Central Valley Regional Water Quality Control Board

18 December 2024

To Interested Parties:

The State Water Resource Control Board (State Water Board) is developing a statewide plan for biostimulatory substances and cyanotoxins under the Biostimulation, Cyanotoxins, and Biological Condition Provisions (Provisions). The Provisions would be amended to the Inland Surface Water, Enclosed Bays, and Estuaries Plan. Biostimulatory substances are excess nutrients, primarily nitrogen and phosphorus, that cause harmful aquatic plant and algal growth. Biological condition refers to small invertebrates and algal diversity and abundance to measure water body health.

In an effort to provide additional information, the Central Valley Regional Water Quality Control Board (Central Valley Water Board) contracted with the Southern California Coastal Water Research Project (SCCWRP) to complete additional analysis focused in the Central Valley. The purpose of the new analyses was to develop an understanding of the potential limits to biological integrity in modified channels and biointegrity tools in urban and agricultural regions of the Central Valley, where channel modification has been extensive.

The Central Valley Water Board is releasing the report from the SCCWRP contracted work, titled “A Technical Foundation for Biointegrity and Eutrophication Indicators and Thresholds for Modified Channels, Intermittent Streams, and Streams on the Central Valley Floor”. The report focuses on indicators and thresholds for modified channels and the Central Valley floor and adds to the analyses completed to support the development of the Provisions. In this context, the term “modified stream” encompasses constructed channels and waterways whose shape and/or hydrology have been engineered or significantly altered by human activities.

The perspectives in the report are not necessarily the perspectives of the Central Valley Water Board or the State Water Board and only reflect those of the report authors.

More information on the State Water Board’s Provision development can be found here:

https://www.waterboards.ca.gov/water_issues/programs/biostimulatory_substances_biointegrity/index.html

For descriptions of continued efforts by Central Valley Water Board staff to support development of the Provisions, please see the Executive Officer's Reports located here:

https://www.waterboards.ca.gov/centralvalley/board_info/exec_officer_reports/index.html

Summary of the topics covered in the SCCWRP Report

SCCWRP's report covered these topic areas:

- Testing the goodness of fit of biointegrity indices (algae and benthic invertebrates) and biostimulatory relationships for streams in the Central Valley floor and the Modoc Plateau
- Process for categorizing modified channels based on features observable in the field, including soft or hard bottom and soft or armored sides
- Options for nitrogen and phosphorus thresholds for intermittent and modified streams. Threshold options include nitrogen and phosphorus concentrations that correspond to:
    - California Stream Condition Index (CSCI) and/or Algal Stream Condition Index (ASCI) scores in reference streams
    - "Best available" CSCI and/or ASCI scores in the current dataset from streams of the same type or ecoregion
    - "Best achievable" CSCI and/or ASCI scores for modified channels and intermittent streams (advised by example streams before and after nutrient management)
    - Thresholds based on statistical response models of bioassessment indices to increasing eutrophication stress.

SCCWRP created a dashboard for exploring various thresholds for stream sites of interest and comparing them to existing bioassessment data. The dashboard can be accessed here:

https://sccwrp.shinyapps.io/ModifiedChannelThresholds.

SCCWRP has conducted the science to support the Provision development for years and has developed a portal that contains key scientific products funded by the Water Boards and other SCCWRP partners. The portal can be accessed here:

https://www.sccwrp.org/about/research-areas/biointegrity-and-biostimulatory-science-portal/

For this project, “indicator” refers to a type of measurement or index of water quality, such as dissolved oxygen concentration and bioassessment indices. “Threshold” refers to a numeric value of a measurement or index that describes a level of protection or impairment. Biological integrity, also called biointegrity, describes the extent to which a water body supports a healthy ecosystem that is functionally similar to natural habitats in the region. Biostimulatory substances are nutrients, primarily nitrogen and phosphorous compounds, that promote excess organic matter accumulation and other adverse effects of eutrophication; biostimulatory conditions are those which can enhance the accumulation through environmental factors such as flow modification. Channel and flow modifications, as well as biostimulatory substances, can degrade stream biointegrity.

Central Valley Water Board staff perspective and recommendations

To describe eutrophic conditions, SCCWRP’s report relies on relationships between a single stressor and single response. Examples of these are total nitrogen versus chlorophyll or total phosphorus versus ASCI score. These relationships were used to identify nitrogen and phosphorus concentrations (thresholds) associated with levels of risk that the waterway will have poor eutrophic condition. The report’s methodology is consistent with the approaches to characterize eutrophic condition and identify numeric nutrient thresholds previously developed by SCCWRP for the State Water Board for perennial streams. Single stressor-response models are also used to develop USEPA’s recommended numeric nutrient criteria issued in 2021 for lakes and reservoirs.

It is important to note that excess nitrogen and phosphorus are not the only stressors that potentially affect stream ecology and CSCI and ASCI scores in the Central Valley. Channels in the Central Valley are also affected by pesticides, channel management, and lack of riparian corridors. These factors were not considered in the analysis, nor in the thresholds provided in the report. Additionally, the modified channels section focused on nitrogen and phosphorus as the primary factors controlling eutrophication and stream biointegrity to similar extents at all locations. Other factors that may affect biointegrity include lack of riparian corridor or cover, vegetation management on banks and in-channel and controlled hydrology.

The report also identifies environmental characteristics of Central Valley floor streams that are different from most sites in Statewide bioassessment datasets (Part 1 introduction section). Central Valley Water Board staff recommend using this report in combination with additional information about the multiple factors present in the Central Valley that can affect CSCI and ASCI scores in modified channels and the potential for improving eutrophic conditions. Central Valley Water Board staff also recommend gathering additional information from published literature and, if available, comparisons of conditions after changes in nutrient or other factors.

The report provides a system for classifying modified channels that relies on features observable in the field. Central Valley Water Board staff recommend additional

information be gathered to identify and categorize modified channels in the Central Valley based on channel use and history.

If you have any questions or concerns, please contact Meredith Howard, Environmental Program Manager of the Planning Section, at Meredith.howard@waterboards.ca.gov.

Sincerely,

Adam Laputz

Digitally signed by Adam Laputz
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Water Boards

Patrick Pulupa

Executive Officer