

BACKGROUND

- **More than 15 years ago, CTAG determined modeling was needed to investigate local nutrient input effects on OA and hypoxia**
 - SCCWRP formed a partnership with UCLA in 2013 to develop ROMS-BEC
- **Spent a decade developing and validating the model**
 - Published more than 50 journal manuscripts describing this work
- **A few years ago, we started transitioning from model development to running application scenarios**
 - Focused on regional bookend scenarios
 - The bookend runs suggested nutrient inputs have a non-trivial effect on local acidification
- **Some community members expressed concern about whether the model is mature enough for use as a management decision-making tool**

EXPERT REVIEW PANEL

- **An independent expert panel was formed to review the model**
 - Six internationally renowned experts who met for over a year
 - Held five public sessions to receive information
 - Administered through National Water Research Institute to ensure independence
- **They issued their final report six weeks ago**
- **I will summarize the Panel findings**
 - Then I will describe the steps SCCWRP will take in response to the Panel report

TYPES OF PANEL FEEDBACK

- **Soundness of the model**
- **Suggested expansions of the model**
- **Activities to further quantify model uncertainty**
- **Steps we can take to enhance community acceptance**
- **Additional model runs that provide context**

MODEL IS FUNDAMENTALLY SOUND

“The Panel members agree that, in its current form, the coupled modeling system is capturing fundamental physical and biogeochemical processes in the Southern California Bight that are associated with ocean acidification and hypoxia. The coupled modeling system has been validated and gone through a rigorous scientific peer review process. It can be used to address basic management questions about whether nutrient loads from treated wastewater discharges in the region have impacted the marine environment and ecosystem in the Southern California Bight and what the large-scale and first-order impacts are.”

MODEL EXPANSIONS

- **Panel offered caution about not extending the model beyond the scales for which we have validated it**
 - “the ROMS-BEC modeling system has limitations and does not capture all details of the physical and biogeochemical processes related to treated wastewater discharges. The Panel recommends exercising caution when using the Model to pinpoint exactly how and where such discharges have affected the marine ecosystem. The Panel also provides recommendations for additional model analyses to address more detailed regulatory questions.”
- **They suggested two classes of model expansion**
 - Further model development at nearfield scales, particularly if the model is to be used for assessing fate of individual plumes
 - Expanding model interpretation to include more species

FURTHER QUANTIFY MODEL UNCERTAINTY

- **Conduct comparisons with more existing observational variables**
 - Apparent oxygen utilization
 - Biomass-normalized rates
 - Subsurface nutrient concentrations
 - Sediment trap data
 - Light (Photosynthetically active radiation)
 - High-frequency radar data
- **Collect new observation data for validation**
 - In outfall nearfields and in the nearshore
 - Long-term investment in observations required to answer ecosystem-level questions
- **Conduct additional sensitivity analyses**
 - Light attenuation
 - Particle sinking and remineralization rates
 - Zooplankton grazing
 - Relative preference of phytoplankton groups for nitrate and ammonium
 - Natural nutrient inputs
 - Nitrate uptake half-saturation constant

MORE STAKEHOLDER ENGAGEMENT

- **Provide close-to-full model output, rather than summarized data**
 - Daily averages of key variables at key depths, across the full model domain
- **Automate production of graphical comparisons and summary statistics**
- **Provide observation comparisons following engineering norms, rather than scientific publishing conventions**
- **Create a system for associating output datasets, model-observation comparisons, and publications with versions of the model's source code**

MORE MODEL RUNS TO PROVIDE CONTEXT

- **Place model findings into context of California Current-scale patterns**
 - Assess effects on places of ecological concern, not just on the Bight as a whole
- **Compare the effect of potential intervention to projected future changes in climate-induced acidification**
- **Conduct runs addressing finer-scale regulatory decisions**
 - On the scale of individual outfalls
- **Compare simulations at 300-meter and 1-kilometer resolution**

MANY SUGGESTIONS

- **The Panel offered 40 recommendations**
 - Challenge is discriminating critical from subtle activities
 - With both timing and cost implications
- **Modeling team has its own opinions, but we want this to be a community decision**
 - You are the ones who need to have confidence in the model if you are to use it
- **Our plan is to have an advisory group help with those decisions**
 - I previously suggested using the NWRI Expert Panel Steering Committee
 - You endorsed that suggestion
 - That group has agreed to serve

NWRI STEERING COMMITTEE

- **Diverse membership**

- Three POTW representatives (Lan Wiborg, Steve Wagner, Lorien Fono)
- Three Regulators (Karen Mogus, Dave Gibson, Justine Kimball)
- Three ex-officio advisors (Kristen Davis, Sean Bothwell, Steve Weisberg)

- **Facilitated by an independent third party**

- Kevin Hardy from National Water Research Institute

- **They held their first meeting on Nov 14**

- Meeting focused on developing a charter and operating procedures
- They are considering membership, possibly promoting Sean Bothwell to a full member and adding another NGO representative
- They are meeting again on Dec 18

SCCWRP WILL FORMULATE A WORKPLAN

- **Steering Committee will be advisory**
 - Burden remains on SCCWRP to turn that advice into a workplan
- **The workplan will define the products we intend to produce**
 - Including budget and schedule
- **Workplan will include a communications plan**
 - Including how we interact with organizations outside of SoCal
- **We will bring that workplan to the Commission for feedback**
 - I asked the Steering Committee for their task prioritizations by end of April
 - Plan is to present our next steps to CTAG in May and to you in June

SECOND CHALLENGE

- **There are two aspects to developing a SCCWRP workplan**
 - Does the plan include the right activities?
 - Are those activities being done well?
- **Steering Committee will focus on first question**
- **Setting up two mechanisms for the addressing the second question**
 - CTAG
 - Second review by the Independent Expert Review Panel

CTAG ROLE

- **CTAG will help us early in the process when we are planning tasks**
 - Are we taking the proper technical approach?
 - They will also provide midcourse review
- **CTAG formed a subcommittee to support our ROMS-BEC work**
 - Topic deserves more than a 40-minute agenda item at regular CTAG meetings
 - The Subcommittee will likely have full-day meetings several times per year
- **Their first meeting will help us get started on two projects**
 - Quality Assurance Project Plan
 - Model runs comparing management intervention effects to projected future changes in climate-induced acidification

INDEPENDENT EXPERT PANEL

- **CTAG will focus on ensuring we do individual projects well**
- **We also need to look at the entire body of work collectively**
 - Did our subsequent work adequately address issues identified by the Panel?
- **The Independent Expert Panel seems like the right entity to do that**
 - My desire would be to have the Panel meet at future milestone points
 - CASA has expressed willingness to financially support the Panel
 - NWRI has expressed interest in continuing to be the Panel convener
 - Individual Panel members have expressed interest in serving again

DOES THIS PLAN WORK FOR YOU?

- **Have we selected the right group to help prioritize our activities?**
 - Is the timeline for my sharing those priorities with you appropriate?
- **Are you happy with the CTAG role?**
 - Is there clarity about that role?
- **Should we bring back the Independent Expert Panel?**
 - Should we use the same process as we used the first time through?
 - Any thoughts on the right time frame?

NEXT STEPS

- **CTAG will hear a verbal outcome at their February meeting**
 - A chance for additional discussion
 - Particularly for anyone who missed the intersessional or sent surrogates
- **CTAG will consider a written document at their May meeting**
- **Commission will consider the Executive Summary research plan in June**
 - The thematic specific research plans (the 20-pagers) developed that year will be included as part of your Commission packet