

From: Craig J. Wilson
To: Vitale, Pavlova
Date: 7/18/05 3:07PM
Subject: Fwd: RE: Mat Kirby's study of LE sediment

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Pavlova,

Thanks. As we discussed, it appears that the original listing was faulty...sedimentation and eutrophication were linked when in fact they should not have been. As you mentioned over the phone, there is no empirical data or information showing that sedimentation impacts beneficial uses or causes nuisance. If this is correct, we will use this info as the basis for delisting.

CJWilson
916-341-5560

>>> Pavlova Vitale Monday, July 18, 2005 >>>

Hi Craig, the report does talk about historic sedimentation. Here is what it says:

In determining whether there is a sedimentation problem they looked at the sedimentation rates for the 18th and 19th century and they also looked at the sedimentation rates for the 20th century and compared them. They also looked at the sedimentation rates for Canyon Lake, which is a reservoir that was built by damming the San Jacinto River just north of Lake Elsinore. The study found that the historic sedimentation rates in Lake Elsinore are different than those for the 20th century. There is a three fold difference in these rates (3.6 mm/yr for the historic ones and 12.7 mm/yr for the 20th century one). However, there is a lot more uncertainty in the data for the historic sediment rates because there are few chronological markers that were available in obtaining the data. The 20th century data are more accurate.

The Canyon Lake sedimentation rate is higher (average around 24 mm/yr) than the Lake Elsinore sedimentation rate (average around 12.7 mm/yr) showing that over time, Canyon Lake has served to prevent quite a bit of sediments from entering Lake Elsinore.

Here is why we believe the lake should be delisted

We originally believed that since Lake Elsinore was impacted by nutrients, that the nutrients were associated with sediments and thus it should be listed for sediments. However, in implementing the nutrient TMDL we found that all the nutrients coming in to the lake are in the dissolved form and are thus not associated with sediments. So our listing assumption was wrong.

We agree with the study that I summarized to you above. There has been an increase in sediment rates but there is no evidence to support that beneficial uses have been impaired as a result of this increase.

IF toxicity were an issue, which at this time we are investigating, it is being addressed through the toxicity tmdl that we are currently working on for that lake. If clarity were an issue, we are addressing that through the nutrient tmdl that is currently in place as well.

If this is not sufficient to show that the lake should be delisted for sediments, please let me know what study we could use to prove that. I reviewed the delisting policy and we were not able to find any specific information regarding sediments.

Pavlova N. Vitale
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>>> Craig J. Wilson 07/18/05 12:19PM >>>
Pavlova,

Thanks for sending the report. Since this is a new report (it was finished in Mar 05) and since I am out of time for reviewing new data, I need your help in summarizing the report and making the case for delisting sedimentation.

At first read, I can't see how this report supports delisting sedimentation under the terms of the Listing Policy (attached). The report seems to be focused on historical nutrient levels (over the last ~10K years). Perhaps Region 8 staff can help me prepare a summary of the justification for the delisting.

Let's discuss today. Thanks.

CJWilson
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email: cjwilson@waterboards.ca.gov
<http://www.waterboards.ca.gov>

>>> Pavlova Vitale Monday, July 18, 2005 >>>

Here is the final report for the Lake Elsinore sediment study. We would like to delist based on that study.

CC: Smythe, Hope

From: Craig J. Wilson
To: Vitale, Pavlova
Date: 7/18/05 11:30AM
Subject: Re: questions regarding the fact sheets for region 8

Pavlova,

See my responses below.... If we need to discuss this please call me today as I will be out Tues through Fri.

Thanks.

CJWilson
916-341-5560

>>> Pavlova Vitale Monday, July 18, 2005 >>>

Craig, our staff had the following questions regarding the fact sheets:

① We had submitted Dr. Kirby's report to support delisting of Lake Elsinore for sediment, but there is no recommendation or fact sheet. Did St Bd evaluate the data?

CJW: If we do not have a fact sheet for the data we did not review it. Please send me the report ASAP. Also, if you would like to take a crack at the data summary please be my guest. We would like to accommodate you on this.

② Finally, for the NB watershed, St Bd is recommending listing for all of the parameters for which we have tmdls in the Basin Plan (nutrients, coliform, etc.). For this, I take it that you can no longer de-list once a tmdl is in place but only when you have compliance with WQS. Is that still true?

CJW: Yes This is described in section 2 of the Listing Policy.

Please let me know your answers so I can pass them along to our staff. Thanks!

Pavlova N. Vitale
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From: Craig J. Wilson
To: Vitale, Pavlova
Date: 7/18/05 12:19PM
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Let's discuss today. Thanks.

CJWilson
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>>> Pavlova Vitale Monday, July 18, 2005 >>>

Here is the final report for the Lake Elsinore sediment study. We would like to delist based on that study.

From: Cindy Li
To: Smythe, Hope
Date: 7/18/05 11:46AM
Subject: Re: Elsinore sediment

Please see the attached for the final report submitted by UC Berkeley funded by our TMDL contact. I understand that LESJWA is also supporting a project by Matthew Kirby at Cal State Fullerton. I don't have the final report from that study.

>>> Hope Smythe 07/18/05 11:36AM >>>

Cindy,

do we have Dr. Kirby's report on elsinore sedimentation in an electronic format? St Bd apparently did not get it for consideration of de-listing from EPA, but we can still have them review it.

thanks

From: Craig J. Wilson
To: Vitale, Pavlova
Date: 7/18/05 2:32PM
Subject: Fwd: Re: Elsinore sediment

Pavlova,

Is this the report that supports the sedimentation delisting? If so I have several questions:

1. What was the basis for the original listing? If it was not based on data or information, we need to acknowledge the lack of basis for the original listing.
2. What objective was not met? The only objective that appears to be applicable is for solids, suspended and settleable:

Inland surface waters shall not contain suspended or settleable solids in amounts which cause a nuisance or adversely affect beneficial uses as a result of controllable water quality factors.

3. I have questions about the report. My questions center around the conclusions:

- A. Twentieth century sedimentation rates at Lake Elsinore range from 10.1 mm/yr to 15.3 mm/yr the average of which (12.7 mm/yr) is roughly half the average rate of 24 mm/yr at Canyon Lake during approximately the same time period.
- B. The estimated Lake Elsinore sedimentation rates for the period ~ 1730 to 1910 range from 2.8 to 5.0 mm/yr, the average of which is 3.6 mm/yr i.e. ~3x less than the twentieth century average.
- C. The average twentieth century sedimentation rate (12.7 mm/yr) significantly exceeds sedimentation rates during both the 18th and 19th centuries. In other words, the construction of Canyon Lake has slowed but not eliminated the impact of humans (i.e., urbanization) on the rate of sediment infilling of Lake Elsinore.

So, historical sedimentation is much less than sedimentation in the 20th century. I cannot find anything related to how this rate either protects or doesn't protect beneficial uses. Are beneficial uses protected? Is there a nuisance from sedimentation?

It would be very helpful to me if you could answer these questions so a fact sheet could be developed.

Let's discuss today as I will be out for the rest of the week.

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>>> Pavlova Vitale Monday, July 18, 2005 >>>

Attached is the Elsinore sediment report that supports delisting for sediment.

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From: Cindy Li
To: Smythe, Hope; Vitale, Pavlova
Date: 7/18/05 2:07PM
Subject: Fwd: RE: Mat Kirby's study of LE sediment

I prepared the attached report several years ago to propose the de-listing of sediment for Lake Elsinore impairment. I will look at the de-listing policy and the new information we received since then and update the report. The UC Berkeley study specifically address the sedimentation rate of Lake Elsinore in comparison to Canyon Lake. It also compared the sedimentation rte of Lake Elsinore in the 20th century to the 19th century. Kirby's study focused on the climatic changes in the Holocene and the impact on Hydrology in Lake Elsinore.

>>> Hope Smythe 07/18/05 01:20PM >>>
you will need to discuss and coordinate with Cindy. She is much more familiar with the study than I am.

Cindy, I'll forward St Bd's questions to you.

>>> Pavlova Vitale 07/18/05 01:11PM >>>
Hope, can you help me with this?

CC: Lacaro, Fred

Staff Report to Support the Removal of Sediment As a Cause of Impairment of Lake Elsinore

Cindy Li
Santa Ana Regional Water Quality Control Board

Introduction

In 1998, Santa Ana Regional Water Quality Control Board (Regional Board) placed Lake Elsinore on the Clean Water Act Section 303 (d) list because the beneficial uses of Lake Elsinore were deemed impaired due to excessive amount of several pollutants, e.g., unknown toxicity, nutrients, siltation, and organic enrichment/low DO. The Regional Board staff has initiated effort to develop the Total Maximum Daily Load (TMDL) for each pollutant pursuant to the Clean Water Act section 303 (d). After reviewing the existing water quality data, the Regional Board staff believe that sediment has not caused the impairment of beneficial uses of Lake Elsinore. The following report will analyze the existing data and reason why Lake Elsinore should be de-listed for sediment and Canyon Lake should be listed for siltation impairment instead.

1998 California 303 (d) List

The 1998 California 303 (d) list identified the following pollutants as causes of impairment of beneficial uses of Lake Elsinore: nutrients, org.enrichment/low D.O., sedimentation/siltation, and unknown toxicity. The list also identified the source for siltation in Lake Elsinore is "urban runoff/storm sewers". No other data were cited to support the listing.

Impact of Excessive Sediment on Beneficial Uses

Excessive sediment in lakes can impair beneficial uses of a lake in many ways. Sediment could cause high turbidity, which in turn could reduce the depth of photic zone. High turbidity also causes hazard for swimmers in the lake due to low visibility. Sediment on lake bottom can choke spawning gravels, impair fish food sources, fill in rearing pool (reducing cover from prey), and cause direct physical harm such as clogged gills (USEPA, 1999).

Lake Elsinore Water Quality Data Related to Sediment

The water clarity of Lake Elsinore is low, as evidenced by low readings of Secchi depths and high turbidity measurement (Table 1). However, the causes for the high turbidity are complex. Sediment re-suspension caused by wind actions that are common in Lake Elsinore in the afternoon, bio-turbation by abundant bottom dwelling carps and shad, and the high production of phytoplankton, as well as sediment washed to lake during the storms could all contribute to the high turbidity of Lake Elsinore. The fact that Canyon

Lake captures 90 percent of the San Jacinto River watershed ^{Not} suggests that during most years, the majority of the sediment in the watershed will not reach Lake Elsinore, except the sediment in the local watershed that directly connected to Lake Elsinore. A study contracted with Dr. Michael Anderson shows that of the sediment in Lake Elsinore, majority are clay and silt that are distributed in the center of the lake. The clay accounts about 50 percent or more of the sediment particles in the center of the lake (Anderson, 2000). The re-suspension of the clay particles is quite possible by wind actions and fish boring.

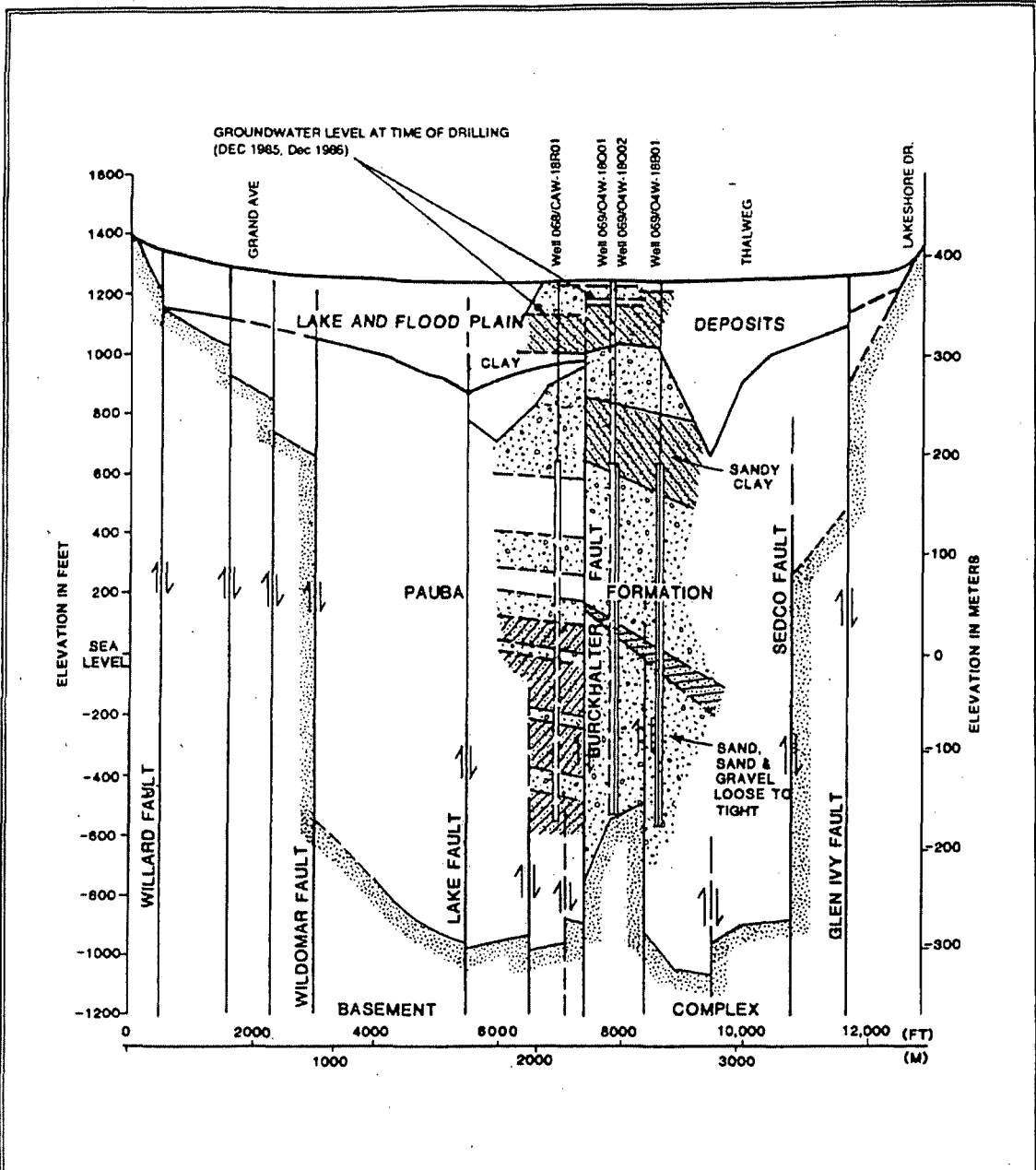
Table 1. Secchi Depth and Turbidity of Lake Elsinore (Monitoring data by Regional Board in 2000)

	Secchi Depth (inches)	Turbidity (nTU)
Mean	27.92	16.50
Standard Error	0.52	1.48
Median	30.00	12.50
Std Deviation	7.67	14.99
Sample Variance	58.89	224.76
Range	34.50	99.50
Minimum	10.50	2.50
Maximum	45.00	102.00
Count	215.00	103.00

Geologically, Lake Elsinore is situated in a graben that is bounded by several faults (Figure 1). Movements on these faults have produced a series of extensional basins, which in aggregate result in an elongate, composite, structural trough. The parallel series of faults within this zone include the Willard, Rome Hill, Wildmar, Lake, Burchklater, Sedco, Glen Ivy, and Freeway Faults. The land subsidence is substantial. Actually the lake bottom elevation has decreased from 1223 ft to 1219 ft in the last century¹. Apparently the sediment supply has not kept in pace with the subsidence. Another cause of subsidence might be the pumping of groundwater and lack of recharge mechanism of the aquifers.

¹ In July 2000, the maximum lake depth was measured to be 24 ft. The average lake elevation was at 1243 ft above sea level. So the lake bottom elevation was determined to be 1219 ft above sea level. The reported lake elevation by the USGS has been 1223 ft before the bathymetrical survey by the UC Riverside researcher.

The Regional Board staff believe that although the sediment production is high during the storms (evidenced by the sediment buildups in the storm drains and pipes), such storm erosion is a natural phenomenon for the arid southern California (not much vegetation cover, storms lasting for short period of time with large peak discharge). Sediment alone has not caused the impairment of beneficial uses of Lake Elsinore. Therefore, sediment should be de-listed for Lake Elsinore. Efforts should be focused on controlling the eutrophication processes in Lake Elsinore.



Source: Engineering Science, July 1987

<p>Title</p> <p style="text-align: center;">Geological Cross-Section of Elsinore Valley</p>	<p style="text-align: right;">Figure 7</p>
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