

Workshop Proceedings

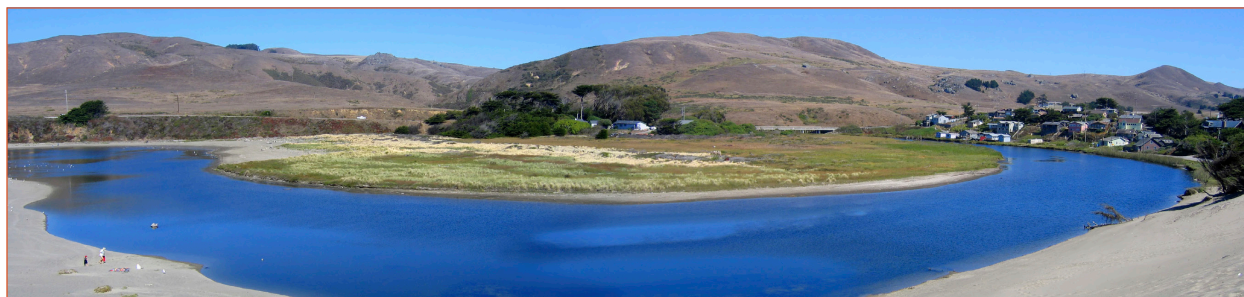
Ocean Protection Council Science Advisory Team (OPC-SAT)

“Exporing Ocean Health as a Scientific Concept and Management Goal”

Hosted by the California Ocean Science Trust

June 11, 2014, 10:00 AM to 5:00 PM

Elihu M. Harris State Building, Room 1, Oakland, CA



Workshop Participants

OPC-SAT Executive Committee: A. Boehm (Co-chair Emeritus), M. Carr (Co-chair), S. McAfee (Co-chair), K. Nielsen (Co-chair Elect)

Other OPC-SAT Members: R. Ambrose, D. Cayan, F. Chavez, H. Doremus, G. Griggs, M. Hall-Arber, G. Hoffman, S. Johnson, B. McCovey, K. McLeod, S. Murray, J. Paduan, J. Schubel, W. Sydeman, and S. Weisberg.

State Speakers: K. Alex (Governor’s Office of Planning and Research), J. Bishop (State Water Resources Control Board), C. Kuhlman (California Ocean Protection Council), and S. Mastrup (California Fish and Game Commission)

Ocean Science Trust Staff: H. Carter, E. Knight, E. Meyer, M. O’Donnell, E. Robinson, M. Villarreal, and E. Whiteman

Additional Workshop Participants: S. Aminzadeh (California Coastkeeper Alliance), S. Ashcraft (California Fish and Game Commission), L. Bernadett (California State Lands Commission), M. Brown (California Ocean Protection Council), J. DeLeon (California State Lands Commission), E. Eger (California Coastal Conservancy), K. Garrison (Natural Resources Defense Council), K. Kayfetz, D. Koepke (McHugh, Koepke and Associates), R. Ota (California Department of Fish and Wildlife), L. Parissenti, D. Santillano, C. Sweeney (San Francisco Estuary Partnership), C. Waldmann, and G. Wilson (Earth Law Center)

Public Comment (received prior to the workshop)

- Earth Law Center submission on [ocean health in environmental policy and law](#).

Workshop Summary

Across California ocean and coastal agencies and beyond – embedded in legal mandates, management plans, and policy guidance – there is a common theme: shared goals for a healthy, resilient California ocean. The scientific community has also been developing ideas and exploring different methodologies for measuring ocean health. The workshop brought together the scientific and decision making communities to begin a dialogue about ocean health as a scientific concept and management goal. Below are four main themes that emerged, which will guide conversations going forward.

Policymakers and managers see value in building a shared vision of ocean health.

Ocean and coastal agencies, departments, commissions, and boards may use different words, and have different approaches, but their mandates, policies and doctrines all support ocean health. A shared vision could advance stronger, more informed decisions about our ocean by helping to align management and policy mandates, leveraging limited resources, and demonstrating utility for the Governor's Environmental Goals and Policy Report (EGPR). Decision makers and the OPC-SAT agreed that the challenge will lie in building a vision that is broad, pragmatic, and resilient across administrations.

To build a shared vision, decision makers and scientists must work together.

Connecting science to policy is a complex and iterative process that involves decision makers and scientists working together to identify and meet science needs. The highest levels of ocean policy in the State, including the Governor's Office and the Ocean Protection Council, expressed a need for tracking progress toward ocean health and anticipating future science needs. Decision makers expressed a specific need for scientists to help explore how MPAs can serve as living laboratories for monitoring ecosystem change, investigate efficiencies between water quality and Marine Protected Area (MPA) monitoring, and articulate tradeoffs and uncertainty. The process for developing a shared vision of ocean health must bring scientists and state entities together, spanning boundaries within and among these communities to build a common understanding.

Building a shared vision for ocean health is about strengthening institutional partnerships to span boundaries.

Rather than a single definition, exploring ocean health is a process that involves bringing together new science with management goals to find synergies among traditionally disparate communities of managers and stakeholders. For example, the overlap between Areas of Special Biological Significance (ASBS) and MPAs offer an important opportunity to bridge across water quality and MPA monitoring communities. Ocean Science Trust has teamed up with the Southern California Coastal Water Research Project (SCCWRP) to develop an approach that goes beyond the traditional bounds of water quality and natural resource monitoring by bringing together interdisciplinary scientists, strengthening ties between the California Environmental Protection Agency, the Natural Resource Agency, as well as stakeholders that do not often have the opportunity to collaborate. This is just one case study of the kind of work that can help lay the foundation to define and track ocean health.

As the role of academic scientists in ocean policy and management expands, their perspectives continue to evolve.

Managers and decision makers in California continue to invite scientists to have a seat at the table – they value the expertise and perspectives that scientists bring. However, what is being asked of scientists and how scientists view these processes are changing. Scientists are being asked to use their scientific way of thinking to interpret the complicated scientific landscape, understand the history of knowledge behind an issue, and to provide guidance on how to connect to the broader community. Scientists are adapting to this need: applying their valuable expertise to diverse science to policy dialogues, communicating and translating science for broader audiences, and allowing the policy landscape to inform some of their research questions.

The OPC-SAT is already involved in initiatives across the landscape of ocean health that address state priorities:

- The [West Coast Ocean Acidification and Hypoxia Science Panel](#): an innovative coast-wide collaboration advancing across academic and political landscapes, the OPC-SAT scoped this effort at its November 19, 2012 meeting.
- Advancing Science in Support of Sustainable Fisheries: at the [September 4, 2013 OPC-SAT meeting](#), scientists and decision makers identified and discussed opportunities to support fisheries initiatives that are opening new pathways and strengthening collaboration.

Looking Forward

We have the opportunity to explore an aligning process that would utilize the Ocean Protection Council as the high level policy venue that brings together state agencies, the OPC-SAT as the conduit to the scientific community, and Ocean Science Trust as convener and science integration experts. Decision makers from the Governor's Office of Planning and Research, the California Environmental Protection Agency, and the Natural Resources Agency expressed interest in participating, but outreach to additional departments, commissions, boards, and conservancies is needed.

Outcomes of the meeting include:

- Broad agreement that launching a conversation around building a shared vision of ocean health for California would be valuable, and the Ocean Protection Council is the appropriate high level policy venue;
- Momentum to move forward with designing an aligning process to advance this dialogue, balancing credibility and transparency and bringing together decision makers and scientists;
- Designing an aligning process to build a shared vision for the state fundamentally differs from developing scientific indices;
- The OPC-SAT serving as a forum for the collective wisdom of the scientific community on ocean health as a scientific concept will be critical to an aligning process;
- Considering the role of metrics in tracking our progress toward ocean health could support the Ocean Protection Council and the Governor's Environmental Goals and Policy Report.

Welcome & Introduction

Skyli McAfee, Executive Director, Ocean Science Trust, Co-chair, OPC-SAT

Welcome OPC-SAT members, state decision makers, staff and interested citizens. I look forward to today's workshop – and encourage all to participate in the discussion. In particular, I want to welcome our new OPC-SAT members; this is their first workshop:

- Dr. Holly Doremus, Professor of Environmental Regulation, Co-Director, Center for Law, Energy & the Environment, Director, Environmental Law Program, University of California, Berkeley
- Dr. Gretchen Hofmann, Professor, Department of Ecology, Evolution and Marine Biology, University of California, Santa Barbara
- Barry McCovey Jr., Fisheries Biologist, Yurok Tribal Fisheries Program

Use of the term ocean health seems to be on the rise – among scientists, legislators, other decision makers, NGOs, the media, and others. And it can elicit some strong responses, especially from scientists and decision makers. Some already have a definition for what it should be, while others think it is meaningless or lacks credibility. Our challenge today is to let go of those preconceptions, and explore this anew. We won't resolve everything. Some moments might be difficult – but nothing worth doing is easy. What I expect is a lively, thoughtful discussion that begins to find the common ground among scientists, policymakers and managers, and interested citizens.

Symposium: Ocean Health as a Scientific Concept & Management Goal

Introduction

Mark Carr, Professor, University of California, Santa Cruz, Co-chair of the OPC-SAT

This workshop is intended to explore developing a shared vision for California's ocean health – informed by scientific understanding, as well as the legal mandates, management plans and policy guidance that exist across California's ocean and coastal agencies. The scientific and decision making communities across the spectrum are already engaged in a variety of efforts that give meaning to ocean health. Let's pull those threads together – the various scientific initiatives, such as the Ocean Health Index; ways decision makers already advance a healthy ocean through natural resource and water quality management – and explore what a shared vision could look like and how to get there.

Today's agenda includes a series of segments that aim to inform and spur discussion around the following questions:

- *How are California decision makers engaged?* Gain an understanding of the different mandates, management levers, and policies related to ocean health that exist within California (and I would recommend the Earth Law Center [document](#) as a resource);
- *What are current science initiatives?* Discuss the role of science and scientists in supporting California policy and management goals related to ocean health; and
- *How do we build common approaches?* Learn about a case study and discuss how to bridge California agency needs and the role of the scientific community.

Through these conversations, we can begin to test the utility of ocean health as a concept for advancing California's ocean and coastal management, and illuminate opportunities and challenges in moving forward.

Aligning the Policy and Management Vision Across the Landscape

From marine protected area (MPA) management, fishery regulations and coastal development

permitting, to reductions in marine debris and wastewater treatment, California regulators, managers and policymakers are already taking actions that promote a healthy, productive ocean. The workshop opened with a series of perspectives from decision makers on ocean health as an overarching management or policy goal, and ways to track progress towards that goal.

Speaker: Ken Alex, Senior Policy Advisor to Governor Jerry Brown, Director of the Governor's Office of Planning and Research

Ocean health is inextricably linked to changing climate. And understanding the impacts of climate change on California's human and natural environment, and the role science must play in helping to determine and track those impacts are priorities for Governor Brown. Towards that end, one key initiative for the Governor's Office of Planning & Research (OPR), of which I am Director, is preparing an [Environmental Goals and Policy Report](#) (EGPR) for California. The goals in the report will be linked to a set of indicators to help California track its progress over the long term.

Through the EGPR, we can be bold. Think more long term – 20 years. We can visualize what we are working towards, and through the indicators, how to get there across the State. OPR will be looking to the agencies, as well as California's scientific community to engage in this effort. We need you (the OPC-SAT) in this – both to participate and connect us to the best available scientific thinking. The MPA network and subsequent monitoring will likely help support development of the ocean component of the EGPR. The Governor has said we must adapt California's ocean policies in the face of climate change. Work with us to put those pieces in place.

Catherine Kuhlman, Deputy Secretary for Ocean and Coastal Matters, California Natural Resources Agency, Executive Director, California Ocean Protection Council

I will start by quoting the mission of the California Ocean Protection Council: "The Ocean Protection Council will ensure that California maintains healthy, resilient, and productive ocean and coastal ecosystems for the benefit of current and future generations." Thus ocean health is integral to fulfilling our legal mandate (the [California Ocean Protection Act](#), 2004), and is the goal of all the policies we pursue across a suite of priority issues, including MPAs, sustainable fisheries, climate change adaptation, and water quality, among others. Now is the time to begin what I believe will be a multi-year conversation to visualize what we mean by that. This is what I need to fulfill my mandate, and it is critical that the OPC-SAT participate to ensure that it is science-based.

We also must bring California ocean and coastal decision making bodies to the table for this conversation. This too will be a complex undertaking as agencies have different ways to advance ocean health. To build a shared vision, we must find the common ground among them. For instance, the State Water Resources Control Board – under the umbrella of the California Environmental Protection Agency (CalEPA) – define it as clean water, available for a variety of 'beneficial uses.' Whereas the range of departments, boards, commissions and conservancies under the California Natural Resources Agency are each responsible for specific resources (e.g., sustainable fisheries), but are also mandated to manage them within the context of the entire ecosystem.

The backbone of all of this is our network of MPAs. The Ocean Protection Council is already working with the other agencies in implementing California's network. The MPAs are test beds for ecosystem change. They can help us begin to measure and understand the impacts of climate change on California's ocean, and ultimately track its health. We heard from Ken Alex that the Governor's office is beginning an effort to develop indicators for measuring and tracking California's environmental goals (i.e., the EGPR). As California's cabinet level ocean policy body, we are well positioned to support this effort in a way that brings together decision makers and the scientific community (through the OPC-SAT).

I will conclude by reiterating that any effort to define and measure ocean health as a management goal will require the expertise of the scientific community. You all can help us understand what is known, the key questions going forward, and how to track our progress.

Speaker: Jonathan Bishop, Chief Deputy Director, State Water Resources Control Board, California Environmental Protection Agency

While ocean health is not explicitly mentioned in the State Water Resource Control Board's (Water Boards) mandate and mission statement, managing for ocean health is implicit in our policies and our goals, as represented in the Water Boards' [Ocean Plan](#). The Water Boards protect water quality for 'beneficial uses.' We do this by setting objectives and standards, which we implement through regulatory frameworks (e.g., permitting and strict enforcement). Thus by fulfilling our mandate, we advance ocean health. However, we do not evaluate the effectiveness of our policies and standards based on ocean health explicitly.

One key policy we have in place that presents an important opportunity for greater collaboration is the prohibition of discharges into Areas of Special Biological Significance (ASBS), which are our water quality protection areas. Many ASBSs are co-located with MPAs. We are very interested in how these tools can be used synergistically to better protect and track resources and water quality in these areas. The case study you will hear about later in the agenda ('Building Bridges between MPAs and Water Quality') will highlight a model that combines ecosystem and water quality indicators to inform both water quality and natural resource management, and more broadly assess ecosystem health. This approach goes beyond the traditional bounds of water quality and natural resource monitoring. It brings together interdisciplinary scientists, is building a bridge between CalEPA and the Natural Resources Agency, and stakeholder communities (e.g., fishermen, dischargers) that do not often have the opportunity to collaborate.

In conclusion, it is these kinds of pilot projects that lay the groundwork to actually define and track ocean health as a management goal. We need more multi-institutional, interdisciplinary efforts that build partnerships between traditionally disparate communities. I look forward to the discussion today, and continuing to work with you all.

Sonke Mastrup, Executive Director, California Fish and Game Commission

I believe we must develop a shared vision of ocean health. Currently agencies define and promote ocean health as it is conveyed in their individual mandates and policies, and while there is overlap, there are also incompatibilities. The California Department of Fish and Wildlife (CDFW) and the California Fish and Game Commission define ocean health as it is expressed in the [Marine Life Management Act \(MLMA\)](#) and the [Marine Life Protection Act \(MLPA\)](#). Both of these have incorporated fundamental principles of sustainability, and balancing human use with resource protection.

Bringing together the agencies with the scientific community to develop a shared vision of ocean health could have a number of benefits:

- Begin to clarify what we're collectively managing toward.
- Help resolve some of the incompatibilities that exist between different agency mandates and directives.
- Better synergize efforts across agencies and incentivize collaborations in ways that pool resources and create efficiencies.
- Presents a unified message to all citizens that care about California's coast and ocean.

Pulling together the agencies – each with departments, boards, commissions, and conservancies that have their own conceptions about ocean health – will be challenging. This process will be long. But to build a real commitment to sustainable resource management and water quality protection, we must put something in place that can rise above the politics, garner public support, and survive multiple political administrations.

I will conclude with some thoughts on what I suggest as key criteria of a definition of ocean health: it must be pragmatic, actionable (e.g., at a scale relevant to the State), and anticipate climate change. Science

will be necessary to inform how we approach and navigate these criteria, particularly in helping us to understand the trade-offs that we will inevitably have to make.

Discussion

Key Areas of Agreement

- Developing a shared vision for ocean health will be a challenging and long-term process, but has value for managers and decision makers. Some key points:
 - Human use of ocean resources, including land-based activities, must be dealt with and balanced with conservation in a shared vision of ocean health.
 - Considering its mandate and role as a cabinet level policy body, the Ocean Protection Council is the venue to advance this conversation.
- There are key policy and management initiatives already ongoing that will draw from and inform a shared vision of ocean health:
 - The EGPR to help identify statewide environmental goals and indicators to track progress.
 - California's network of MPAs are the backbone of a shared vision, as a means to build bridges across management communities (e.g., water quality and natural resource management), evaluate progress, and understand impacts of climate change.
- The scientific community (through the OPC-SAT) must play a key role in developing a shared vision for ocean health, particularly in bringing together scientific knowledge, helping decision makers weigh trade-offs, and ultimately identifying indicators to track progress.

Potential Next Steps

- Begin to explore designing an aligning process that would utilize the Ocean Protection Council as the high level policy venue that brings together state agencies, the OPC-SAT as conduit to the scientific community, and Ocean Science Trust as convener and science integration experts to advance a constructive dialogue that balances credibility and transparency.

Areas in Need of Continued Discussion

- Ways scientists can help state decision makers more fully comprehend the tradeoffs associated with different management decisions, and their impacts.
- The scientific community must continue to generate and communicate their science in ways that are relevant to state decision makers. The academic community – especially many young professors and graduate students – is already increasingly engaging with decision makers. This should be encouraged.
- Agencies must meaningfully engage in building a shared vision for any of this to be successful, garner long-term investment, and/or survive multiple political administrations.

Panel Discussion: Mapping the Opportunities for Science and Scientists

Each agency has its own unique mission, mandates, management levers, and policies – different words, different cultures and different day-to-day operations. In this discussion, the OPC-SAT, decision makers and other workshop participants explored ways in which the OPC-SAT can continue to grow as the State's primary forum for advancing science to ocean and coastal management and policy.

Panelists: Emily Knight, Program Manager, and Erin Meyer, Associate Scientist, California Ocean Science Trust

To begin to understand the range of decision makers' perspectives on ocean health as a management goal, we conducted Science Needs Assessment, an approach rooted in interview techniques developed by the Ocean Science Trust, with director- and manager-level staff at a set of California ocean and coastal management agencies. Though not comprehensive, these important conversations helped us to gain insight into how different kinds of decision makers (i.e., policymakers, managers and regulators) define a healthy, resilient ocean, and the actions they already take to advance it. Responses were used to shape the agenda for this workshop, and we aim to carry on with these conversations to expand our understanding of the decision making context.

Table: Entities that have participated (so far) in Science Needs Assessment

Agency	Department/Commission/Board/Office	Division/Program/Unit
Natural Resources Agency	CA Fish and Game Commission	n/a
Natural Resources Agency	CA Department of Fish and Wildlife	Marine Region
Natural Resources Agency	CA Coastal Commission	Ocean, Energy Resources and Federal Consistency; Water Quality Program
Natural Resources Agency	CA State Lands Commission	Environmental Planning and Management
Natural Resources Agency	CA Ocean Protection Council	n/a
CA Environmental Protection Agency	State Water Resources Control Board	Division of Surface Water Quality
n/a	Governor's Office of Planning and Research	n/a

- Statewide policy bodies identified developing a shared vision for ocean health as an important need.

The Ocean Protection Council and OPR both actively work across different scales of management to strengthen coordination toward key statewide goals. For the Ocean Protection Council, ocean health is explicit in its mission statement, while the OPR has identified ocean health as a key indicator in the EGPR, a statewide initiative currently under development.

- Ocean and coastal management departments, commissions and boards recognized value in developing a shared vision of ocean health.

Respondents, which included regulators and managers, discussed that they are not explicitly making decisions based on ocean health, but have mandates, policies, and/or guiding doctrines in place that essentially point to or add up to ocean health. Therefore, by successfully fulfilling their existing directives, California's ocean and coastal agencies are actively working toward a healthy, productive ocean. Developing a shared vision could be valuable if there is a strategic process that brings agencies and scientists to the table, and appropriately balances what will likely be varied, sometimes competing, criteria.

- The scientific community has a key role in informing the direction of the dialogue on defining and tracking ocean health, however it must be in collaboration with decision makers from the beginning, and on the scales of state management.

Respondents characterized their understanding of the views of the scientific community as piecemeal, but had the basic perception that there are two general camps: (1.) some scientists that define a healthy ecosystem as pristine, or undisturbed by humans, and (2.) scientists that recognize a healthy ecosystem can (and should) support a reasonable amount of human use. Beyond this, respondents would like to

better understand the thinking of the scientific community, but in order for it to have any impact, scientists must make their work relevant to the scales of decision making in California.

Respondents also stressed the need for co-production. In other words, that for science to be useful, scientists and decision makers must collaborate from the beginning. Respondents expressed frustration with scientific results or tools that are just 'dropped on their laps' only when published or complete. In some cases, these actually hurt more than help.

- Science Needs Assessment has provided some insight, but is not complete.

Science Needs Assessment thus far has initiated a series of insightful conversations, but we must continue to expand our understanding, and identify opportunities for greater alignment between scientists and decision makers.

Panelist: Karina Nielsen, Professor, Sonoma State University, Co-chair of the OPC-SAT

I would like to share some of my experiences engaging at the science policy interface over the years, particularly as a Science Advisory Team member for the Marine Life Protection Act, a member of the OPC-SAT, and now working on ecosystem health assessments for sandy beach and surf zone ecosystems. Throughout my time working on these, and other decision making relevant initiatives, I have learned much about how scientists can engage more effectively.

- We need to continue to broaden the community of scientists that are active, and serve as a forum that brings together scientific knowledge, including academic, traditional, and local knowledge.

The Ocean Protection Council can bring together the community of state agencies to better coordinate and collaborate. Part of our role as the OPC-SAT is to be a conduit to the scientific community, broadening the number of experts engaged, and bringing together the wealth of scientific knowledge in the State (e.g., academic, traditional, and local knowledge) in service of state priorities.

- We are not being asked to 'be scientists' for the State. Rather, we are being asked to bring a scientific way of thinking to the management and policy table.

When you are a scientist in the policy realm, it can be difficult to understand what your role is. But as you continue to work with managers, you realize that you have so much to offer far beyond your specific area of expertise because what is useful is not limited to what you know, it's how you've been trained to think. Scientific thinking is huge in helping decision makers solve problems.

- Engaging in these policy and management conversations also informs and influences how scientists work.

Scientists also benefit immensely from engaging in these conversations with decision makers. Specifically, it helps us really understand the decision makers' needs and the key gaps in knowledge. As a scientist, you are aware of the gaps in your field, but to be able to hone in on those that actually inhibit management action is a much more focused, nuanced application that requires greater crosstalk and collaboration.

- The MPAs are the backbone of a grand experiment to better understand and weigh tradeoffs in science-informed decision making.

We've heard a lot about the need to better delineate tradeoffs at the state level. With the MPAs, we can approach this much like a scientific experiment or theory: we built this network, we set up monitoring, and now we build on monitoring to understand ecosystem health. We have put in place all the pieces of an iterative, adaptive process that will allow us to learn and improve as we go.

- Our opportunity going forward is to break beyond our individual fields and bring together all forms of scientific knowledge to answer the relevant questions.

I will conclude by saying we should embrace the fact that the boundary between science and decision making is fuzzy. It is not just ecology, or climate science, or any one field. It is about bringing to the table scientific knowledge – academic, traditional, local – to answer the relevant questions.

Panelist: Holly Doremus, Professor, Co-Director, Center for Law, Energy & the Environment, Director, Environmental Law Program, University of California Berkeley

Stepping back, the relevant question for the OPC-SAT now is how can we as a team add the most value? Towards that, a series of themes have emerged here today:

- *Science and policy linkages:* We must focus on scales that are actionable, understand the constraints on decision makers, and fully engage in the conversation to set priorities.
- *Integration is key on all fronts:* We must collaborate to bring together knowledge across many scientific fields. But we also must be open to understanding the concerns and intricacies of intra- and inter-agency connections in order to help the Ocean Protection Council in their ocean health mandate.
- *Getting to the heart of management goals:* We must help the State articulate what it is they're trying to achieve for ocean ecosystems and resources. With California already having many strong, progressive legal mandates, policy guidance and directives, and the EGPR underway, we have a strong starting point.

Discussion

Key Areas of Agreement

- There is need and interest in building a shared vision of ocean health that incorporates human use, and on some level, articulates the State's aspirations. In other words, goes beyond just the status of our ocean.
- In thinking through a shared vision that includes human use, there is much we can learn from the interdisciplinary process of creating the Ocean Health Index. (*Update – published in PLOS One: [Assessing the Health of the U.S. West Coast with a Regional-Scale Application of the Ocean Health Index.](#)*)
- With the OPC-SAT (working with Ocean Science Trust) now engaged on behalf of the Ocean Protection Council, we now have a forum and venue to broaden the community of scientists and decision makers involved.

Potential Next Steps

- One idea offered was for the OPC-SAT to develop position paper to begin to gather the lines of thinking across the scientific community. Decision makers acknowledged this could be powerful in terms of clearly conveying consensus, but expressed concern about how to actually use it. Ocean Science Trust will explore this, and other potential mechanisms, for the OPC-SAT to engage the broader scientific community.

Areas in Need of Continued Discussion

- Further explore measures of ecological health (which is different than ecosystems services for humans), but in a California management and policy relevant context.
- Scientists and decision makers must work together to better understand and balance what is realistic or feasible for a vision of ocean health. Sustainability will be a key factor in trying to weight different elements (i.e., conservation vs. human use) that can be at odds.
- Consider status of (and goals for) healthy coastal communities as a measure of ocean health.

- The role of scientists in decision making in California is constantly evolving, the OPC-SAT must continue to grow its identity as the forum through which scientists can more deeply engage.

Case Study Discussion: Building Bridges Between the MPA and Water Quality Communities

From legal mandates to agency authorities, and management levers to monitoring programs, water quality and natural resource management are often largely separate endeavors. During this discussion, speakers described a collaborative project currently underway in southern California that brings together new science and common management goals for a healthy ocean to find synergies and efficiencies among traditionally disparate communities of managers and stakeholders.

Speakers: Liz Whiteman, Program Director, California Ocean Science Trust, and Steve Weisberg, Executive Director, Southern California Coastal Water Research Project

As outlined during previous discussions, ocean health is a guiding principle across many state agencies, and building a process for developing a shared vision is one potential next step beyond this workshop. This process will need to be adaptive to the changing landscape and will inevitably involve science engagement throughout, including how the OPC-SAT can help track progress. There are multiple ways to advance ocean health, including building and leveraging partnerships and broadly engaging across the agency and academic landscapes.

Co-located MPAs and ASBSs in southern California offer an important opportunity to bridge across the water quality and MPA communities. By building on shared goals, while recognizing the different definitions and mandates, we are working to integrate these communities on three levels:

- **Bringing data together across monitoring methods:** We are bringing together data that have been standardized via a variety of robust programs across multiple habitats, from kelp forests and shallow rocky reefs to rocky intertidal (i.e., [CRANE](#), [MARINe](#), [U.S. EPA](#)). Using common data formats, we are able to begin bringing together the Bight '13 Monitoring Program with the South Coast MPA Baseline Program to address shared monitoring questions from water quality and natural resource managers.
- **Conducting data analysis and developing interpretation tools:** This aspect highlights the challenge that water quality and natural resource managers have different approaches to assessing ecosystem health. For example, data are viewed on different spatial and temporal scales, which reveal different patterns and lead to different interpretations. Water quality managers assess the biological community at a particular time point and interpret the local water quality using a robust and static index. Natural resource managers are more interested in the sustainability of biological communities and use population metrics collected over longer timeframes to interpret current and predict future patterns of change. In this project, we are working to span these needs by developing a marine water quality index and a fishing pressure index (from the Ocean Observing Systems) that are integrated with biological data (from MPA monitoring) ultimately to produce an index of ecosystem health.
- **Disseminating findings:** Through this work, we are bringing managers and stakeholders (e.g., dischargers, fishing community) together around new scientific information. First, the California Water Quality Monitoring Council, a state body appointed by the Secretaries of CalEPA and the Natural Resources Agency, has created a [series of data portals](#) aimed at helping the public understand: is water safe to drink? Is it safe to swim? Are fish safe to eat? And more broadly, is ecosystem health being protected? Through this case study, we have been invited to develop an additional data portal focused on ocean health.

Rather than a single definition, exploring ocean health is a process that involves bringing together new science with management goals to find synergies among traditionally disparate communities of managers and stakeholders. This case study demonstrates that:

- Advancing this dialogue isn't just about building an index or communicating better, but looking for alignment across projects, policies, and relationships.
- By looking for common ground among legal mandates, policies and management plans, we can also build new partnerships between institutions, programs, all the way down to scientists in the field.
- Shared personnel establishes bonds between agencies that can help them more creatively interpret individual mandates, and pursue initiatives that span multiple political administrations.
- Scientists and agencies must collaborate from the beginning. Decision makers are not only recipients of data; they also generate new information that inform key information gaps.
- Joint datasets are valuable to develop tools moving forward. Data collected for MPA monitoring (i.e., South Coast MPA Baseline Program) and Regional Water Quality Monitoring (i.e., Bight '13 Monitoring) can help different communities of managers address relevant questions.

While challenges certainly remain, we hope to expand this case study in a way that adds value to and serves a range of stakeholders and agencies. Statewide monitoring in service of different agencies will be critical to understanding the impacts of climate change, which otherwise is prohibitively expensive. We can take the next step by linking efforts toward building a shared vision of ocean health.

Concluding Discussion: Tracking Our Progress

Skyli McAfee, Executive Director, California Ocean Science Trust, Co-chair, OPC-SAT

To close the symposium on ocean health, policymakers, managers, OPC-SAT members, and other participants reflected on the day, and offered ideas. S. McAfee initiated the discussion with some remarks:

- We have an opportunity here to define a new paradigm by developing a shared vision for ocean health that we can then operationalize. Our task is to bring together all of the agency mandates and guidance, and develop science-based language that we can all point to, and that helps deliver on decision makers' commitment to constituents.
- We've started with MPAs, working to parse out the impacts of water quality and fishing. This has long been a priority of decision makers and the fishing community. And through this, we're strengthening a cross-agency partnership between CalEPA and the Natural Resources Agency, establishing links between water quality and fishing stakeholders, and developing new useful science. This serves as a valuable model to continue to build upon.
- We also must continue to expand access to academic resources. The scientific community is changing. More and more students, postdocs, and young professors are eager to engage. Through new institutional partnerships, we can create new kinds of jobs, fellowships, and research trajectories that will attract up and coming talent.
- Finally, the issues are not isolated. MPAs, fisheries, water quality, ocean acidification etc. Ocean health is a priority for the Governor because he is concerned about all of these, and the links between them. What we need now is an aligning process that anoints this work, lifts it, and brings together decision makers, scientists, and others to engage in the conversation.

Decision makers all echoed these closing remarks, in particular J. DeLeon, California State Lands Commission, who offered this additional insight:

- What we need is a broad, conceptual, aspirational goal and statement that we could all point to and drive towards as a shared vision for ocean health, even in the context of our own agency mandates, jurisdictions and policies. We do not need a numeric scale. That is not helpful right now. We need a conceptual scale.

- We are willing to be in this conversation. Our commissioners are bold. This is in line with actions and resolutions they've approved in the past. But the key is even though they are willing to step out on a limb, it comforts them to know they are not stepping out alone. We look forward to engaging further.

Some attending members of the public then closed the workshop offering these valuable comments:

- S. Aminzadeh, California Coastkeeper Alliance, reiterated the value of the MPAs, both as living laboratories, and as a vehicle to bring communities together. There are already so many – academics, citizen scientists, and others – working to make monitoring a success. As this work expands (between ASBSs and MPAs), let's ensure we make the information and these data readily available in a meaningful way.
- K. Garrison, Natural Resources Defense Council, applauded this workshop as being rare. That California is in a new era of using science and engaging scientists to design and implement key decision making programs. And to build on this, we must now pull the threads together to vision the whole of what we're trying to achieve: a healthy, productive ocean.

OPC-SAT Related Updates

The West Coast Ocean Acidification and Hypoxia Science Panel (OAH Panel)

Ali Boehm, Associate Professor, Stanford University, OAH Panel Chair, Co-Chair, OPC-SAT

- President Obama's Council on Environmental Quality has reached out to the three west coast states about ocean acidification, including the work of the OAH Panel. We are now looking toward that venue as a critical opportunity to identify for high level policymakers what meaningful progress science can make in the next 5, 10, and 20 years. The OAH Panel will develop a vision, and pathways to that vision, and initial steps along identified research trajectories that provide actionable scientific guidance.
- The research trajectories developed by the OAH Panel will draw heavily from the other products currently ongoing, which are a series of publications that are addressing key priority topics identified by state, regional and federal decision makers: ecosystem and food web impacts, policy and management responses to ocean acidification and hypoxia, ocean and coastal dynamics, and hypoxia physiology.
- Working with Ocean Science Trust, we are also elevating our communications and outreach efforts, including – I am pleased to share – a new [Panel website](#).

Department of Fish and Wildlife Task Force on Scientific Collecting Permits

Mark Carr, Professor, UC Santa Cruz, Co-Chair, OPC-SAT

- The OPC-SAT Task Force on Scientific Collecting Permits in MPAs has been working with CDFW to complete a decision making framework for issuing scientific collecting permits in MPAs, a sensitive issue.
- We expect to complete our work in November 2014. We have developed quantitative models that CDFW can use to weigh impacts to ecosystems, habitats, and species. We will have products describing the use of the models. We will also pursue scientific publications discussing the utility of these tools in decision making.

Becky Ota, Marine Habitat Conservation Program Manager, CDFW, also added important management context to this update: the challenge to CDFW with this is appropriately balancing scientific collecting activities with other extractive activities. This project is key because it addresses the cumulative effect so that we are able to look at the big picture, and make the key tradeoff decisions. This is especially

important now because with the MPAs in place, there has been a significant increase in requests to conduct scientific work in MPAs.

Northern Red Abalone Science Advisory Committee

Moose O'Donnell, Senior Scientist, Ocean Science Trust

- CDFW requested Ocean Science Trust to coordinate a scientific and technical review of the survey design and methods currently used to estimate red abalone (*Haliotis rufescens*) density. These density estimation methods are key to informing management decisions on the northern red abalone recreational fishery.
- Ocean Science Trust designed and implemented the review process. We convened a six-member Science Advisory Committee (SAC) that included Karina Nielsen and Mark Carr, as well as other experts in intertidal and subtidal ecology, abalone population dynamics, and statistics. The process also involved areas of engagement between the SAC, CDFW biologists and managers, as well as fishing constituents, who demonstrated great interest in the results of this review.
- The final report of the SAC will come out the week of June 16 (*update - [the final report of the Science Advisory Committee was released on June 18, 2014](#)*). The report contains both short and long-term recommendations based on what the Abalone Recovery and Management Plan allows without formal revision. The core of these recommendations speak to much of the conversation today: which is how can science help clarify uncertainty, and help decision makers weigh risk and make tradeoffs in a transparent way.

- Adjourn -

