

WATER BOARD STAFF WORKPLAN FOR DEVELOPMENT OF NUTRIENT OBJECTIVES

**Rik Rasmussen, State Water Resources
Control Board**

**Nutrient Objectives Stakeholder
Advisory Group Meeting**

July 7, 2014

9:30 am-12:30 pm Webinar



WELCOME TO THE NUTRIENT OBJECTIVES STAKEHOLDER ADVISORY GROUP MEETING

Goals:

- Water Board staff has a plan for nutrient objective development
 - We want to your feedback on that plan
- Stakeholders need to be organized in order to effectively provide feedback to us through out the process
 - At June 13, 2014 meeting, we started this process
 - This meeting is catching up those who couldn't attend to clue you into the process
- We will be putting together a Science Panel to provide ongoing technical review
 - We've already gotten stakeholder feedback on the process and desired attributes of the Panel at the June 13, 2014 meeting
 - Provide instructions for providing feedback on the candidates

AGENDA (9:30 AM – 12:30 PM)

- Introductions, meeting goals
- Discussion of State Water Board workplan for nutrient objective development
 - Overarching plan (Rik Rasmussen, State Water Board)
 - Overview of technical elements (Martha Sutula, SCCWRP)
- Stakeholder organization and governance (Brock Bernstein)
- Science Panel Process and Selection Criteria (Martha Sutula, SCCWRP)
- Next steps and timing (Rik Rasmussen, State Water Board)

NUTRIENT OBJECTIVES— WHY NOW?

- Adverse effects of nutrient pollution are evident across California's landscape as well as the nation
 - Well documented examples in streams, lakes, rivers and coastal waters
- Nutrient controls have largely not been implemented in California
 - Few of California NDPES permits have nitrogen limits
 - Ag Waiver programs have focused on monitoring, not on load reductions
- EPA has been pushing for Numeric Nutrient Criteria

NUTRIENT OBJECTIVES NEED A DIFFERENT APPROACH THAN THAT OF TOXIC CONTAMINANTS

- Nutrients are required to support life
 - How do we establish the correct nutrient balance?
- Direct effects (e.g. toxicity) are often less important than indirect effects
 - Indirect effects occur at much lower levels than toxic effects
- Ambient concentrations can give false positives or negatives
- Need a different approach



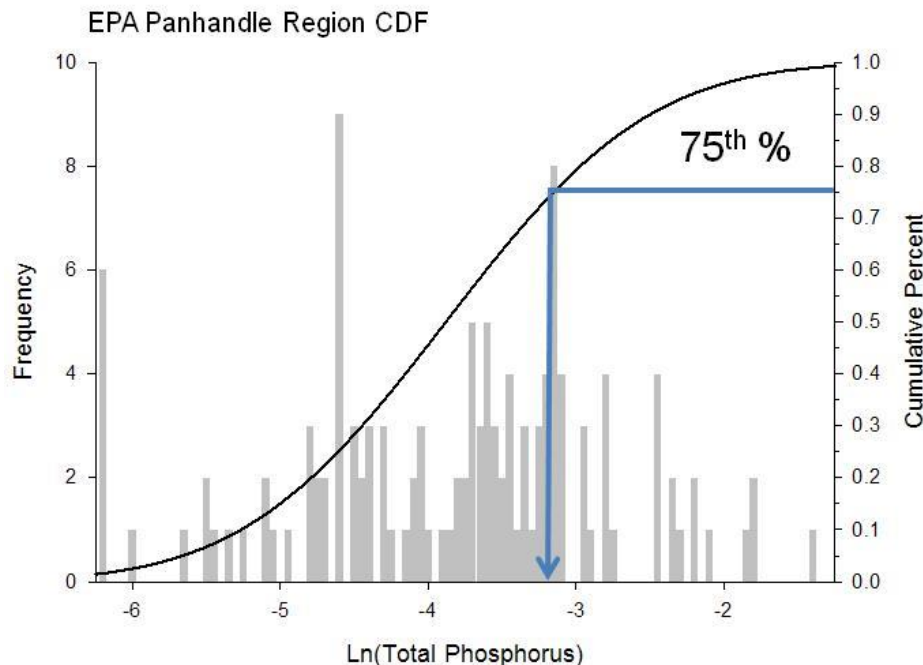
THREE BASIC APPROACHES TO NUTRIENT OBJECTIVES

EPA guidance on nutrient criteria development suggests three basic approaches (EPA 2001)

- Reference
- Empirical stress-response
- Causal modeling

REFERENCE APPROACH

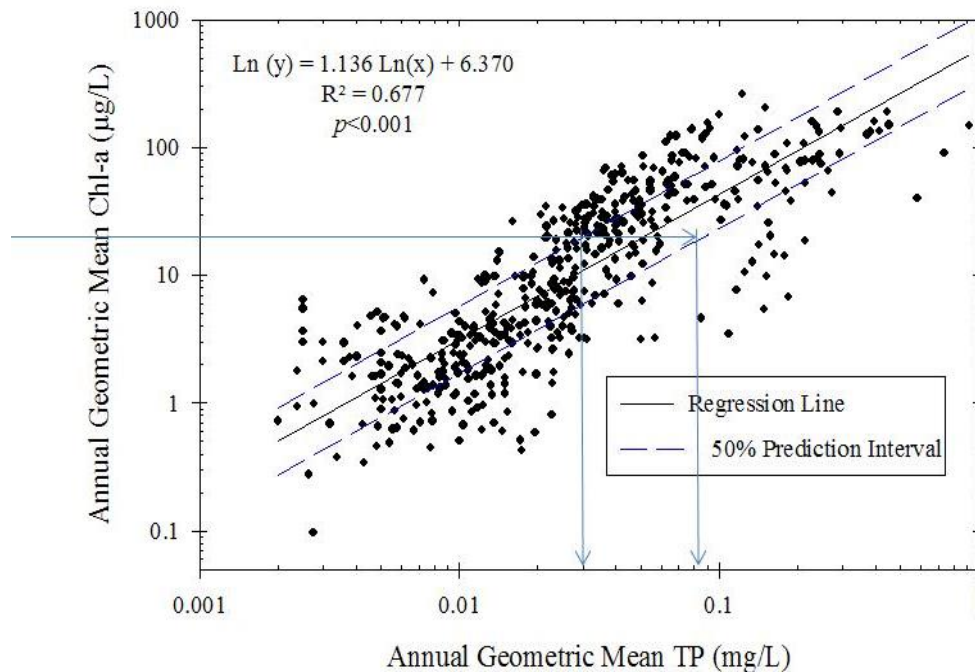
- Characterize distributions of nutrient in “minimally disturbed” waterbodies
- Choose nutrient concentrations at some statistical percentile of reference waterbodies



75th Percentile of Florida
Panhandle Reference
Streams

EMPIRICAL STRESS-RESPONSE APPROACH

- Identify biological response indicator of interest (e.g. algal biomass)
- Analyze statistical relationships between nutrient concentrations and response



Correlation Between
Chl a and TP in
Alkaline Lakes

SWRCB STAFF FAVOR CAUSE EFFECT APPROACH

- California's version of this is coined as "nutrient numeric endpoint (NNE) approach"
- Consists of two major components
 - Response indicators with numeric endpoints for waterbody assessment
 - Models to link response indicator numeric endpoints to nutrient targets (e.g. permits, TMDLs, etc.)

Algae & Aquatic Plants

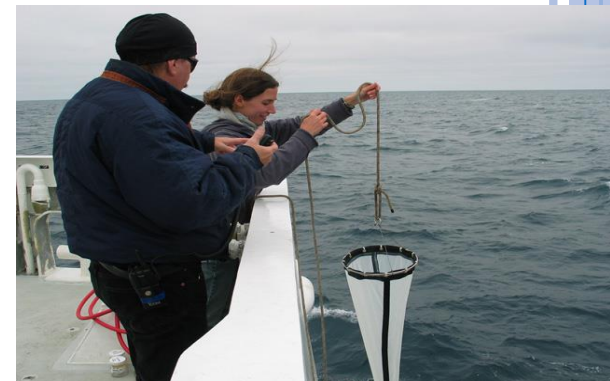


Dissolved Oxygen, pH



PREVIOUS WORK ON NUTRIENT OBJECTIVES

- Water Board work has focused on streams and lakes beginning in 2001
 - Significant technical foundation completed in 2006
 - Since then focused on TMDL as case studies and implementation guidance
 - Initiated CEQA scoping in Fall 2011
- Funding science to support estuarine nutrient WQOs since 2009
 - That science is still ongoing



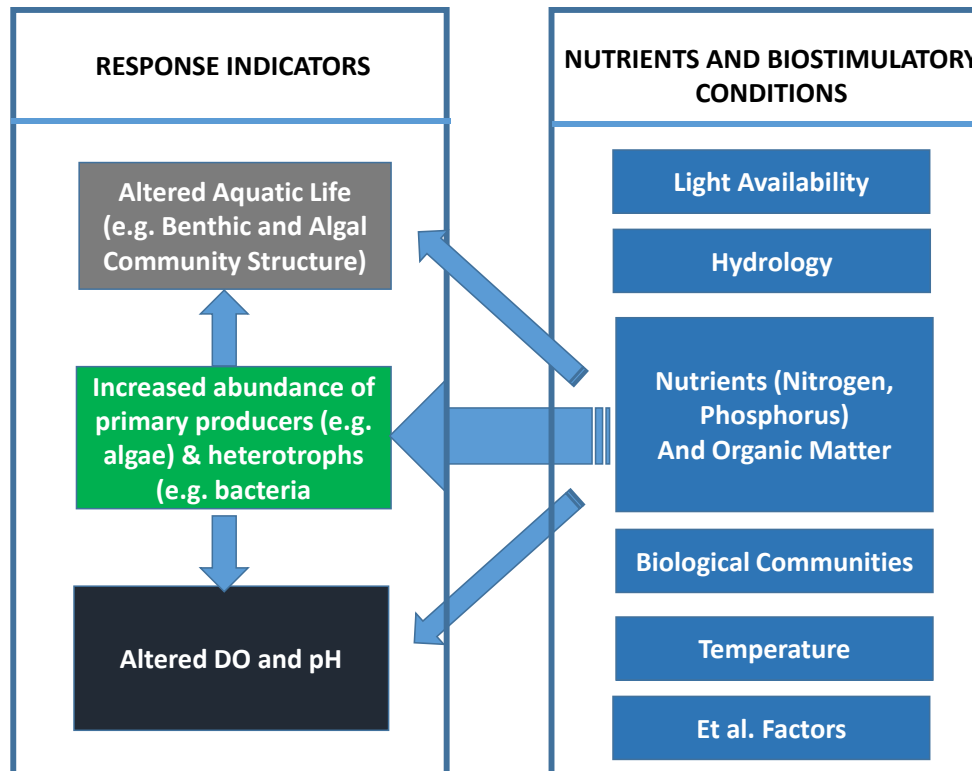
CEQA SCOPING IDENTIFIED ADDITIONAL WORK NEEDED

- New peer-reviewed science and additional data now available for wadeable streams and lakes
- Not a traditional regulatory approach
 - Need for stakeholder input and independent science review throughout the process

STAFF HAS DEVELOPED A WORKPLAN TO MOVE FORWARD ON NUTRIENT OBJECTIVES

Five Guiding Principals:

- The policy should address nutrient pollution and biostimulatory substances and/or conditions.



STAFF HAS DEVELOPED A WORKPLAN TO MOVE FORWARD ON NUTRIENT OBJECTIVES

Five Guiding Principals:

- The policy should address nutrient pollution and biostimulatory substances and/or conditions.
- The state should develop narrative nutrient objectives with numeric guidance.
- Numeric guidance should have a strong linkage to beneficial use.
- The state should have numeric guidance for all waterbody types.
- There should be statewide consistency with regional flexibility.

NUMERIC GUIDANCE WILL BE PHASED BY WATERBODY TYPE

Phase I (2016): **Establish narrative approach** applicable to all waterbodies and numeric guidance for **wadeable streams**

Phase II (2017): **Lakes**

Phase III: (2019): **Estuaries and non-wadeable rivers**

PHASE I: NARRATIVE OBJECTIVE AND NUMERIC GUIDANCE FOR WADEABLE STREAMS

Phase I Tasks

- 1 Conceptual Approach, Waterbody Definition and Classification
 - 2 Conduct and Synthesize Science to Support Nutrient Objectives in Wadeable Streams
 - 3 Implementation Plan Development
 - 4 Rulemaking
 - 5 Outreach
 - 6 Training, Standardization, and Information Management
-

TASK 1: CONCEPTUAL APPROACH, WATERBODY DEFINITION AND CLASSIFICATION

- Provides the problem statement for nutrient pollution and biostimulatory conditions
- Lays out the options considered for development of nutrient objectives
 - How each option was explored in California
 - Advantages and disadvantages of each
- Provides waterbody definitions and classification of habitat types relevant for interpretation of numeric guidance

Key Products: Technical report and presentations

TASK 2: CONDUCT & SYNTHESIZE SCIENCE TO SUPPORT NUTRIENT OBJECTIVES IN WADEABLE STREAMS

- Evaluate candidate ecological response indicators
- Conduct & synthesize science on thresholds at which indicators support or adversely affect beneficial uses
- Summarize the distribution of these indicators in reference and ambient sites across the State
- Develop models to support the linkage of response indicators to nutrient management
- Identify technical considerations for implementation of numeric guidance

Key Products: Technical reports and presentations

TASK 3: Implementation Plan Development

- Define how numeric guidance should be used in regulatory programs
 - Waterbody assessments and 303(d) listing
 - Total maximum daily loads
 - NPDES permitting and compliance
 - Non-point sources, etc.

Key Products: Implementation guidance that includes draft language relevant for each of the regulatory programs

TASK 4: Rulemaking

- Follow the legislatively defined public process of developing, adopting, and implementing objectives
- Include public dissemination, review, and response process such as:
 - Public workshops
 - Response to comments
 - Informational meeting presentations
 - State Water Board briefing
 - California Environmental Quality Assessment (CEQA) document or equivalent

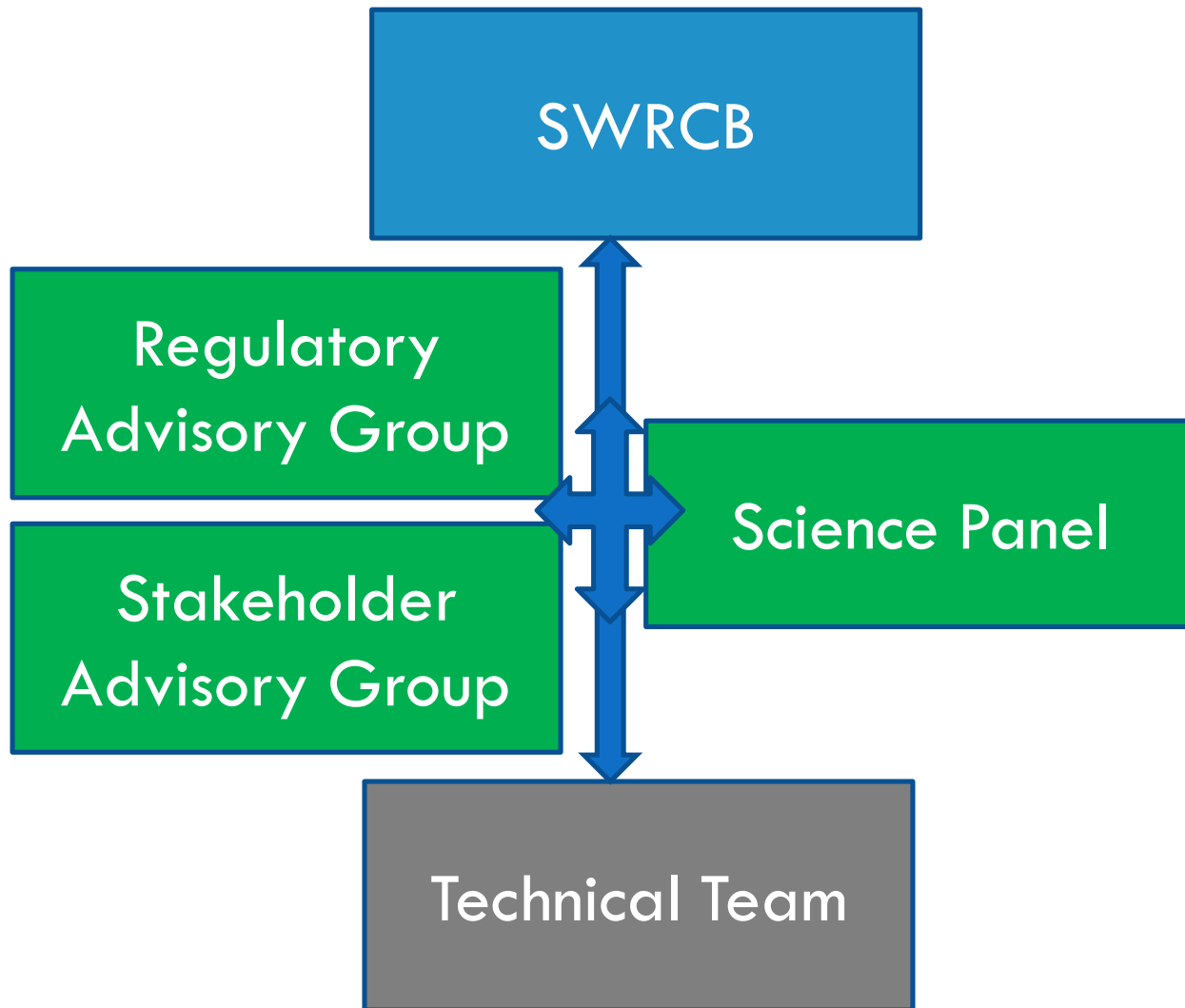
Key Products: Detailed staff report and proposed amendments to the State Water Board's Inland Surface Waters Plan

TASK 5: Outreach

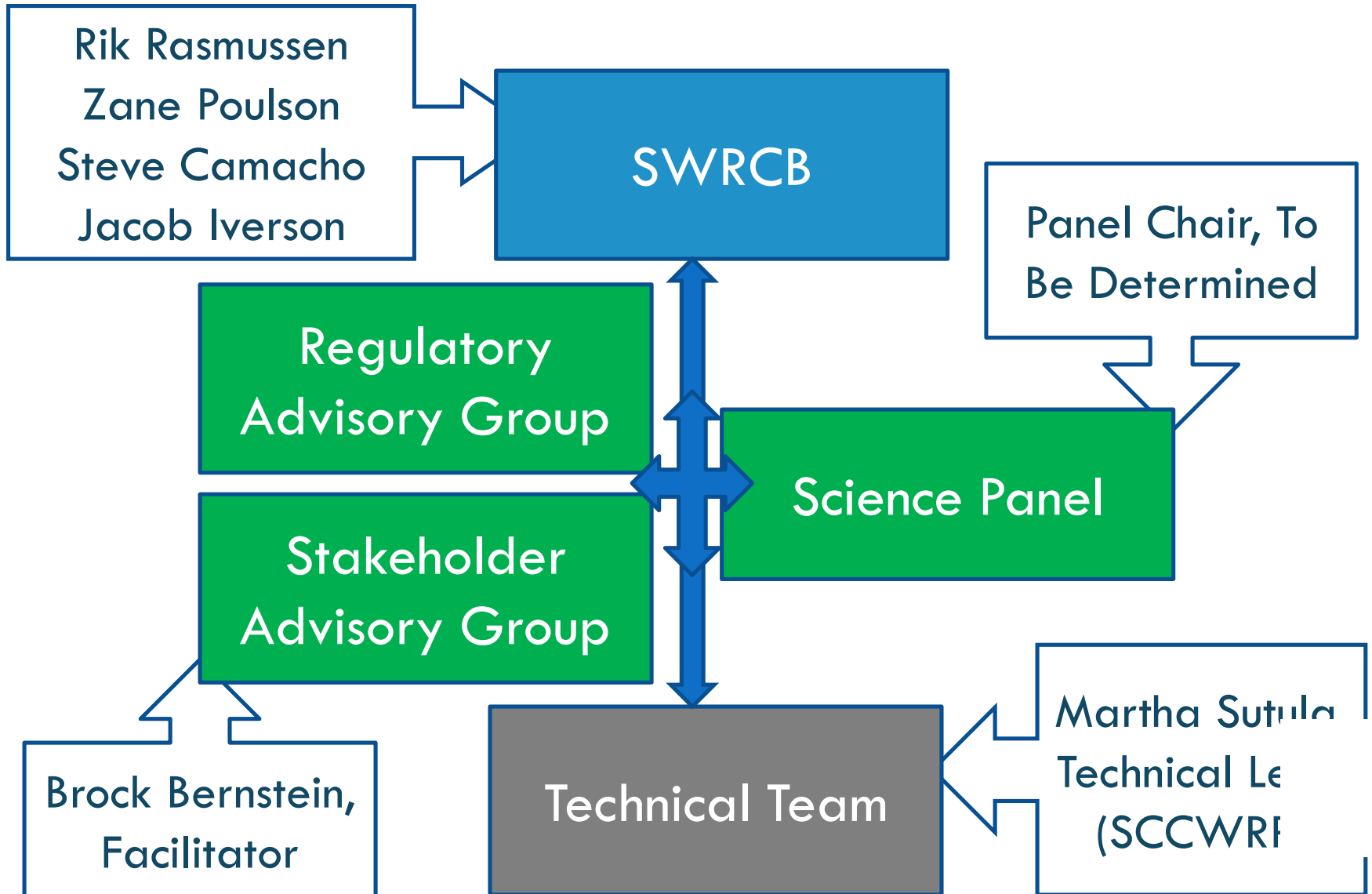
- Conducted in accordance with the State Water Boards Public Participation Plan
- The goal of this task is to actively reach out to stakeholders to ensure that their ideas and concerns are fully considered
- Covers three important areas
 - Transparency in development of policy
 - Opportunity to voice their opinions about the relative merits of the possible approach(es)
 - Technical aspects of the objectives should receive an independent and rigorous technical review

Key Products: 1) A Stakeholder Management Plan, 2) Facilitation of Advisory Groups and 3) Meeting materials and summaries

STATEWIDE NUTRIENT OBJECTIVES PROGRAM: ORGANIZATION



MEET THE TEAM



TASK 6: TRAINING, STANDARDIZATION, AND INFORMATION MANAGEMENT

- Need to standardize:
 - How to collect data with prescribed quality assurance
 - How to interpret data with linkage to implementation guidance
- What we need:
 - Standard Operating Procedures, and Quality Assurance Plans
 - SWAMP standardized data transfer formats
- We are benefiting from investment in stream bioassessment
 - A lot of this work has already been done
- We will assess what else is required for implementation

TIMING OF TASKS

Phase I Tasks	Year 1	Year 2	Year 3
1 Conceptual Approach	■		
2 Stream Science	■		
3 Implementation	■	■	
4 Rulemaking			■
5 Outreach	■	■	■
6 Standardization and IM			■

QUESTIONS? COMMENTS?

PLEASE SEND WRITTEN COMMENTS ON WATER BOARD WORK
PLAN BY
COB JULY 18, 2014
TO BROCK@BROCKBERNSTEIN.COM

AGENDA (10 AM – 3 PM)

- Introductions, meeting goals
- Discussion of State Water Board workplan for nutrient objective development
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OVERVIEW OF TECHNICAL ELEMENTS SUPPORTING WADEABLE STREAM NUMERIC GUIDANCE

Martha Sutula, Ph.D.

Principal Scientist, Biogeochemistry Department
Southern California Coastal Water Research Project
Authority (SCCWRP)

PHASE I: NARRATIVE OBJECTIVE AND NUMERIC GUIDANCE FOR WADEABLE STREAMS

Phase I Tasks

1 Conceptual Approach, Waterbody Definition and Classification

2 **THESE TASKS HAVE TECHNICAL ELEMENTS**
Conduct and Synthesize Science to Support Nutrient Objectives in Wadeable Streams

3 Implementation Plan Development

4 Rulemaking

5 Outreach

6 Training, Standardization, and Information Management

THIS PRESENTATION FOCUSES ON TASK 2

GOAL OF TODAY'S PRESENTATION

- Give you sufficient detail to allow you to comment on the State Water Board work plan
- Not enough detail to allow you to comment on the technical workplan
 - Meant to be an orientation
- Opportunity for focused feedback on the technical workplan will happen at the next stakeholder meeting
 - We will give you a written workplan in advance to review

WATER BOARD STAFF FAVOR CAUSE EFFECT APPROACH

- Coined as “nutrient numeric endpoint (NNE) approach”
- Consists of two major components
 - Response indicators with numeric endpoints for waterbody assessment
 - Models to link response indicator numeric endpoints to nutrient targets (e.g. permits, TMDLs, etc.)

Algae & Aquatic Plants

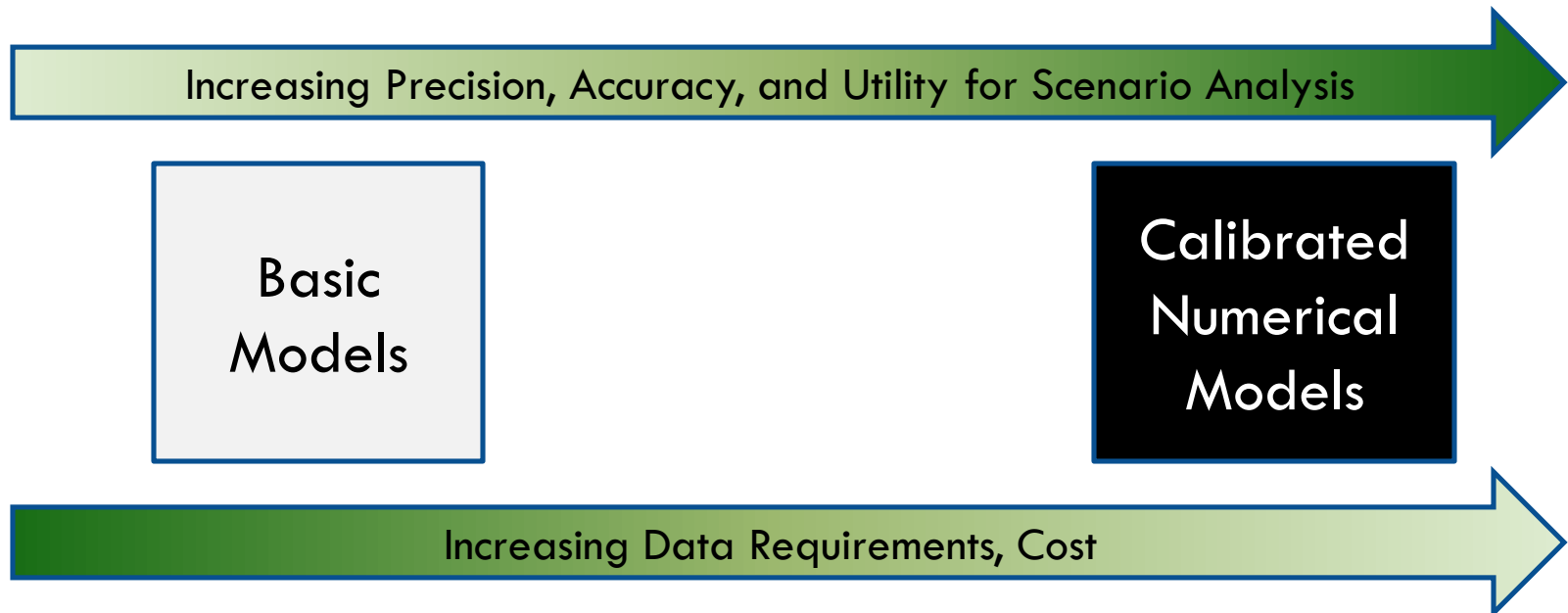


Dissolved Oxygen, pH



MODELS TO LINK TO NUTRIENT MANAGEMENT: TWO BOOK ENDS

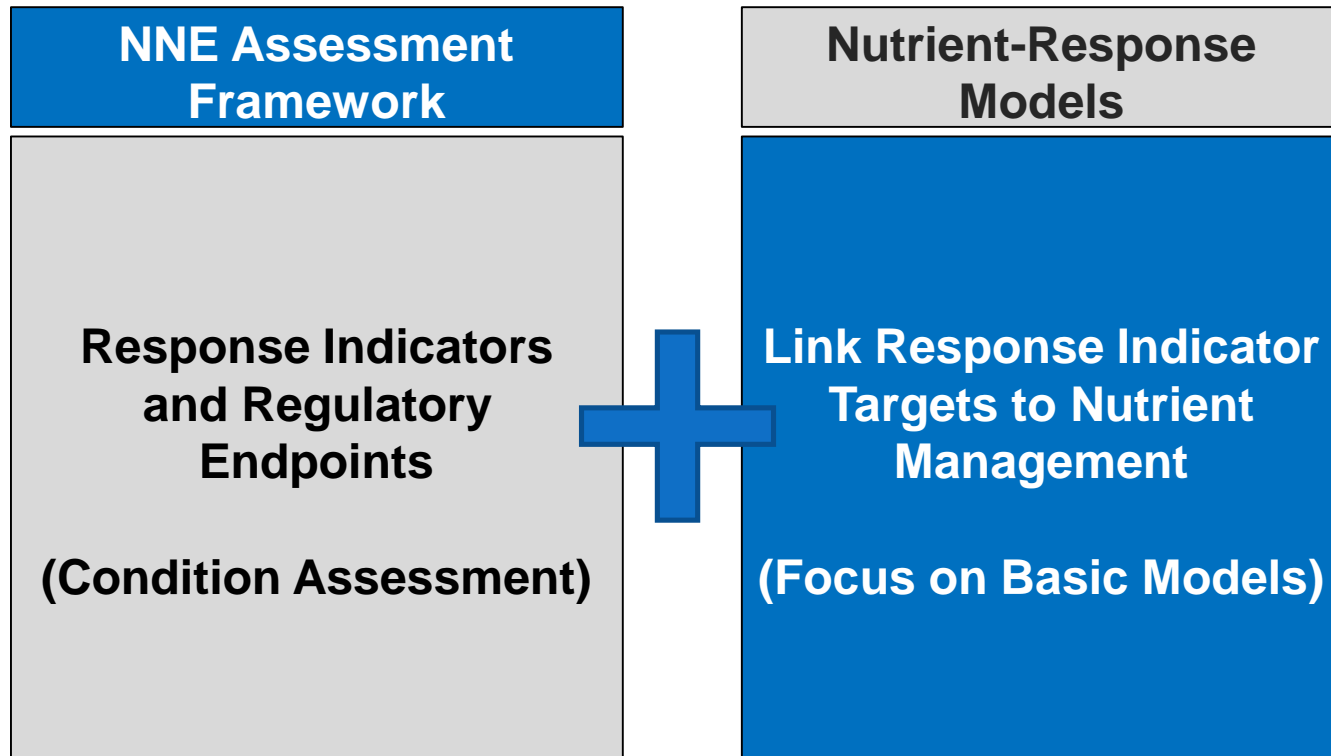
- Calibrated numerical models
 - Site-specific, high precision, requires considerable expertise and expensive data
- Basic models
 - Regional or statewide, lower precision, low cost and expertise



STATE OFFERING BASIC MODELS TO SET “DEFAULT” NUTRIENT TARGETS

- Translates response indicator numeric endpoints to site-specific nutrient targets
 - Accounts for site-specific factors that control response to nutrients (canopy cover, temperature, etc.)
- “Default” nutrient targets resulting from model are a starting point for conversations on permits and TMDLs
- Flexibility offered to stakeholders to develop more sophisticated models if required
- Models available for wadeable stream and lakes (Tetra Tech 2006)

CORE ELEMENTS OF NNE SCIENCE PLAN WILL FOCUS ON BASIC MODELS FIRST



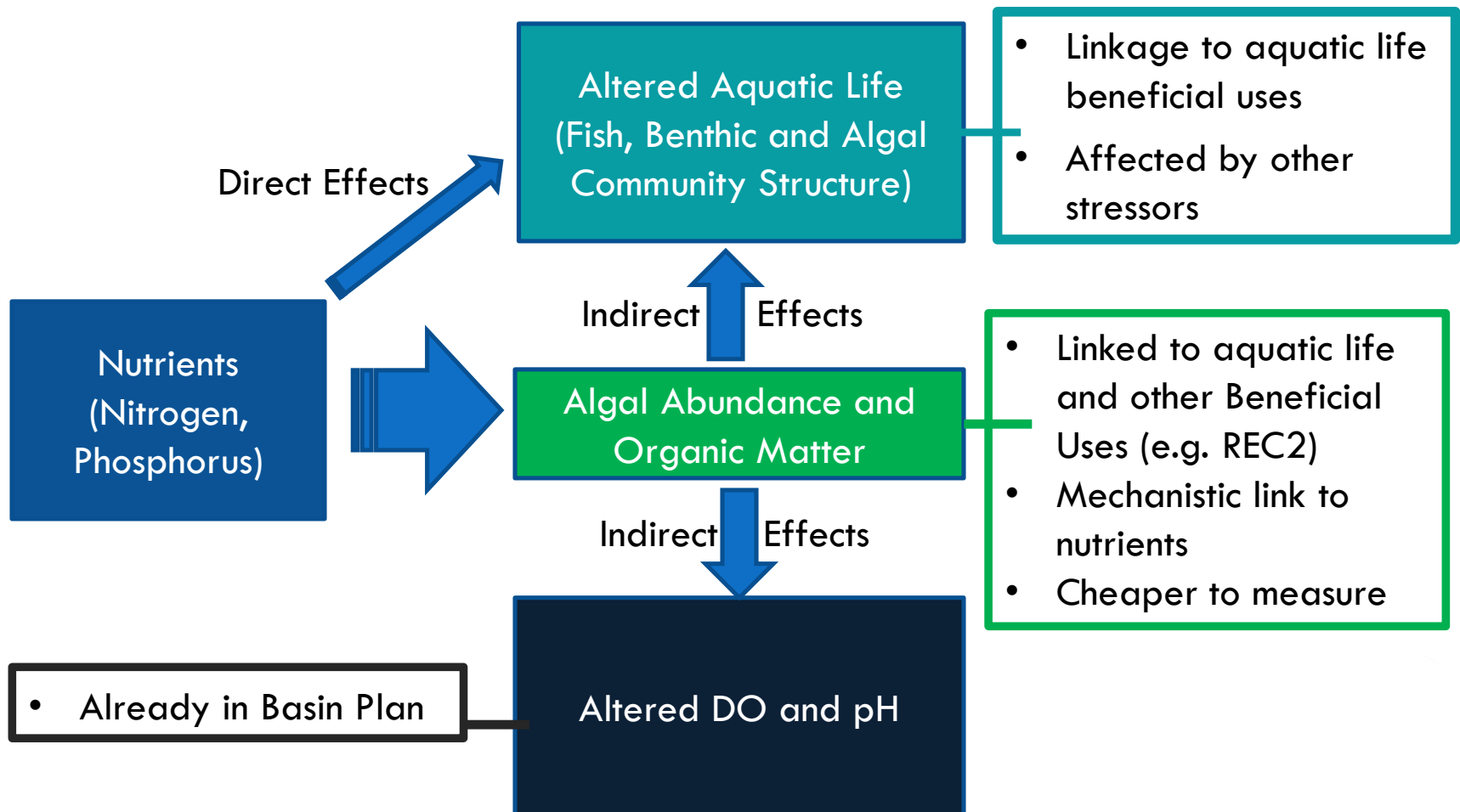
TECHNICAL WORKPLAN FOR WADEABLE STREAM NUMERIC GUIDANCE

Goals:

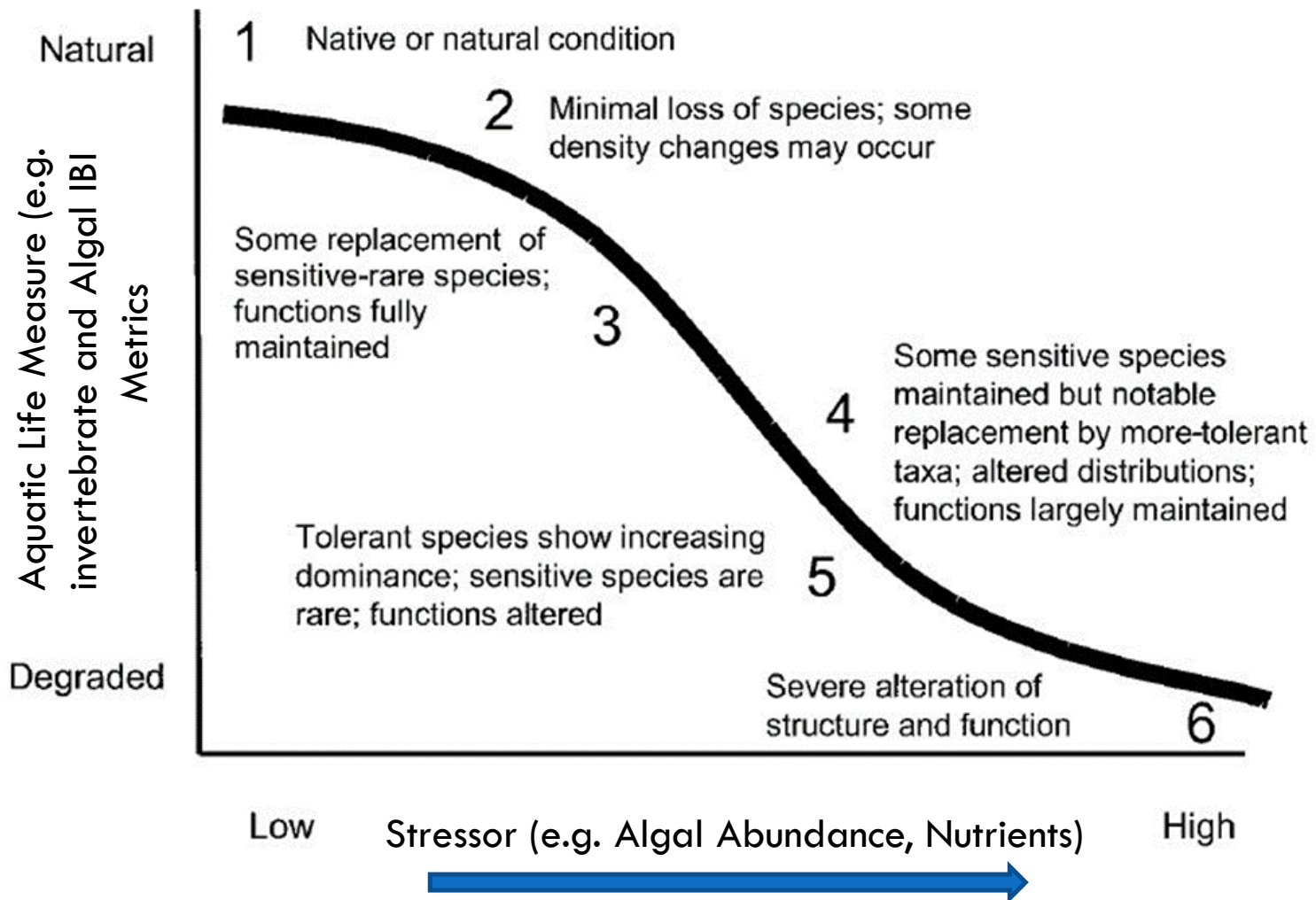
1. Identify **appropriate response indicators** representative of beneficial uses
2. Identify **thresholds of adverse effects of response indicators** on aquatic life to support decision on regulatory endpoints
 - **Relative to reference and ambient concentrations of those indicators** in wadeable streams
3. **Develop basic models** for wadeable streams
4. Identify key **technical elements** addressing **implementation**

WHAT ARE THE APPROPRIATE RESPONSE INDICATORS IN WADEABLE STREAMS?

Response Indicators



TEST STRENGTH OF STRESS-RESPONSE RELATIONSHIPS ALONG BIOLOGICAL CONDITION GRADIENT

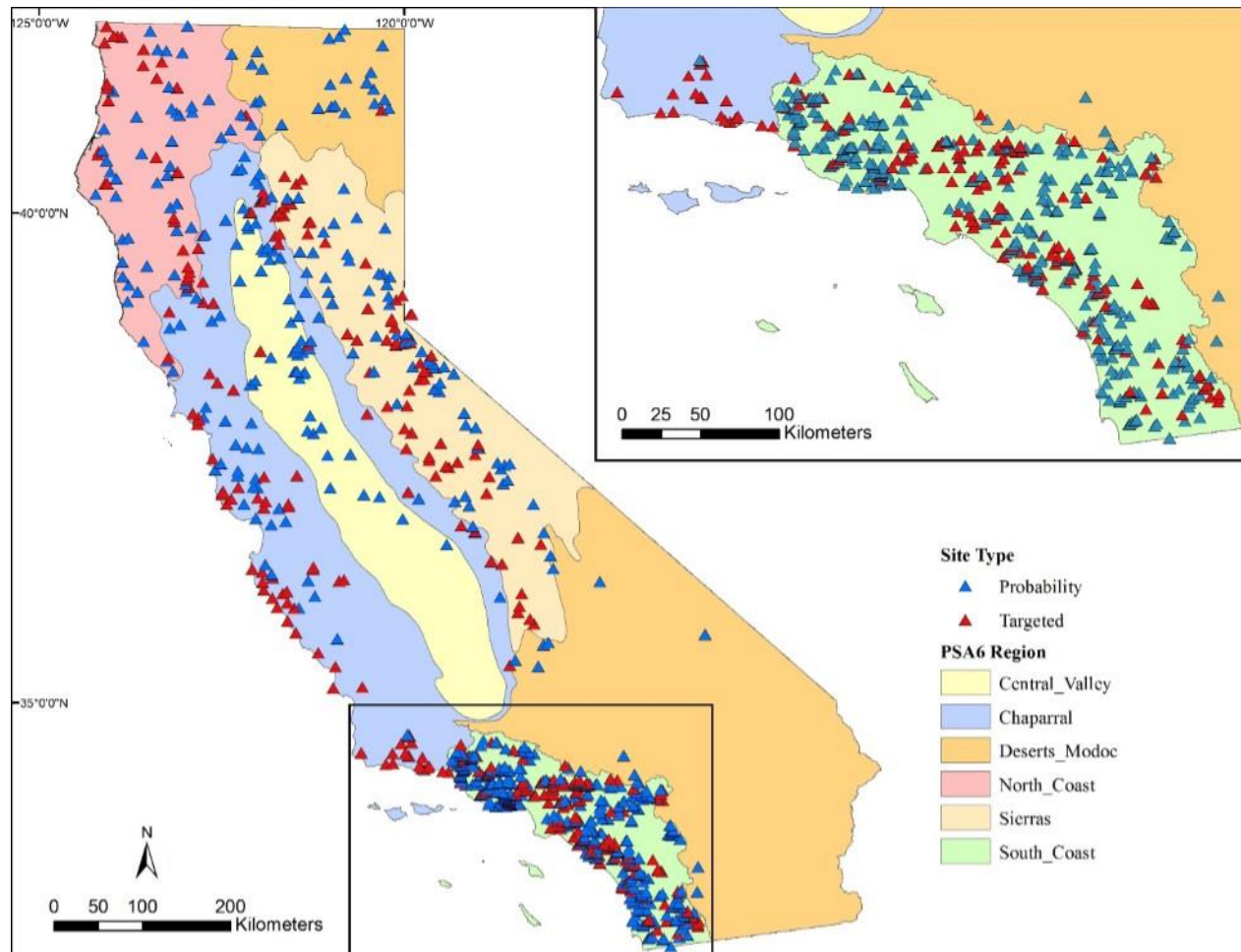


STREAM BIOASSESSMENT PROGRAM PROVIDES ROBUST DATASET FOR STRESS-RESPONSE ANALYSIS

Available data from combined surveys (>1,000 wadeable stream reaches)

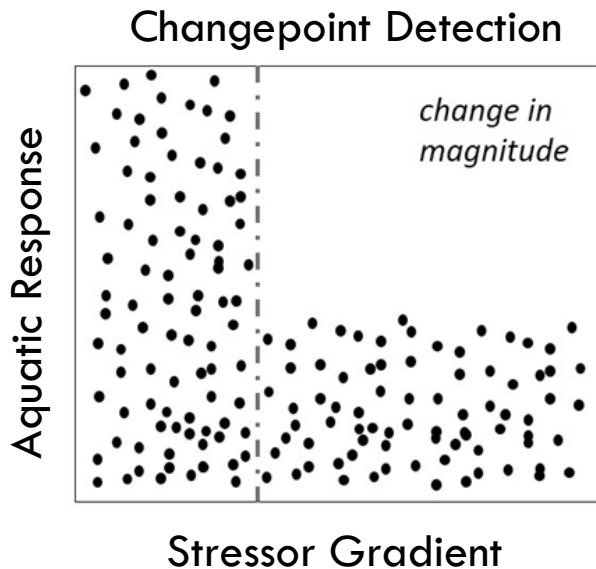
Includes both ambient and reference sites

Narrow down 10+ algal abundance available

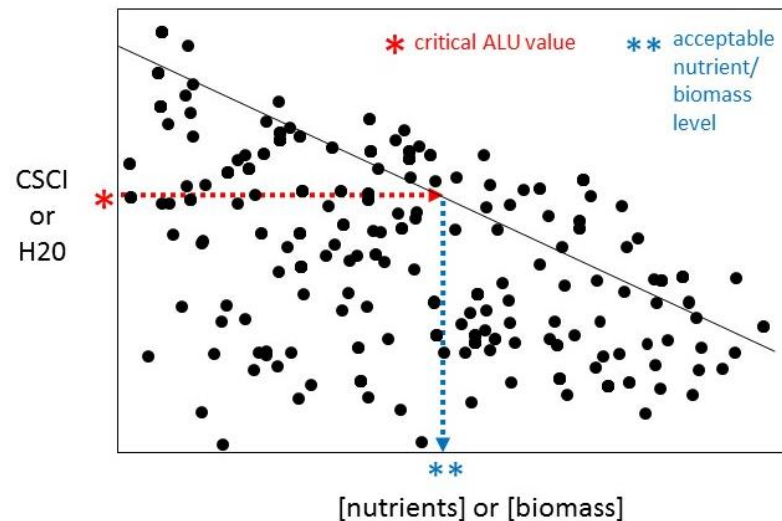


HOW DO WE IDENTIFY THRESHOLDS? TWO APPROACHES

Let the Data Speak for Itself



Identify quantitative thresholds for an indicator of beneficial use



Threshold or Levels = Science; Endpoint = Policy Decision

SCIENTIFIC FOUNDATION FOR WADEABLE STREAM NUMERIC GUIDANCE

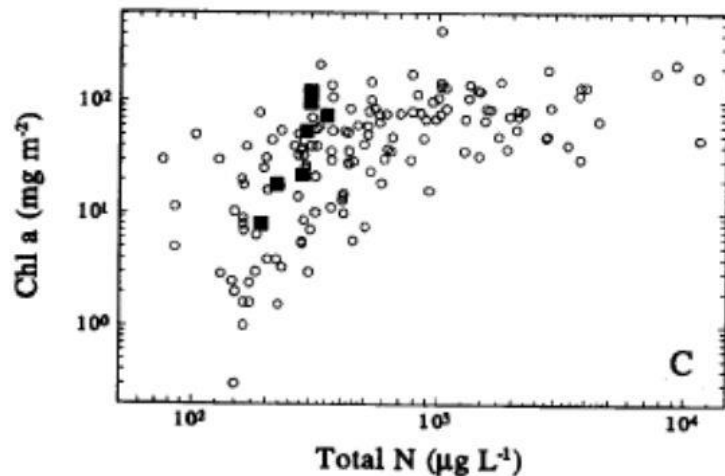
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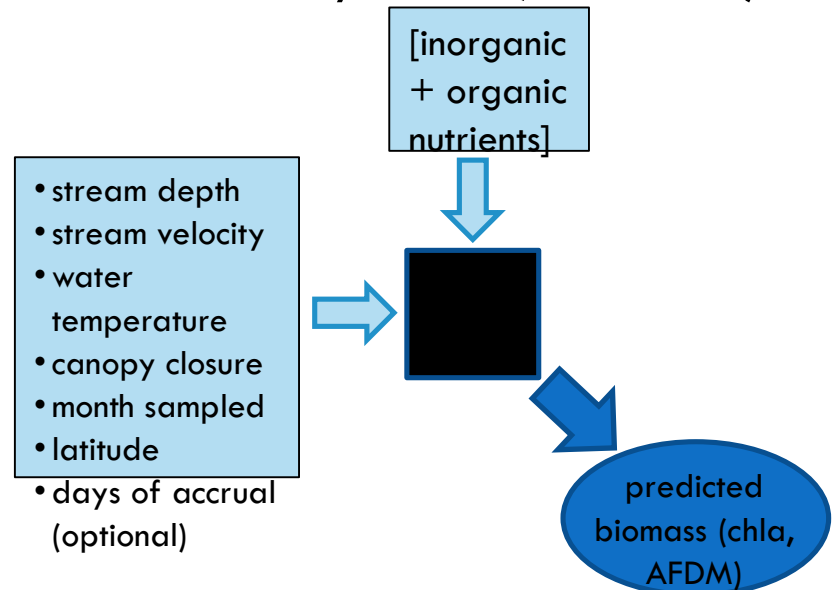
STATE ALREADY HAS BASIC MODEL FOR WADEABLE STREAMS: NNE BENTHIC BIOMASS SPREADSHEET TOOL

Two basic types of model:

Empirical (Dodds et al. 1997 and 2002):



Mechanistic (River and Stream Water Quality Model; QUAL2K):



First step is to validate them and consider refinements...

RECENTLY COMPLETED EPA-ORD STUDY BEGINS TO ADDRESS THREE OF FOUR TECHNICAL GOALS

Goals:

1. Identify **appropriate response indicators**
2. Identify **thresholds of adverse effects of response indicators** on aquatic life to support decision on regulatory endpoints
 - **Relative to reference and ambient concentrations of those indicators** in wadeable streams
3. **Evaluate the performance of the Benthic Biomass Spreadsheet Tool** for wadeable streams and recommend avenues for refinement

CONTEXT AND STATUS OF EPA-ORD REPORT

- Research project conducted in collaboration with EPA-ORD and SCCWRP
 - Not meant to give the final word on neither thresholds nor basic models!
- Additional analysis and synthesis is planned to address other aspects
 - This will be detailed in the technical work plan
- Report currently in expert peer review
- Expecting final version to be available for public distribution in early August

WHAT WILL THE PRODUCTS LOOK LIKE— TARGETED FOR SPRING 2015

- Synthesis of appropriate response indicators, thresholds relative to reference and ambient condition, and options for how to get to default nutrient targets
- Supporting technical reports
 - EPA-ORD ReSERVe
 - Supplemental analyses to support decisions on numeric endpoints for response indicators
 - Basic models of nutrient-algal abundance
 - And others...

SCIENTIFIC FOUNDATION FOR WADEABLE STREAM NUMERIC GUIDANCE

Goals:

1. Identify **appropriate response indicators** representative of beneficial uses
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 - **Relative to reference and ambient concentrations of those indicators** in wadeable streams
3. **Develop basic models** for wadeable streams
4. Identify key **technical elements** addressing **implementation**
 - This work element is not in contract

TECHNICAL ELEMENTS ADDRESSING IMPLEMENTATION

Two Flavors:

1. Key technical products needed to ease policy into implementation
 - Training, Standardization, and Information Management (e.g. Task 6)
2. Science needed to address key data gaps identified during implementation discussions
 - E.g. Control technologies, limits they can achieve and costs
 - Science plan should evolve to capture these needs

PARTING THOUGHTS ON TECHNICAL WORKPLAN...

- Today was meant to give you sufficient detail to allow you to comment on the State Water Board work plan
- Not enough detail to allow you to comment on the technical workplan
 - Meant to be an orientation
- Focused feedback on the technical workplan will happen at the next stakeholder meeting
 - We will give you the written technical workplan and EPA-ORD report in advance to review

QUESTIONS AND COMMENTS?

Martha Sutula

www.sccwrp.org

Marthas@sccwrp.org

714-755-3222

Taking a break— Back at 10:55

Please email Brock@brockbernstein.com to
be added to the email distribution list



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OVERVIEW OF STAKEHOLDER ORGANIZATION AND GOVERNANCE

Brock Bernstein, Ph.D.

ROLE OF STAKEHOLDER GROUP

- Based on experience with other statewide stakeholder groups
- Foster transparent process
- Provide review and input to State Board, technical team, Scientific Advisory Committee
- Address both scientific and implementation issues
- Communicate information to and from constituencies
- Examine sources and implications of disagreement
- Goal is NOT to reach consensus

POTENTIAL ISSUE AREAS

- Agriculture
- Environmental protection
- Land managers
- Municipalities
- POTWs
- Resource managers
- Stormwater: municipal, industrial
- Tribes
- Water agencies
- Others? (Builders, fire fighting, hatcheries, mining, mosquito abatement, pesticide manufacturers, recreation)

COMMITTEE MEMBERSHIP

- Primary and alternate for each issue area
 - Responsible for communication and outreach to constituencies
 - One or the other should attend all (or most) meetings
- Meetings open to all other interested parties
- All attendees participate equally
- Information provided to all interested parties

CONTACT INFORMATION

Dr. Brock Bernstein

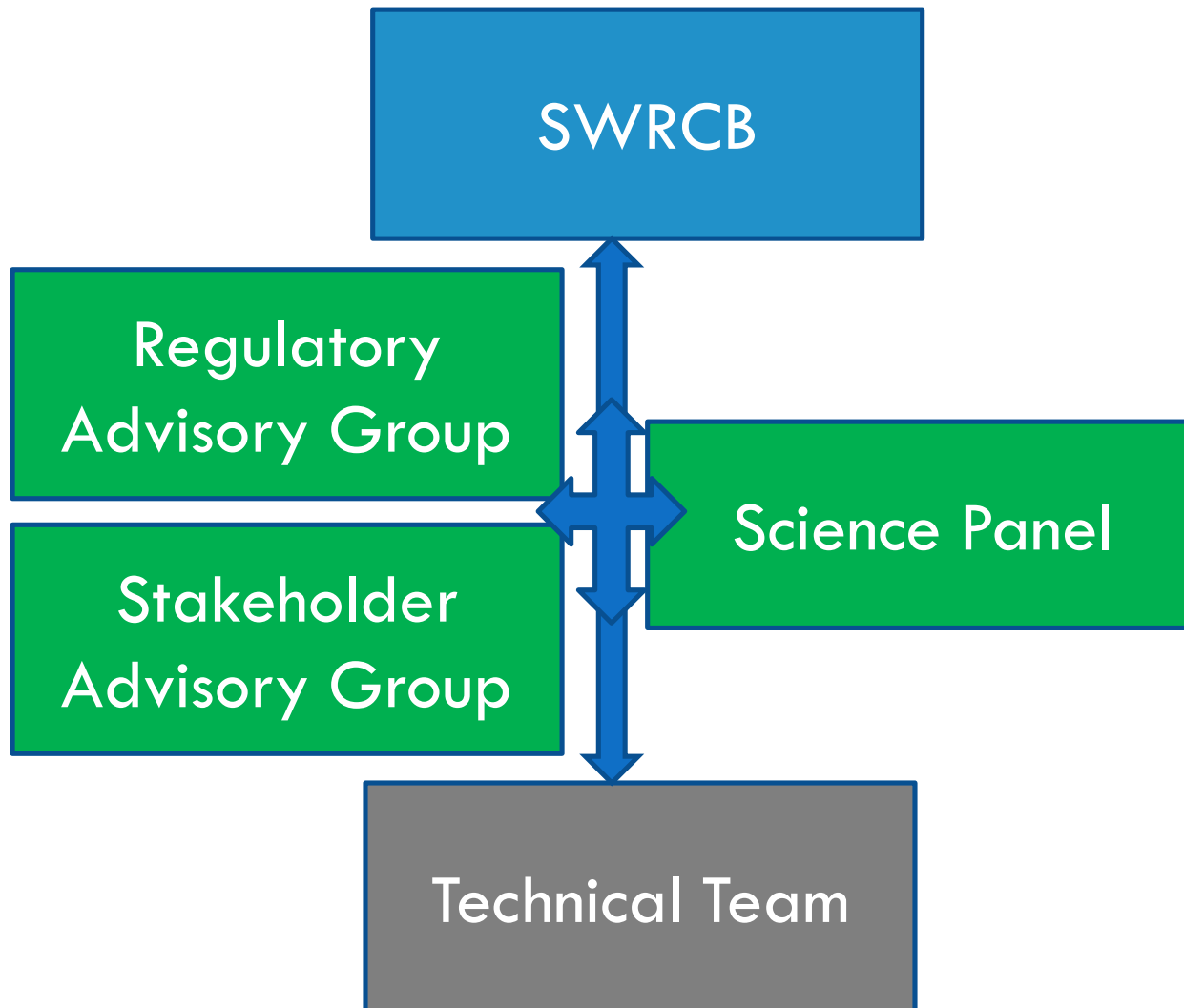
805-646-8369

brock@brockbernstein.com

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STATEWIDE NUTRIENT OBJECTIVES PROGRAM: ORGANIZATION



ROLE OF SCIENCE PANEL

- Provide independent technical review of policy development products
 - Includes the workplan and individual tasks
- Provide critical scientific insight based on extensive real world experience
 - Data gaps, alternative approaches, limits of interpretation
 - Potential management implications
- Like the SAG, their role is not approval
 - Its advisory

CONTEXT

- Vetted criteria for Science Panel previously with stakeholder groups for SF Bay and other estuaries
- Expanding work to freshwater habitats
 - Need to expand the expertise on panel
 - Allow involve new stakeholders in process
- Forming a new panel
 - Have already sought SAG input on process, desired attributes and asked them to suggest candidates
 - Want to make sure that you folks know how to provide input on the final set of candidates

ADDITIONAL GUIDANCE FROM STATE WATER BOARD

- Keep relatively small
 - Four members
- Needs to cover streams, lakes and estuaries
- Ensure no conflicts of interest
 - Try to choose from outside California to avoid potential conflicts
- Pick necessary disciplines for representation
 - Provide optional candidates for each

PROCESS

- Technical Team lead (SCCWRP) identifies candidates, based on desired attributes of SP panel members
- Representatives of the Regulatory Advisory Group (RAG) and SAG:
 - Review nominated candidates
 - Rank the candidates in the preferred order, and tell us if you really dislike a candidate
- Technical Team lead (SCCWRP) summarizes stakeholder input and provides to SWRCB staff
- SWRCB staff makes final decision

DESIRED ATTRIBUTES

- Four panel members, internationally or nationally recognized in one of four areas:
 - Nutrient and organic biogeochemistry and/or ecology with experience in management of eutrophication in estuaries;
 - Nutrient and organic biogeochemistry and/or ecology with experience in management of eutrophication in freshwater habitats;
 - Development of statistical and computational models of nutrients, environmental variables and ecological response and their application to nutrient management;
 - Science needed to support the implementation to support a wide array of nutrient management activities.
- No conflict of interest
 - Has not conducted significant work in California freshwater and estuarine habitats that would likely be subjected to technical review

CANDIDATES- ESTUARINE ECOLOGIST/ BIOGEOCHEMIST

- Walter Boynton, Professor, University of Maryland
- Ivan Valiela, Professor, Boston University
- Robert Twilley, Professor, Louisiana State University
- Robert Diaz, Professor, Virginia Institute of Marine Science

CANDIDATES- FRESHWATER ECOLOGIST/ BIOGEOCHEMIST

- Walter Dodds, Professor, Kansas State University
- Judith Meyer, Professor, University of Georgia
- Robert (Jan) Stevenson, Professor, Michigan State University
- Stephen Carpenter, Professor, University of Wisconsin

CANDIDATES- MODELER

- Ken Reckhow, Professor Emeritus, Duke University
- Dominic DiToro, Professor, University of Delaware
- Stephen Chapra, Professor, Tufts University
- Don Scavia, Professor, University of Michigan

CANDIDATES- NUTRIENT MANAGEMENT

- Richard Batiuk, Assistant Director, US EPA Chesapeake Bay Program
- Holly Greening, Executive Director, Tampa Bay Estuary Program
- Paul Stacey, Connecticut Department of Environmental Protection
- Donald Boesch, President, University of Maryland Center for Environmental Science

WHAT HAPPENS NOW?

- We've already received feedback on process and desired attributes
- You gave us recommendations for candidates by June 25, 2014
- We sent out a list of candidates on June 30, 2014
- Contact Brock@brockbernstein.com to be placed on distribution list
- Submit candidate ranks (and let us know if there is anyone you have an issue with, if needed) by COB July 18, 2014 to NNE@sccwrp.org.

COMMENTS OR QUESTIONS?

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NEXT STEPS AND TIMING OF SAG MEETINGS

- **Late Summer- Early Fall 2014- SAG meeting**
 - Presentation on EPA-ORD ReSERV study findings
 - Presentation of proposed technical workplan
 - Stakeholder presentation of feedback on technical workplan
- **Mid Fall 2014–SAG meeting**
 - Presentation of revised technical workplan
 - Brainstorming of implementation issues to address in policy
- **Late Fall 2014– Science Panel meeting**
 - Presentation of state of science and proposed workplan
 - Stakeholder presentation of issues
- **Early 2015– SAG meeting**
 - Technical Team Response to Science Panel comments
 - Beginning of focused discussion of implementation issues