California Stormwater Quality Association (CASQA) Perspective & Comments - Biointegrity/Biostimulatory Science Panel

State Water Resources Control Board

December 12-13, 2018

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Context for Biostimulatory-Biointegrity Science Products and Review of Panel Charge Questions

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CASQA's Overarching Comments for Science Panel Consideration – Policy Options/Decisions

- Scientific Work Products should include tools that allow evaluation of a range of policy options
- Science work products should not include implied or explicit policy decisions
- Ranges and options should be provided in all documents rather than just single threshold values (i.e., multiple lines of evidence)
- Science work products should include a disclaimer on their use for regulatory decision making prior to adoption of the amendments to the ISWEBE

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CASQA's Overarching Comments for Science Panel Consideration – Water Code Requirements

- Scientific Work Products should include tools and analyses that support California Water Code requirements (especially for waterbodies that are likely or possibly constrained)
  - Achievability of proposed objectives
  - Reasonable protection of beneficial uses
  - Program of implementation to achieve proposed objectives

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CASQA's Overarching Comments for Science Panel Consideration – Hydrologic Conditions and Datasets

- Request input on the appropriate application of developed science and tools for different hydrologic conditions
  - Application during storm events (science is based on data collected during dry conditions)
  - Technical work does not adequately address non-perennial, intermittent, ephemeral streams
- Request input on the use of statewide datasets and analyses
  - Should regional analyses be considered?

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CASQA's Overarching Comments for Science Panel Consideration – Policy Development

- Policy development should include consideration of categorical approach for waters in developed landscapes
- Policy development should include allowances for a watershed specific approach
- Input requested on how the developed science could be used to support this approach or what additional science should be developed to include these elements in the policy
- Request Science Panel input on the characterization of assumptions in the work products and the appropriate use of the science in policy development

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Questions to Science Panel

1. Do the scientific analyses allow for a range of policy options?
2. Do the scientific analyses allow for the use of multiple lines of evidence instead of single thresholds?
3. Do the scientific analyses identify achievability for the proposed objectives or range of objectives?
4. Do the scientific analyses and tools account for different hydrologic conditions?
5. Should regional analyses be conducted?
6. Does the technical documentation fully support the development of an administrative record and staff report for the adoption of the biointegrity/biostimulatory policy/objectives?

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Algal Stream Condition Index

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Issue: Policy-Related Statements within Technical Document (Examples)

- "…sites that exceeded a single threshold were still frequently in good condition (i.e., they met biointegrity goals…" (Abstract)
- "Throughout, "thresholds" refer to numeric values derived….whereas "targets" refer to management or policy decisions" (Introduction)
- "We classified sites as attaining/not attaining a biointegrity goal"
- "…set eutrophication thresholds at concentrations corresponding to 90% relative probabilities, reflecting policy makers' tolerance for risk of failing to meeting biointegrity goals" (Methods)

Questions to Science Panel

1. Does the scientific analyses allow for a range of policy options?
2. Does the scientific analyses identify achievability for the proposed objectives or range of objectives?

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Issue: Concern Regarding Algae Condition Indices and Thresholds

- Additional information and analyses may be needed to develop an algal index with the precision and accuracy for policy development
  - Statement "the paucity of trait attributes available for algae species contributes to the inability to develop predictive models for individual metrics, and that trait attribution for sensitive taxa should be a priority focus of future studies."
  - Unbalanced index that is primarily composed of metrics that respond to increasing perturbation; lacking metrics responding to loss of rare and sensitive taxa (due to lack of trait information)
- Concerned that algal thresholds derived from the MMI may be prematurely incorporated into State Water Board policies.

Question to Science Panel

1. Does the proposed non-predictive algae MMI have precision accuracy necessary for policy development?

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Issue: Many Reference Streams can not meet the Thresholds

- Thresholds set for TN, TP, chl-a, AFDM, and % cover are low, even for reference locations, and particularly for the biomass endpoints
- Biomass measures at a significant number of regional reference locations are above statewide biomass Ref10 thresholds (Mazor et al.)
- In the South Coast region, over 40 percent of reference sites would exceed the AFDM derived Ref10 threshold

Question to Science Panel

1. If many reference streams cannot meet thresholds, what is the expectation for other streams?

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Issue: Lack of Accuracy in Measuring Algal Biomass for Some of the Selected Indicators

- Both Mazor et al. and Sutula et al. state multiple times that AFDM is prone to false positives due to non-algal organic matter, and macroalgal % cover can underestimate total biomass
- AFDM is not a true measure of algal biomass
- Conflicting high AFDM associated with low Chl-A data sets have been noted in many SoCal programs. Including many reference sites
- Algae is an extremely "patchy" indicator, known to be imprecise with inherent error due to the nature of sampling methodology

Question to Science Panel

1. Given the known sampling error associated with sampling algae, should these two measures be reconsidered as primary endpoints for this policy?

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Issue: Stressors Other Than Nutrient Concentrations can Impact Biointegrity and Biostimulatory Results

- Poor relationships (low signal / high noise) between eutrophication indicators and biological endpoints; model approach did not adequately account for other factors contributing to variability in the underlying data.
- Correlation, but not causation.
- Data analyses not conducted at regional or watershed scale
  - Santa Clara County analyses of 7 year bioassessment data showed highly variable relationships (both negative and positive) between biological conditions and eutrophication indicators at the watershed scale

Question to Science Panel

1. What additional data analyses could be applied to better evaluate correlations between eutrophication indicators and biological endpoints at watershed and regional scales.

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Biological Condition Gradient Model

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Channels in Developed Landscapes

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Issue: Policy-Related Statements within Technical Document (Examples)

- "15% of streams statewide are unlikely to achieve biological integrity" (lines 36-38)
- "A CSCI threshold of 0.79…..has been used to identify stream degradation…was used to represent a potential management target" (lines 199-201)
- "Regulatory management…involves the protection of sites meeting biological objectives and the restoration of sites that do not" (lines 450-451)

Questions to Science Panel

1. Does the scientific analyses allow for a range of policy options?
2. Does the scientific analyses identify achievability for the proposed objectives or range of objectives?

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Issue: A Range of Approaches for Constrained Channels Should be Analyzed/Assessed

- Regulatory context for constrained channels not defined
- Landscape constraints could limit ability to improve biological conditions
- Previously identified options include:
  - Current, Proposed – One set of endpoints to assess all waterbodies
  - Watershed – May develop different set of endpoints based on watershed characteristics
  - Categorical – Ranges of values applied based on different categories of waterbodies
  - Phased (focus on highest priority waterbodies first) – one set of endpoints to assess all waterbodies

Question to Science Panel

1. What scientific analyses or tools could support this approach?

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Issue: Management Goals for Developed Landscape as Referenced in Technical Documents

- Due to a consistent methodology applied to all streams, the expectation for highly intermittent or ephemeral streams may be artificially inflated because of the inherent differences in those biological communities, and how they respond across the drying cycle
- Application distinctions to perennial, intermittent, and ephemeral streams are not discussed

Questions to Science Panel

1. Is a consistent modelling approach to all streams warranted?
2. Might expectations be different for these stream types, especially in less stressed streams?
3. Where along the drying continuum of non-perenniality would the approach no longer apply?

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Biostimulatory Science

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Issue: Policy-Related Statements within Technical Document (Examples)

- "Use of these thresholds or other thresholds should be informed by clear guidance on duration, frequency and seasonal considerations (wet versus dry weather, winter versus summer) and use of the indicators as multiple lines of evidence. The scientific basis for this guidance can be added as policy options become clarified." (Page iii)

Questions to Science Panel

1. Does the scientific analyses allow for a range of policy options?
2. Does the scientific analyses identify achievability for the proposed objectives or range of objectives?

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Issue: Variability in Reference Condition among Regions is lost by using Statewide Datasets to Develop Thresholds

- Use of statewide datasets to develop single CSCI and ASCI thresholds does not account for the variability in reference conditions among regions in California
- The underlying assumption of this model is that sites statewide all respond to stressors in a similar way, which may not be warranted
- CSCI - A significant % of some ecoregion reference pools would not meet the biological expectations of the statewide threshold
- Substantial difference in Ref10 thresholds between regional reference pools

Differences Between Northern and Southern California BMI Biological Cluster Reference Pool Groups

Groups	Predominant Region	Taxa Richness	Percent Intolerant Taxa	Percent of Regional Reference Sites Below Statewide Ref10 CSCI (0.79)	Range of Group Ref10 Percentile Scores
1–7	Northern CA	30–43	22–36	0–6	0.82–0.96
8–11	Southern CA	15–31	6–16	9–46	0.40–0.80

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Issue: Variability in Reference Condition among Regions vs. Statewide applications

- ASCI – Differences in site characteristics indicate that applying a single ASCI threshold derived from a statewide dataset may not accommodate the different biological characteristics or some ecoregions
- Rationale given for lack of substantial difference between statewide and regional thresholds is wanting
- Using percentiles of the regional reference pools would still maintain a consistent statewide approach (i.e., all regions Ref30, 10, etc.), but would apply a more appropriate and applicable standard of compliance

Question to Science Panel

1. Should regional index thresholds be further considered in lieu of a single statewide threshold?

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