



## San Diego County Water Authority

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July 7, 2017

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### OTHER REPRESENTATIVE

County of San Diego

**Felicia Marcus, Chair  
and Members of the Board  
State Water Resources Control Board  
P.O. Box 100  
Sacramento, CA 95812-0100**

**Subject: Comment Letter—303(d) List portion of the 2014 and 2016 California Integrated Report**

**Dear Chair Marcus and Members of the Board:**

The San Diego County Water Authority appreciates the opportunity to provide comments on the proposed statewide Clean Water Act section 303(d) list of water quality limited segments for the San Diego region. The Authority is a wholesale water agency with 24 retail member agencies in San Diego County. Together we serve a population of 3.3 million residents through a mix of local and imported water supplies. The Water Authority's comments are limited to a proposed change to a delisting recommendation submitted by the San Diego Water Board for the San Diego region. Although the Water Authority agrees with the San Diego Water Board's recommendation to delist, our justification for delisting is different from the San Diego Water Board's. We request that the State Water Board approve the San Diego Water Board's original recommendation to delist the San Vicente Reservoir for nitrogen based on a weight of evidence approach.

### **Situation-Specific Weight of Evidence Approach**

The State Water Board's *Water Quality Control Policy for Developing California's Clean Water Act Section 303(d) List* requires a waterbody to be evaluated for listing and delisting based on a Situation-Specific Weight of Evidence Listing/Delisting factor. This approach requires that all data and information be evaluated to determine whether to place waters on or remove waters from the 303(d) list. However, this approach was not followed in the original listing which was approved by the State Water Board in 2010, nor in subsequent listing cycles. Not all the data submitted by the City of San Diego was evaluated. Furthermore, additional information on the imported water dominance of the reservoir was not considered.

*A public agency providing a safe and reliable water supply to the San Diego region*

Key reasons to delist the San Vicente Reservoir for nitrogen, which are consistent with the weight of evidence approach, are summarized below and discussed in detail in this letter:

1. The original nitrogen listing was incorrectly based on a water quality objective for biostimulatory substances
2. Characteristics of the reservoir as dominated by imported water
3. Data on water clarity and chlorophyll a during 2005-2006 submitted by the City of San Diego should be evaluated
4. Changed conditions regarding the San Vicente Dam Raise project, which was completed in 2015

### **Objective is for Biostimulatory Substances**

The San Diego Basin Plan establishes a water quality objective for biostimulatory substances to ensure excessive algae growth that could adversely affect beneficial uses does not occur:

*Inland surface waters, bays and estuaries and coastal lagoon waters shall not contain biostimulatory substances in concentrations that promote aquatic growth to the extent that such growths cause nuisance or adversely affect beneficial uses.*

*Concentrations of nitrogen and phosphorus, by themselves or in combination with other nutrients, shall be maintained at levels below those which stimulate algae and emergent plant growth. Threshold total phosphorus (P) concentrations shall not exceed 0.05 mg/l in any stream at the point where it enters any standing body of water, nor 0.025 mg/l in any standing body of water. A desired goal in order to prevent plant nuisance in streams and other flowing waters appears to be 0.1 mg/l total P. These values are not to be exceeded more than 10% of the time unless studies of the specific water body in question clearly show that water quality objective changes are permissible and changes are approved by the Regional Board. Analogous threshold values have not been set for nitrogen compounds; however, natural ratios of nitrogen to phosphorus are to be determined by surveillance and monitoring and upheld. If data are lacking, a ratio of N:P = 10:1 on a weight to weight basis, shall be used.*

This objective clearly establishes a numerical phosphorus threshold of 0.025 mg/l within any standing body of water. It also states that “analogous threshold values have not been set for nitrogen compounds,” and that “natural ratios of nitrogen to phosphorus are to be determined by surveillance and monitoring and upheld.” The Basin Plan objective that directs that reservoir-specific N:P data be used to assess compliance with the biostimulatory substances objective. N:P ratios are a function of the quality of imported water that is delivered to the reservoir, which is dominated by imported water as discussed below. Total nitrogen concentrations in imported water supplies typically exceed 0.25 mg/l.<sup>1</sup>

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<sup>1</sup> See Limnology and Reservoir Detention Study of San Vicente Reservoir (Flow Science, 2013), available online at the following websites: <https://www.sandiego.gov/sites/default/files/legacy/purewater/pdf/projectreport/limnologyreport.pdf>.

The original listing was based on a comparison of reservoir water quality concentrations in 2005-2006 for nitrogen with an assumed threshold of 0.25 mg/l.<sup>2</sup> However, preventing adverse biostimulation can be achieved through a limited-nutrient approach in which reservoirs are managed to consistently achieve phosphorus-limited conditions (e.g. high N:P ratios). Data presented within the December 2009 Integrated Report demonstrates the dominance of phosphorus-limiting conditions during 2005-2006. Phosphorus was detected in six of the 37 San Vicente Reservoir samples during 2005-2006, but all of these detections occurred during the first 90 days of this two-year period. N:P ratios in San Vicente Reservoir were significantly in excess of 10:1 in an overwhelming majority of the samples collected during 2005-2006.<sup>3</sup> Provided that reservoir phosphorus concentrations can be effectively managed and controlled, total nitrogen concentrations in reservoirs can exceed 0.25 mg/l without causing adverse biostimulation.

### San Vicente Reservoir is Imported Water Dominated

The San Vicente reservoir was constructed to store imported water, which comprises the overwhelming majority of the stored water. Therefore, water quality in San Vicente is a function of the quality of imported water. Total nitrogen concentrations in imported water supplies typically exceed 0.25 mg/l.<sup>4</sup> Table 1 summarizes its capacity and watershed.

**Table 1**  
**Imported Water Dominance in San Vicente Reservoir**

Storage Capacity (acre-feet)	Watershed Area <sup>5</sup> (acres)	Average Local Runoff <sup>6</sup> (acre-feet/year)	Runoff as a Percent of Storage Volume
242,000 <sup>7</sup>	47,360	3,290	1%

### San Vicente Dam Raise Project was Completed in 2015

The project to raise the San Vicente Reservoir dam was completed in 2015, which increased the reservoir's capacity from 90,000 to 242,000 acre-feet. This new capacity is owned by the Water Authority and is used for storing water (imported water) for use in dry years or emergency supply. With this expansion, imported water comprises the majority of the volume stored in San Vicente Reservoir supply. Because nutrient loads from local runoff are diluted into a considerably larger volume of water, nutrient concentrations within San Vicente Reservoir are projected to decrease from historic values.<sup>8</sup> Virtually all nitrogen loads into the reservoir

2 See Appendix H of the *Clean Water Act Sections 305(b) and 303(d) Integrated Report for the San Diego Region*, San Diego Regional Water Quality Control Board, December 2009.

3 See water quality data files from the City of San Diego presented in Appendix H of the *Clean Water Act Sections 305(b) and 303(d) Integrated Report for the San Diego Region*, San Diego Regional Water Quality Control Board, December 2009.

4 See *Limnology and Reservoir Detention Study of San Vicente Reservoir* (Flow Science, 2013), available online at the following websites: <https://www.sandiego.gov/sites/default/files/legacy/purewater/pdf/projectreport/limnologyreport.pdf>.

5 Source: 2015 *City of San Diego Watershed Survey*. Available online at <https://www.sandiego.gov/water/quality/environment/sanitarysurvey>.

6 See U.S. Geological Survey Report 2004-5086, *Predicting Water Quality by Relating Secchi Disk and Chlorophyll a to Satellite Imagery for Michigan Inland Lakes* (2004), and Carlson R.E. (1977), A trophic state index for lakes. *Limnology and Oceanography*. Vol. 22, No. 2.

7 The original 90,000-acre-foot capacity of San Vicente Reservoir has been expanded to 242,000 acre-feet with the recent completion of the San Vicente dam raise project. With expansion of the reservoir, nutrient loads from local runoff will now be distributed over a significantly larger reservoir volume, resulting in a projected decrease in reservoir nutrient concentrations compared to historic values.

8 See *City of an Diego Water Purification Demonstration Project, Project Report* (July 2013), available at:

originate with imported water delivery and storage.

**Evaluation of Water Clarity and Chlorophyll a Data from the Original Submittal**

Reservoir data from 2005-2006 presented within the San Diego Water Board’s December 2009 Integrated Report and 2016 Integrated Report demonstrate compliance with the Basin Plan objective for biostimulation, but were not considered. Table 2 summarizes water transparency data presented, but not evaluated in the December 2009 Integrated Report and 2016 Draft Integrated Report.

The reservoir thermally stratifies during spring, summer, and fall months. As shown in Table 2, Secchi disk values in 2005-2006 show a high degree of water clarity during all conditions. Observed Secchi disk values in San Vicente were typically on the order of 14 feet. While 90<sup>th</sup> percentile Secchi disk values were on the order of 6-7 feet, these lower values typically occurred in January/February, and are indicative of storm and climatic conditions rather than algae production. In general, water clarity during 2005-2006 tended to be highest (e.g. clearest) during summer months, when algal growth tends to be higher. This data substantiates the lack of adverse biostimulation effects in these reservoirs and should be considered as part of the weight of evidence approach to delist for nitrogen.

**Table 2**  
**San Vicente Reservoir Water Clarity Data, 2005-2006**

Parameter	Secchi Disk Depth (feet)
Maximum Value	26.6
Average Value	14.0
Median Value	14.4
90 <sup>th</sup> Percentile Value	6.9

Data Source: Data for 2005-2006 from the City of San Diego, as reported within *Clean Water Act Sections 305(b) and 303(d) Integrated Report for the San Diego Region* (San Diego Regional Water Quality Control Board, December 2009).

Table 3 summarizes chlorophyll a values for San Vicente Reservoir that were presented but not evaluated within the listing support documents including back in 2009.

**Table 3**  
**San Vicente Reservoir Chlorophyll a Data, 2005-2006**

Reservoir Depth	Chlorophyll a Concentration (µg/l)	
	Median Value	90 <sup>th</sup> Percentile
1 meter (3.3 feet)	1.5	3.5
3 meters (9.9feet)	1.5	3.2
5 meters (16.7 feet)	1.6	3.4

Data Source: Data for 2005-2006 from the City of San Diego, as reported within *Clean Water Act Sections 305(b) and 303(d) Integrated Report for the San Diego Region* (San Diego Water Board, December 2009).

Chlorophyll a is an indicator of algal biomass and is commonly used to assess eutrophic conditions in lakes or reservoirs. A number of states have or are considering water quality standards for Chlorophyll a, and have incorporated chlorophyll a numeric targets into nutrient TMDLs, including in California. Based on an analysis of the frequency of severe algal bloom conditions, a summer mean target of 5 µg/L means that blooms will almost never occur, while with a target of 10 µg/L blooms will be rare.<sup>9</sup> The North Carolina State University Water Quality Group suggests that water supply reservoirs maintain mean chlorophyll a concentrations less than 15 µg/L, and the State of Oregon has a phytoplankton water quality standard for lakes that thermally stratify of 10 µg/L.<sup>8</sup> In California, the Indian Creek Reservoir nutrient TMDL assigns a Secchi depth of not less than 2 ft and a maximum summer chlorophyll a concentration of 10 µg/L to protect beneficial uses.<sup>8</sup> As shown in Table 2, chlorophyll a concentrations in the epilimnion in San Vicente Reservoir were typically below 2 µg/l, and 90<sup>th</sup> percentile values were on the order of 3 µg/l. This data further substantiates a lack of adverse biostimulation in the reservoir.

### Conclusion

The weight of evidence supports delisting the San Vicente Reservoir as impaired for nitrogen. Had the extensive data set submitted by the City of San Diego been evaluated, it would have demonstrated a lack of adverse biostimulation effects, and no indication of adverse impacts to beneficial uses. Additional weight of evidence that supports delisting include the reservoir's characteristics as dominated by imported water, and the dam raise project completed in 2015.

The City of San Diego has committed to implementing a large-scale potable reuse reservoir augmentation program called Pure Water San Diego, which could involve directing purified water to San Vicente Reservoir as part of a later phase. Delisting for nitrogen could remove a potential future regulatory obstacle to permitting potable reuse. If the San Diego Water Board required that total nitrogen concentrations be maintained at or below 0.25 mg/l in imported water reservoirs, implementation of reservoir augmentation could be rendered infeasible, as compliance with such a 0.25 mg/l nitrogen standard cannot be achieved even with the highest level of treatment proposed with draft regulations being considered by the Division of Drinking Water.<sup>10</sup> As stated earlier, compliance could also not be achieved using imported water since

9 See Tetra Tech Report Prepared for U.S. EPA Region IX and California State Water Resources Control Board, Planning and Standards Implementation Unit, *Technical Approach to Develop Nutrient Numeric Endpoints for California* (2006)  
10 See Advanced Water Purification Facility Study Report (City of San Diego, January 2013) available at the following websites:  
<https://www.sandiego.gov/sites/default/files/legacy/purewater/pdf/projectreport/awpfstudyreport.pdf>.

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total nitrogen concentrations in imported water supplies also typically exceed 0.25 mg/l.<sup>11</sup> Concentrations of phosphorus are projected to be lower in the purified water supply than the imported water supply, and along with total dissolved solids and other dissolved minerals concentrations that are lower than the existing imported supply, offers the potential for improving reservoir biostimulation control while enhancing both the quality and quantity of sustainable local water supplies.

Thank you for considering this request to delist San Vicente Reservoir as impaired for nitrogen. Please contact Lesley Dobalian at (858) 522-6747 with any questions.

Sincerely,

A handwritten signature in blue ink that reads "Toby J. Roy". The signature is written in a cursive style with a large initial 'T' and 'R'.

Toby Roy for  
Robert R. Yamada  
Director of Water Resources

Submitted electronically via: [commentletters@waterboards.ca.gov](mailto:commentletters@waterboards.ca.gov)

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11 See Limnology and Reservoir Detention Study of San Vicente Reservoir (Flow Science, 2013), available online at the following websites:  
<https://www.sandiego.gov/sites/default/files/legacy/purewater/pdf/projectreport/limnologyreport.pdf>.