**Biostimulatory-Biointegrity Policy Science Advisory Panel**

**Meeting #2 December 12-13, 2018**

**Science Charge Questions**

**Context:** The State Water Resources Control Board (State Water Board) is proposing to adopt a statewide water quality objective for Biostimulatory Substances (including nutrients) and a program to implement it as an amendment to the Water Quality Control Plan for Inland Surface Water, Enclosed Bays and Estuaries of California (ISWEBE Plan). As a part of this project, the State Water Board intends to establish a plan to protect and restore biological integrity. Collectively, these components are herein referred to as the Biostimulatory-Biointegrity Policy (Policy).

A Science Advisory Panel (SAP) was formed to provide ongoing advice and peer review of the scientific products developed by the Southern California Coastal Water Research Project (SCCWRP) Technical Team. A Science Plan[[1]](#footnote-1) was developed that articulates the conceptual approach and technical activities to support the Policy. The SAP met in June 2017 to review and provide input on the Science Plan. Subsequently, the SAP met via webinar twice to provide guidance on the development of the Algal Stream Condition Index (ASCI). In September 2018, the technical team completed the products, sponsored three webinars to provide an overview of findings, and distributed the products to the Stakeholder Advisory Group (SAG) and Regulatory Advisory Group (RG) members for their review and feedback. Six biointegrity and biostimulatory technical products that have been recently completed and have been provided to the SAP for review.

**December 12-13 Science Panel Meeting:** The purpose of the December meeting is to solicit feedback from the SAP on the draft technical products. During the meeting, a summary of the charge questions will be presented by Water Board staff and an overview of the technical products will be presented by SCCWRP staff. The SAP will also be provided with copies of written submissions of stakeholder issues and concerns and will hear a summary of those concerns at the meeting. Following the meeting, the SAP will undertake a more detailed written review of the products. Upon completion of the review, the SAP will return for the third meeting to report out on the charge questions and respond to stakeholder concerns about those products. This third meeting will be held in late February or early March 2019.

**Science Panel Charge Questions and Review Instructions:**

The SAP charge questions for each of the technical products are listed below. SAP members are instructed to limit their responses to the scientific and technical merit of the technical products under review. The questions are designed to solicit technical feedback and should not be construed as requests for input on policy decisions.

1. **A Non-predictive Algal Index for Complex Environments (Also known as ‘Algal Stream Condition Index’ or ASCI), Theroux et al. in prep**
* Comment on the adequacy of the provisional ASCI to serve as a statewide bioassessment index applicable to most wadeable streams across California, specifically with respect to data, statistical approaches, evaluation of performance, and soundness of findings.
* Between the Diatom, Hybrid, and Soft Bodied Algae ASCIs, which one do the SAP members think works best for determining water quality impacts to biointegrity? What about impacts due to biostimulatory substances and/or conditions? Why?
* Do the measures of performance (i.e., the accuracy, precision, responsiveness, and sensitivity) of the ASCIs indicate that they are adequate for use in most wadeable streams in California?
* Are there specific stream-types where performance measures indicate that the indices should not be used to assess condition (or require special consideration)?
* Are there additional performance evaluations or refinements to the index that are essential and that can be done with available data?
* Are there any caveats or cautions that should be exercised when using the ASCIs to assess biological condition?
* Are there technical ways to address stakeholder concerns?
1. **Development of Benthic Macroinvertebrate and Algal Biological Condition Gradient Models for California Wadeable Streams, Paul et al. in prep**
* Comment on the adequacy of the statewide bioassessment data set and the analytical approaches to evaluate the range of natural variability and its interpretation in CSCI and ASCI.
* Comment on the adequacy of data set, the analytical approaches and findings of the development of a BCG model.
* Are there technical ways to address stakeholder concerns?
1. **Prioritizing Management Goals for Stream Biological Integrity Within the Developed Landscape Context, Beck et al., in review**
* Comment on the adequacy of the data set, the analytical approaches to predict ranges of biointegrity scores associated with landscape development,
* Comment on the evaluation of performance and findings of the Channels in Developed Landscape Tool, including applicability of the Tool to the range of constructed or hydro-modified channels.
* Are there technical ways to address stakeholder concerns?
1. **Approach to Assessment, Prevention and Management of Biostimulatory Impacts to California Estuaries, Enclosed Bays, and Inland Waterbodies, Sutula SCCWRP Technical Report [TR] 871**.
* Comment on the adequacy of conceptual models and indicators/measures reviewed in **Sutula TR 871** to provide a conceptual, scientific foundation for understanding pathways of impact of eutrophication and linkage to biostimulatory substances and conditions, across all waterbody types in California.
* Are there technical ways to address stakeholder concerns?
1. **Scientific Bases for Assessment, Prevention, and Management of Biostimulatory Impacts in California Wadeable Streams, Sutula et al, SCCWRP TR 1048**.
* Comment on the degree to which the conceptual models and indicators/measures reviewed in **Sutula et al. TR 1048** provide a strong conceptual foundation for understanding pathways of impact of eutrophication and linkage to biostimulatory substances and conditions in wadeable streams, in particular:
	1. Do the conceptual models of impacts to human and aquatic life related uses capture all major pathways of impact?
	2. Should any additional pathways be considered?
* Comment on the completeness of the review of indicators, in particular:
	1. should all measure of indicators and nutrients occur during the index period for bioassessment?
	2. When considering the multiple indicators included in the eutrophication synthesis, which indicators do the SAP member feel are most critical for biostimulatory impact assessments?
	3. How should the multiple indicators be evaluated in combination with each other to assess biostimulatory impacts? Should some indicators hold more weight in the assessment than others, either consistently or for particular types of water bodies or conditions?
	4. Are there any technical reasons why any of the indicators included in the eutrophication synthesis should be excluded from an assessment? How frequently should indicators and nutrients be measured to best characterize conditions?
	5. Are there additional eutrophication indicators that should be reviewed?
	6. Are the conclusions of the eutrophication indicator review appropriate, given the stated evaluation criteria? Should any conclusions be reconsidered?
* Comment on the synthesis of thresholds, in particular:
1. Are the conclusions of the review of thresholds appropriate?
2. The literature review produced less information on organic matter or nutrient thresholds that are linked to human protection endpoints than for aquatic life. Are there additional literature sources that could be used to improve this?
* Are there technical ways to address stakeholder concerns?
1. **Eutrophication Indicator Thresholds Protective of Biological Integrity in California Wadeable Streams, Mazor et al, in prep**.
* Comment on the adequacy of the data set, analytical approach, model performance evaluation, uncertainty, and soundness of the conclusions presented in Mazor et al. (in prep). Comment on the applicability of the findings to assessments conducted outside the bioassessment index period.
	+ There is an underlying assumption that the CSCI applies to all types of different channels; Is this assumption appropriate for constructed channels?
* To develop these models, the Tech Team made simplifying assumptions about the influence of natural factors, and about interactions among biostimulatory factors. Are these assumptions appropriate? Are some more important than others?
* Are there other measurements or lines of evidence that you recommend besides biointegrity protection endpoints, that could determine whether nutrients and/or other drivers of eutrophic condition are the stressors causing impacts?
* Comment on the potential impacts of setting eutrophication thresholds that correspond to 90% relative probabilities of meeting biointegrity goals, given the noise in some eutrophication metric-biointegrity index relationships.
	+ For example, is it possible to set eutrophication thresholds so low that for certain water bodies, meeting such thresholds would limit ecosystem function?
	+ Is it possible that non-nutrient biostimulatory factors, such as long water residence time and light availability, need to be addressed simultaneously with nutrient reductions, to achieve biointegrity goals?”
1. https://www.waterboards.ca.gov/water\_issues/programs/biostimulatory\_substances\_biointegrity/science\_panel/docs/2017/scienceplan.pdf [↑](#footnote-ref-1)