impacts of eutrophication on beneficial uses and supports an approach for California developed by Tetra Tech using secondary indicators for developing nutrient criteria. This approach was discussed at a Nutrient Numeric Training Workshop held on May 2005 in Sacramento, where representatives from Federal, State, and Tribal resource management agencies were given the opportunity to review and comment on the draft California approach to setting nutrient numeric endpoints (CA NNE). The final document explaining the technical approach to develop nutrient numeric endpoints through the use of secondary indicators is still in the process of internal review by workshop participants and the State Board, but the information included in the document has been subject to thorough peer review and is relevant to evaluation of nutrient impacts in the Laguna de Santa Rosa.

The proposed CA NNE approach is based on an evaluation of the risk of impairment of beneficial uses in response to nutrient loading, rather than assigning fixed nutrient concentration targets. Such an approach recognizes that many site-specific factors influence the expression of impacts of nutrients on uses, and also that nutrient-caused impairment may be due to a combination of ongoing water column loads and previously loaded nutrients stored in waterbody sediment. In the case of Laguna de Santa Rosa, it is clear (1) that beneficial uses are impaired by excessive aquatic growth, including the invasive *Ludwigia hexapetala*, (2) that infestations of nuisance aquatic growth including *Ludwigia hexapetala* are associated with nutrient enrichment, among other factors, and (3) nutrient loads (both ongoing and historic) have a reasonable potential to be a promoting factor in the observed impairment by *Ludwigia hexapetala* and other aquatic vegetation. Nutrients thus pose a risk to maintenance of water quality standards in the Laguna. For this reason, the Laguna de Santa Rosa should not be delisted for nutrients at this time.

In addition, Table 1 below presents a comparison of water quality conditions within the Laguna de Santa Rosa and other water bodies within California ecoregion 6. This comparison provides evidence that the Laguna de Santa Rosa has elevated concentrations for all species of nitrogen and phosphorus relative to both impaired and minimally impacted water bodies in the region.

***California Environmental Protection Agency***

The observed concentrations of Chl-A (Median of 20 µg/l, Maximum of 564 µg /l) indicate that the Laguna de Santa Rosa is likely to experience frequent nuisance blooms of planktonic algae during peak growing season conditions. The system thus appears to be adversely impacted by nutrients independent of the *Ludwigia* infestation. Indeed, efforts to eradicate *Ludwigia* will create conditions (increased light penetration in the water column) that may further promote the occurrence of nuisance algal blooms in response to the elevated concentrations of nutrients (both nitrogen and phosphorus) present in the Laguna.

Finally, the City of Santa Rosa raises the specter that the City will likely face severe regulatory action and dire economic impacts if the Laguna de Santa Rosa remains on the 303(d) list for nutrients. There are many potential sources of nutrients in the Laguna watershed, including many non-point sources. As one of the few point source dischargers, the City of Santa Rosa has faced intense scrutiny for water quality problems in the Laguna. By continuing the current watershed planning efforts and ultimately by developing a TMDL, the City can be assured that all sources of nutrients are evaluated and a reasonable, comprehensive control strategy will be developed. Regional Water Board staff will continue to work cooperatively with the City to ensure the improvement of water quality in the Laguna de Santa Rosa.

Given the body of evidence that beneficial uses of the Laguna are impaired, and that nutrients are a contributing factor to the impairment of these beneficial uses, there is no basis for delisting the Laguna at this time. Regional Water Board staff recommends that the State Board retain the Laguna on 303(d) list for nutrients.

Thank you for your consideration.

CER/013106\_cer\_Doduc letter Laguna Listing.doc

Cc: SWRCB members

David Smith  
USEPA Region 9  
75 Hawthorne Street  
San Francisco, CA 94105

Craig J. Wilson  
Division of Water Quality  
State Water Resources Control Board

**The influence of nutrient gradients on an aquatic plant invasion: effects on growth and competition of exotic *Ludwigia hexapetala* (Onagraceae) and its native congener.**

Verdone, Lily<sup>1</sup>, Sears, Anna<sup>1,2,3</sup>, Grewell, Brenda,<sup>1</sup> Sonoma State University, Rohnert Park, CA<sup>2</sup> The Laguna de Santa Rosa Foundation, Santa Rosa, CA<sup>3</sup> University of California, Davis, CA, USA

**ABSTRACT-** In this study, we examine the influence of nutrients on the invasive aquatic plant, *Ludwigia hexapetala*, in the Laguna de Santa Rosa, the largest freshwater wetland on the northern California coast. Excessive nutrient loading, driven by anthropogenic impacts, is thought to have altered the Laguna, which is listed as impaired for sediment and nutrients by the US EPA. In 2004, we implemented a fully-factorial pilot greenhouse study, measuring growth rate of *L. hexapetala* under elevated nutrient levels, within the range found in invaded field sites. Results strongly suggest that increased nitrogen and phosphorous concentrations enhance growth rates and net biomass of *L. hexapetala*. We found peak growth rates at higher ranges of nitrogen and phosphorous additions. In natural stands, *Ludwigia* growth rate and biomass were also greater in sites with higher ranges of nitrogen and phosphorous. These findings support the proposition that *Ludwigia* species and similar creeping macrophytes have a greater ability to establish and invade areas with high nutrient loads and spatial and temporal nutrient perturbations. In 2005, we expanded this study into a larger greenhouse mesocosm experiment; investigating inter- and intraspecific competition between the invasive *Ludwigia hexapetala* and its native congener, *L. peploides*, along a nutrient gradient. Interaction strength between the native and invasive *Ludwigia* species was measured through a pair-wise additive design under a varied nutrient regime. A simultaneous field component measured growth rate and biomass of *Ludwigia* along a natural nutrient gradient in the Laguna de Santa Rosa watershed. Results from this research are aimed at establishing an acceptable nutrient range in the waterway, to aid long-term management of *L. hexapetala* and similar invasive aquatic macrophytes.

**Table 1. Water Quality Monitoring Data (nutrient related parameters) of Laguna de Santa Rosa - Compared to other Water Bodies Within Ecoregion 6**

Chemical	Stream Type	Median	Average	First Quartile	Second Quartile	Third Quartile	Fourth Quartile	No of Data points
<b>NH<sub>4</sub></b> <b>(mg/l)</b>	Minimally Impacted	0.02	0.05	0.01	0.02	0.04	3.25	281
	Unimpaired	0.02	0.41	0.01	0.02	0.07	32.94	1228
	Impaired (nutrient)	0.05	0.34	0.01	0.05	0.14	12.10	907
	Impaired (other)	0.05	0.47	0.02	0.05	0.12	17.10	1279
	<b>Laguna de Santa Rosa</b>	<b>0.40</b>	<b>1.16</b>	<b>0.10</b>	<b>0.40</b>	<b>0.90</b>	<b>15.00</b>	<b>279</b>
<b>NO<sub>2</sub></b> <b>(mg/l)</b>	Minimally Impacted	0.00	0.01	0.00	0.00	0.00	0.06	110
	Unimpaired	0.02	0.15	0.01	0.02	0.13	12.00	1500
	Impaired (nutrient)	0.04	0.09	0.01	0.04	0.10	5.00	861
	Impaired (other)	0.02	0.14	0.01	0.02	0.09	2.95	1160
	<b>Laguna de Santa Rosa</b>	<b>0.09</b>	<b>0.41</b>	<b>0.02</b>	<b>0.09</b>	<b>0.40</b>	<b>4.30</b>	<b>66</b>
<b>NO<sub>3</sub></b> <b>(mg/l)</b>	Minimally Impacted	0.05	0.16	0.05	0.05	0.15	2.85	112
	Unimpaired	0.36	4.45	0.05	0.36	3.79	45.99	1301
	Impaired (nutrient)	4.74	5.02	1.17	4.74	7.50	31.84	600
	Impaired (other)	2.2	4.71	0.58	2.20	4.80	48.10	1037
	<b>Laguna de Santa Rosa</b>	<b>2.30</b>	<b>0.32</b>	<b>0.00</b>	<b>2.30</b>	<b>5.20</b>	<b>26.70</b>	<b>265</b>
<b>TKN</b> <b>(mg/l)</b>	Minimally Impacted	0.25	0.31	0.13	0.25	0.41	1.20	156
	Unimpaired	0.40	1.01	0.20	0.40	0.93	42.70	1425
	Impaired (nutrient)	0.7	1.06	0.40	0.70	1.20	11.00	868
	Impaired (other)	0.6	0.97	0.30	0.60	1.10	33.00	1486
	<b>Laguna de Santa Rosa</b>	<b>1.11</b>	<b>1.09</b>	<b>0.81</b>	<b>1.20</b>	<b>6.10</b>	<b>19.00</b>	<b>67</b>
<b>PO<sub>4</sub></b> <b>(mg/l)</b>	Minimally Impacted	0.04	0.05	0.02	0.04	0.07	0.23	260
	Unimpaired	0.06	0.49	0.02	0.05	0.50	26.73	1671
	Impaired (nutrient)	0.22	0.60	0.03	0.22	0.90	8.10	1056
	Impaired (other)	0.05	0.45	0.02	0.05	0.26	40.00	1793
	<b>Total PO<sub>4</sub></b>	<b>Laguna de Santa Rosa</b>	<b>0.62</b>	<b>1.38</b>	<b>0.46</b>	<b>0.62</b>	<b>1.80</b>	<b>6.20</b>
<b>Ortho PO<sub>4</sub></b>	<b>Laguna de Santa Rosa</b>	<b>0.75</b>	<b>1.93</b>	<b>0.37</b>	<b>0.75</b>	<b>1.90</b>	<b>46.0</b>	<b>66</b>
<b>TP</b> <b>(mg/l)</b>	Minimally Impacted	0.08	0.08	0.03	0.08	0.09	0.30	34
	Unimpaired	0.07	0.36	0.01	0.07	0.27	24.80	633
	Impaired (nutrient)	0.13	0.77	0.05	0.13	1.07	7.94	525
	Impaired (other)	0.07	0.34	0.03	0.07	0.22	45.10	1069
	<b>Laguna de Santa Rosa</b>	<b>0.64</b>	<b>0.66</b>	<b>0.47</b>	<b>0.66</b>	<b>0.70</b>	<b>1.20</b>	<b>27</b>
<b>Chl-A</b> <b>(pg/l)</b>	Minimally Impacted							
	Unimpaired							
	Impaired (nutrient)							
	Impaired (other)							
	<b>Laguna de Santa Rosa</b>	<b>20.6</b>	<b>42.37</b>	<b>6.80</b>	<b>20.00</b>	<b>50.00</b>	<b>564.00</b>	<b>157</b>





Alan C. Lloyd, Ph.D.  
Agency Secretary

**California Regional Water Quality Control Board**  
**North Coast Region**  
**Beverly Wasson, Chairperson**

<http://www.waterboards.ca.gov/northcoast>  
5550 Skylane Boulevard, Suite A, Santa Rosa, California 95403  
Phone: 1 (877) 721-9203 (toll free) • Office: (707) 576-2220 • FAX: (707) 523-0135



Arnold  
Schwarzenegger  
Governor

To: Selica Potter,  
Acting Clerk to the Board

From: Cat Kuhlman   
Executive Officer

Date: December 1, 2005

Subject: **Comments on SWRCB Staff Recommendation for the 2004-2006 303(d) List Update**

Thank you for the opportunity to review and comment on the State Water Resources Control Board report, "REVISION OF THE CLEAN WATER ACT SECTION 303(d) LIST OF WATER QUALITY LIMITED SEGMENTS" (303(d) Update report), dated September 2005. The 303(d) Update report represents a significant effort to assemble important information required for meaningful continuous planning. State Water Board staff is to be commended for the level of effort required to prepare this 2006 - 303(d) Update report. Comments on factual content and procedural considerations are provided below. First, however, please accept some information about the impaired status of the Laguna de Santa Rosa.

The Laguna de Santa Rosa, tributary to Mark West Creek, thence the Russian River, thence the Pacific Ocean, is impaired due to a variety of human activities, including watershed urbanization, removal of riparian vegetation, hydromodification, loss of flood retention capacity, and discharges of treated wastewater, urban storm water runoff, and various nonpoint sources of pollutants. Though greatly reduced in size and assimilative capacity, the Laguna provides important migratory waterfowl habitat and natural wetland water quality protections. For more than thirty years, considerable effort has led to progress in reducing discharges of untreated effluent, agricultural runoff, and construction site storm water, while protecting and enhancing portions of the historic riparian wetlands. This same time period has been marked by considerable increases in developed, paved, drained areas; sanitary sewer service areas; increased discharges of treated wastewater and increased peak storm water runoff. One of the most widely recognized impacts to the Laguna de Santa Rosa water quality has been the exceedence of the assimilative capacity for biostimulatory substances (nutrients), primarily phosphorus and nitrogen. The level of phosphorus entering the Laguna de Santa Rosa in sediment, agricultural runoff, and effluent discharges is so great that phosphorus is sequestered into the sediment, and

***California Environmental Protection Agency***

*Recycled Paper*

cycled into the biota with any additions of available nitrogen. The nitrogen levels are additionally seen in concentrations that have direct impacts on water quality, including transient levels of unionized ammonia in exceedence of wildlife criteria. Together, the excess biostimulatory substances (phosphorus and nitrogen) contribute to additional secondary water quality impairments, including nuisance plant growth (*Ludwigia* is a recent example of particular concern) impairing REC1 and REC2 beneficial uses, and low dissolved oxygen levels.

The SWRCB staff recommendation to remove the Laguna de Santa Rosa listings for phosphorus and nitrogen is not supported by the weight of evidence, nor is it consistent with the 303(d) Listing Update Policy adopted by SWRCB September 2004. Regional Water Board staff would not have brought forward this de-listing recommendation to the State Water Board for consideration at this time, and recommend a conservative approach, requiring no SWRCB action to delist.

As to the opportunity for improving report clarity, the naming convention needs to include both the actual basin plan water body affected as well as the common name for that portion affected. Some listing actions are based on evidence of a single point, some for a reach of stream, some for a defined drainage area. A clear description, with a map of an appropriate scale, should be provided for each recommended list change. It would also be informative to provide the same (description and map) for each of the watershed pollutant pairs where the recommendation is no change in status.

Finally, the topics addressed above provide case studies in support of the 303(d) List Update approach prescribed in the September 2004 Listing Policy (as contrasted with the top down approach before you at this time). Allowing the Regions to first solicit, compile, evaluate, notice and bring to hearing the Regional updates, as has been the case for past updates, and as is required under the September 2004 Policy, would have saved considerable effort.

Regional Water Board staff looks forward to working closely with State Water Board staff in correcting the recommendations prior to consideration at State Water Board hearing.

Thank you for your consideration.

~~California Environmental Protection Agency, Division of Water Quality, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025~~

Cc: SWRCB members

David Smith  
USEPA Region 9  
75 Hawthorne Street  
San Francisco, CA 94105

Craig J. Wilson  
Division of Water Quality  
State Water Resources Control Board

## Summary of Available Continuous Temperature Records for the Lower Lost River, CA

Site	Site ID	Period of Measurement
Lost River @ East-West Road	LREW	7/19/02-9/18/02
		5/19/03-5/23/03
		8/25/03-8/29/03
		6/14/04-6/17/04
Tule Lake Sump @ Pump D	TLSR	7/30/02-9/02/02
		5/19/03-5/23/03
		8/25/03-8/29/03
Tule Lake Tunnel Outlet	TLTO	5/3/00-11/12/00
Klamath Straits Drain @ Stateline Road	KSDSR	5/19/03-5/23/03
		8/25/03-8/29/03
		6/14/04-6/17/04
P-Canal @ Poverty Flat	PC	5/19/03-5/23/03
		8/25/03-8/29/03

Lower Lost River includes Lost River from Oregon-California  
stateline to Tule Lake Sump, Tule Lake Sump, and Lower  
Klamath Lake Wildlife Refuge  
No continuous data for 2001 were found.



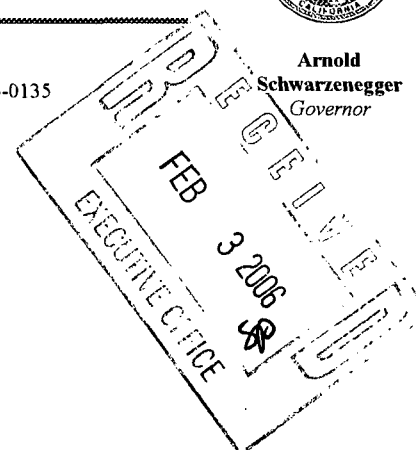
**California Regional Water Quality Control Board  
North Coast Region  
Dennis Leonardi, Chairman**



Alan C. Lloyd, Ph.D.  
Agency Secretary

www.waterboards.ca.gov/northcoast  
5550 Skylane Boulevard, Suite A, Santa Rosa, California 95403  
Phone: (877) 721-9203 (toll free) • Office: (707) 576-2220 • FAX: (707) 523-0135

Arnold  
Schwarzenegger  
Governor



**To:** Tam Doduc, Chair,  
State Water Resources Control Board  
P.O. Box 100  
Sacramento CA, 95812

**From:** *jr* Cat Kuhlman  
Executive Officer 

**Subject:** Additional Comments for the 2004-2006 303(d) List Update

The North Coast Regional Water Quality Control Board strongly supports the continued 303(d) listing of the Laguna de Santa Rosa for nitrogen and phosphorus. In a letter to you dated January 5, 2006, the City of Santa Rosa provided additional information that the City contends supports the delisting of the Laguna de Santa Rosa for nitrogen and phosphorus.

In the January 5<sup>th</sup> letter, the City of Santa Rosa states that because there are no numeric standards for nitrogen and phosphorus for the Laguna de Santa Rosa, the listing of the Laguna for these pollutants is not appropriate. This argument questions the legitimacy of narrative standards and the authority of Regional Boards to enforce narrative standards to protect beneficial uses and prevent nuisance. Specifically, the North Coast Region's Water Quality Control Plan (Basin Plan) states the following:

"Waters shall not contain biostimulatory substances in concentrations that promote aquatic growths to the extent that such growths cause nuisance or adversely affect beneficial uses"

Narrative water quality objectives were established in full conformance with the Porter-Cologne Water Quality Control Act and federal regulations (40 CFR 122.44(d)(1)). Further, the use of narrative objectives in regulatory decisions is commonplace in permitting actions throughout the state, most notably for preventing toxicity, where narrative standards require that all waters be maintained free from toxicity in toxic amounts. We believe there is significant information to indicate that nuisance aquatic growths are a serious problem in the Laguna. One invasive species (*Ludwigia*-water primrose) is spreading rapidly. Over 50 news articles and commentaries have appeared in the Sonoma County Press Democrat since 2003 describing the public's concern about the uncontrolled growth of *Ludwigia*, its effect on the Laguna and its effect on mosquito control efforts. There are comments in the record linking the aquatic weed growth to potential outbreaks of West Nile Virus. The public health and economic implications for the failure to limit the growth of *Ludwigia* are severe. Last year, local agencies removed 5,300 tons of the invasive weed from two limited areas of the Laguna. Over the next five years, local agencies will spend over \$1.9 million to eradicate *Ludwigia* from the Laguna.

The City of Santa Rosa discounts the testimony of individuals speaking in opposition to the delisting by claiming that the speakers' arguments are emotional and irrelevant because the speakers did not present scientific data to support their claim that the "*Ludwigia* problem" in the Laguna is caused by nitrogen and phosphorus. While space limits a complete discussion of the complex interaction between nutrients, sedimentation, temperature, flow, and shading in the growth of aquatic macrophytes in water bodies, it is scientifically unsupportable that nitrogen and phosphorus in the water column and the sediment are not at least a contributing factor in the uncontrolled spread of *Ludwigia* and the impairment of the beneficial uses of the Laguna. There is more than adequate scientific evidence to support the assertion that *Ludwigia* clearly responds to excess nutrient loading. We provide the full abstract for a recent paper presented at the August 11, 2005 meeting of the Ecological Society of America as one source of evidence (See Attachment 1).

The City also questions the rationale used by the U.S. EPA in 2003 to support the listing of the Laguna de Santa Rosa for nitrogen, stating that the nitrogen objective of 1.0 mg/l is outdated and not region-specific. Regional Water Board staff has not taken a position regarding the applicability of this nitrogen criterion. Instead, Regional Water Board staff acknowledges that nutrient concentrations within a waterbody alone are not effective in assessing the impacts of eutrophication on beneficial uses and supports an approach for California developed by Tetra Tech using secondary indicators for developing nutrient criteria. This approach was discussed at a Nutrient Numeric Training Workshop held on May 2005 in Sacramento, where representatives from Federal, State, and Tribal resource management agencies were given the opportunity to review and comment on the draft California approach to setting nutrient numeric endpoints (CA NNE). The final document explaining the technical approach to develop nutrient numeric endpoints through the use of secondary indicators is still in the process of internal review by workshop participants and the State Board, but the information included in the document has been subject to thorough peer review and is relevant to evaluation of nutrient impacts in the Laguna de Santa Rosa.

The proposed CA NNE approach is based on an evaluation of the risk of impairment of beneficial uses in response to nutrient loading, rather than assigning fixed nutrient concentration targets. Such an approach recognizes that many site-specific factors influence the expression of impacts of nutrients on uses, and also that nutrient-caused impairment may be due to a combination of ongoing water column loads and previously loaded nutrients stored in waterbody sediment. In the case of Laguna de Santa Rosa, it is clear (1) that beneficial uses are impaired by excessive aquatic growth, including the invasive *Ludwigia hexapetala*, (2) that infestations of nuisance aquatic growth including *Ludwigia hexapetala* are associated with nutrient enrichment, among other factors, and (3) nutrient loads (both ongoing and historic) have a reasonable potential to be a promoting factor in the observed impairment by *Ludwigia hexapetala* and other aquatic vegetation. Nutrients thus pose a risk to maintenance of water quality standards in the Laguna. For this reason, the Laguna de Santa Rosa should not be delisted for nutrients at this time.

In addition, Table 1 below presents a comparison of water quality conditions within the Laguna de Santa Rosa and other water bodies within California ecoregion 6. This comparison provides evidence that the Laguna de Santa Rosa has elevated concentrations for all species of nitrogen and phosphorus relative to both impaired and minimally impacted water bodies in the region.

***California Environmental Protection Agency***

The observed concentrations of Chl-A (Median of 20 µg/l, Maximum of 564 µg /l) indicate that the Laguna de Santa Rosa is likely to experience frequent nuisance blooms of planktonic algae during peak growing season conditions. The system thus appears to be adversely impacted by nutrients independent of the *Ludwigia* infestation. Indeed, efforts to eradicate *Ludwigia* will create conditions (increased light penetration in the water column) that may further promote the occurrence of nuisance algal blooms in response to the elevated concentrations of nutrients (both nitrogen and phosphorus) present in the Laguna.

Finally, the City of Santa Rosa raises the specter that the City will likely face severe regulatory action and dire economic impacts if the Laguna de Santa Rosa remains on the 303(d) list for nutrients. There are many potential sources of nutrients in the Laguna watershed, including many non-point sources. As one of the few point source dischargers, the City of Santa Rosa has faced intense scrutiny for water quality problems in the Laguna. By continuing the current watershed planning efforts and ultimately by developing a TMDL, the City can be assured that all sources of nutrients are evaluated and a reasonable, comprehensive control strategy will be developed. Regional Water Board staff will continue to work cooperatively with the City to ensure the improvement of water quality in the Laguna de Santa Rosa.

Given the body of evidence that beneficial uses of the Laguna are impaired, and that nutrients are a contributing factor to the impairment of these beneficial uses, there is no basis for delisting the Laguna at this time. Regional Water Board staff recommends that the State Board retain the Laguna on 303(d) list for nutrients.

Thank you for your consideration.

CER/013106\_cer\_Doduc letter Laguna Listing.doc

Cc: SWRCB members

David Smith  
USEPA Region 9  
75 Hawthorne Street  
San Francisco, CA 94105

Craig J. Wilson  
Division of Water Quality  
State Water Resources Control Board

**The influence of nutrient gradients on an aquatic plant invasion: effects on growth and competition of exotic *Ludwigia hexapetala* (Onagraceae) and its native congener.**

Verdone, Lily<sup>\*1</sup>, Sears, Anna<sup>1,2,3</sup>, Grewell, Brenda,<sup>1</sup> Sonoma State University, Rohnert Park, CA<sup>2</sup> The Laguna de Santa Rosa Foundation, Santa Rosa, CA<sup>3</sup> University of California, Davis, CA, USA

**ABSTRACT-** In this study, we examine the influence of nutrients on the invasive aquatic plant, *Ludwigia hexapetala*, in the Laguna de Santa Rosa, the largest freshwater wetland on the northern California coast. Excessive nutrient loading, driven by anthropogenic impacts, is thought to have altered the Laguna, which is listed as impaired for sediment and nutrients by the US EPA. In 2004, we implemented a fully-factorial pilot greenhouse study, measuring growth rate of *L. hexapetala* under elevated nutrient levels, within the range found in invaded field sites. Results strongly suggest that increased nitrogen and phosphorous concentrations enhance growth rates and net biomass of *L. hexapetala*. We found peak growth rates at higher ranges of nitrogen and phosphorous additions. In natural stands, *Ludwigia* growth rate and biomass were also greater in sites with higher ranges of nitrogen and phosphorous. These findings support the proposition that *Ludwigia* species and similar creeping macrophytes have a greater ability to establish and invade areas with high nutrient loads and spatial and temporal nutrient perturbations. In 2005, we expanded this study into a larger greenhouse mesocosm experiment; investigating inter- and intraspecific competition between the invasive *Ludwigia hexapetala* and its native congener, *L. peploides*, along a nutrient gradient. Interaction strength between the native and invasive *Ludwigia* species was measured through a pair-wise additive design under a varied nutrient regime. A simultaneous field component measured growth rate and biomass of *Ludwigia* along a natural nutrient gradient in the Laguna de Santa Rosa watershed. Results from this research are aimed at establishing an acceptable nutrient range in the waterway, to aid long-term management of *L. hexapetala* and similar invasive aquatic macrophytes.



**Table 1. Water Quality Monitoring Data (nutrient related parameters) of Laguna de Santa Rosa - Compared to other Water Bodies Within Ecoregion 6**

Chemical	Stream Type	Median	Average	First Quartile	Second Quartile	Third Quartile	Fourth Quartile	No of Data points
<b>NH<sub>3</sub></b> <b>(mg/l)</b>	Minimally Impacted	0.02	0.05	0.01	0.02	0.04	3.25	261
	Unimpaired	0.02	0.41	0.01	0.02	0.07	32.94	1229
	Impaired (nutrient)	0.05	0.34	0.01	0.05	0.14	12.10	907
	Impaired (other)	0.05	0.47	0.02	0.05	0.12	17.10	1279
	<b>Laguna de Santa Rosa</b>	<b>0.40</b>	<b>1.16</b>	<b>0.10</b>	<b>0.40</b>	<b>0.90</b>	<b>15.00</b>	<b>279</b>
<b>NO<sub>2</sub></b> <b>(mg/l)</b>	Minimally Impacted	0.00	0.01	0.00	0.00	0.00	0.06	110
	Unimpaired	0.02	0.15	0.01	0.02	0.13	12.00	1500
	Impaired (nutrient)	0.04	0.09	0.01	0.04	0.10	5.00	861
	Impaired (other)	0.02	0.14	0.01	0.02	0.09	2.95	1160
	<b>Laguna de Santa Rosa</b>	<b>0.09</b>	<b>0.41</b>	<b>0.02</b>	<b>0.09</b>	<b>0.40</b>	<b>4.30</b>	<b>66</b>
<b>NO<sub>3</sub></b> <b>(mg/l)</b>	Minimally Impacted	0.05	0.16	0.05	0.05	0.15	2.85	112
	Unimpaired	0.36	4.45	0.05	0.36	3.70	48.09	1301
	Impaired (nutrient)	4.74	5.02	1.17	4.74	7.50	31.84	600
	Impaired (other)	2.2	4.71	0.56	2.20	4.80	48.10	1037
	<b>Laguna de Santa Rosa</b>	<b>2.30</b>	<b>0.32</b>	<b>0.80</b>	<b>2.30</b>	<b>5.20</b>	<b>26.70</b>	<b>285</b>
<b>TKN</b> <b>(mg/l)</b>	Minimally Impacted	0.25	0.31	0.13	0.25	0.41	1.20	156
	Unimpaired	0.40	1.01	0.20	0.40	0.93	42.70	1425
	Impaired (nutrient)	0.7	1.06	0.40	0.70	1.20	11.00	868
	Impaired (other)	0.6	0.97	0.30	0.60	1.10	33.00	1486
	<b>Laguna de Santa Rosa</b>	<b>1.11</b>	<b>1.09</b>	<b>0.81</b>	<b>1.20</b>	<b>6.10</b>	<b>19.00</b>	<b>67</b>
<b>PO<sub>4</sub></b> <b>(mg/l)</b>	Minimally Impacted	0.04	0.05	0.02	0.04	0.07	0.23	260
	Unimpaired	0.08	0.49	0.02	0.08	0.50	28.73	1671
	Impaired (nutrient)	0.22	0.60	0.03	0.22	0.90	8.10	1056
	Impaired (other)	0.05	0.45	0.02	0.05	0.26	40.00	1793
	<b>Total PO<sub>4</sub></b>	<b>Laguna de Santa Rosa</b>	<b>0.82</b>	<b>1.38</b>	<b>0.46</b>	<b>0.82</b>	<b>1.80</b>	<b>6.20</b>
<b>Ortho PO<sub>4</sub></b>	<b>Laguna de Santa Rosa</b>	<b>0.75</b>	<b>1.93</b>	<b>0.37</b>	<b>0.75</b>	<b>1.90</b>	<b>46.0</b>	<b>66</b>
<b>TP</b> <b>(mg/l)</b>	Minimally Impacted	0.08	0.08	0.03	0.08	0.09	0.30	34
	Unimpaired	0.07	0.36	0.01	0.07	0.27	24.80	633
	Impaired (nutrient)	0.13	0.77	0.05	0.13	1.07	7.94	525
	Impaired (other)	0.07	0.34	0.03	0.07	0.22	45.10	1069
	<b>Laguna de Santa Rosa</b>	<b>0.64</b>	<b>0.66</b>	<b>0.47</b>	<b>0.66</b>	<b>0.70</b>	<b>1.20</b>	<b>27</b>
<b>Chl-A</b> <b>(µg/l)</b>	Minimally Impacted							
	Unimpaired							
	Impaired (nutrient)							
	Impaired (other)							
	<b>Laguna de Santa Rosa</b>	<b>20.0</b>	<b>42.37</b>	<b>8.00</b>	<b>20.00</b>	<b>50.00</b>	<b>564.00</b>	<b>157</b>