

**Coastal and Marine Ecological Classification Standards California  
Workshop  
California Ocean Protection Council**

March 30, 2011  
9:00 a.m. – 5:15 p.m.  
State Building  
1515 Clay Street, Room 1, Second Floor  
Oakland, CA

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**Workshop Summary**

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**Introduction**

The Coastal and Marine Ecological Classification Standards California Workshop was convened by the California Ocean Protection Council (OPC) and took place on March 30, 2011 in Oakland, California at the State Building. The objectives of the workshop were to:

1. Evaluate the potential roles of ecological classification schemes in supporting coastal ocean management including fisheries management, marine protected area (MPA) management, ocean energy and coastal development, and marine spatial planning;
2. Assess the potential for the Coastal and Marine Ecological Classification Standard (CMECS) to address management and research needs;
3. Gauge the potential for a CMECS pilot project to inform management efforts; and
4. Identify the essential criteria for a coastal and marine ecological classification pilot project (e.g., scale, data integration, finances) in California.

This meeting summary captures key issues discussed and key outcomes that resulted from the meeting. This document is not intended to serve as a transcript of everything said at the meeting, but rather a summary of main points discussed.

The meeting summary is organized into the following sections:

1. Purpose of the Workshop
2. CMECS Updates
3. Ecological Classification Schemes in a Management Context
4. Humboldt Bay and Eel River Estuary CMECS Project
5. Presentations on CMECS Components
6. Breakout Group Discussion Highlights
7. Applying CMECS to Management: How can the CMECS framework foster integration among disciplines?
8. Pilot Project Criteria
9. Closing Remarks and Next Steps

Each section below provides a brief overview of the topics discussed and then highlights key comments made by participants or OPC staff. The meeting participants are listed below in Appendix 1. The agenda is attached as Appendix 2. All of the PowerPoint presentations may be

found on the OPC website at the following link: <http://www.opc.ca.gov/2011/04/coastal-and-marine-ecological-classification-standard-workshop/>

### **1. Purpose of the Workshop**

*Sheila Semans, OPC*, welcomed the participants to the workshop and provided an overview of the workshop purpose. Sheila stated that the state's investment in seafloor mapping, marine protected areas, and ocean observing has provided California with a unique opportunity to advance our understanding of ecological classifications. She explained that the OPC is evaluating whether CMECS is an appropriate tool to support ocean management needs. This workshop is intended to explore how CMECS could be used by managers, where improvements to CMECS are needed, and if a CMECS pilot project is pursued, how California might contribute to the refinement of CMECS.

### **2. CMECS Updates**

*Mark Finkbeiner, NOAA Coastal Services Center*, presented on the development of CMECS over the past several months and the public input process, including the Federal Geographic Data Committee (FGDC) adoption process, updates from the CMECS developers working group, and follow-up to the four CMECS webinars that were convened as a prelude to this workshop. The presentation can be found on the OPC website:

[http://www.opc.ca.gov/webmaster/ftp/project\\_pages/ecological\\_classification/SCC\\_Workshop-FGDC\\_Review3.pdf](http://www.opc.ca.gov/webmaster/ftp/project_pages/ecological_classification/SCC_Workshop-FGDC_Review3.pdf)

After the presentation, workshop participants shared the following clarifications and comments:

- Anything that is not considered a land-based soil should be classified using marine sediment terms and definitions.

### **3. Ecological Classification Schemes in a Management Context**

Various natural resources managers participating in the workshop presented briefly on how an ecological classification scheme could be useful for their particular management needs. Below is a summary of the topics that each manager addressed:

*Liz Whiteman, Marine Protected Areas Monitoring Enterprise (MPA Monitoring Enterprise)*, gave an overview presentation of the MPA monitoring framework and the approach developed to meet the monitoring requirements for designated MPAs in California. She illustrated the challenges in aligning ecological classification schemes with monitoring designed to 'take the pulse' of marine ecosystems. She also presented initial ideas in support of MPA management regarding the use of habitat as a proxy for conserving biodiversity and posed the question of whether or not CMECS could help. The presentation can be found on the OPC website:

[http://www.opc.ca.gov/webmaster/ftp/project\\_pages/ecological\\_classification/Liz\\_Whiteman\\_-\\_CMECS\\_Workshop\\_Mar\\_2011.pdf](http://www.opc.ca.gov/webmaster/ftp/project_pages/ecological_classification/Liz_Whiteman_-_CMECS_Workshop_Mar_2011.pdf)

*Lisa Gilbane, Bureau of Ocean Energy Management, Regulation, and Enforcement (BOEMRE)*, shared BOEMRE's goals and needs for the siting of wave and wind energy projects on the Outer Continental Shelf (OCS). She expressed that BOEMRE currently uses maps from many different sources and could benefit from having consistency in terminology in the various maps. BOEMRE thinks this effort of developing an ecological classification scheme would be useful for looking at resources at a spatial and temporal scale in order to predict the potential effects of the development and operation of a wave energy project.

*Paulo Serpa, California Department of Fish and Game (DFG)*, provided his agency's perspective on the usefulness of an ecological classification scheme. He explained that DFG has many mandates, and there are always challenges in bringing together a lot of data in a short period of time, particularly habitat data. It would be very helpful to have a standard to compile data from various sources using an overarching scale.

*Marilyn Latta, California Coastal Conservancy*, shared that her agency has recently completed a San Francisco Bay Subtidal Habitat Goals Report (<http://www.sfbaysubtidal.org/>). This plan focuses on regional planning efforts for mapping and monitoring submerged areas of San Francisco Bay. She explained that there remains a need to identify the habitat that exists so that we can better predict changes, and it would be very helpful to have a mapping tool for classifying habitat types.

*Melissa Foley, Stanford's Center for Ocean Solutions*, shared that she is working on marine spatial planning in California and that classifications may be useful for data organization within the state. CMECS could be a helpful tool to accomplish this objective. She noted that classifications could make data more manageable and interoperable, tasks that have been mandated to OPC by Assembly Bill 2125. She emphasized that it is important to make sure that the components of CMECS are interrelated and can advance management objectives.

*Adrienne Harris, Morro Bay National Estuary*, shared that an ecological habitat classification scheme would be useful for sharing data, especially for organizations like Morro Bay National Estuary that operate with limited resources. She explained that it is important for marine classifications to accurately knit together with land-based wetland classifications/definitions. An ecological habitat classification scheme would be helpful to predict where habitats and species will move due to climate change. In addition, it could be useful for public access development, enforcement and aquaculture siting purposes.

Based on the presentations above, the following clarifications and points were discussed with regard to ecological classification schemes and CMECS:

- CMECS can be applied to individual components or integrated across components, determined by the particular objectives of the study or project.
- Incorporation of good metadata into CMECS will ensure that integration is not done ad hoc.

- There was a discussion over whether or not CMECS is an appropriate tool for monitoring dynamic ecological processes. In particular, several participants commented that CMECS was well suited to describing static structures, but they did not believe that, in its current format, it was as useful for describing dynamic processes. It was noted that CMECS can be a building block and dynamic layers can be added on top of it.
- A distinction was made between developing CMECS for a given management need (e.g. CMECS is an interdisciplinary framework for describing habitats), and applying the information derived from CMECS toward a particular analysis (using CMECS data to solve a problem).

#### **4. Humboldt Bay and Eel River Estuary CMECS Project**

*Susan Schlosser, California Sea Grant*, gave a presentation on the use of CMECS for habitat mapping in the Humboldt Bay and Eel River Estuary. She explained that the classification effort developed as part of a community, ecosystem-based management program, with the purpose of creating intertidal and subtidal habitat goals in the region. Management objectives include habitat loss and fragmentation where invasive species control is a priority issue, especially *Spartina densiflora*. Adapting to expected climate change impacts is another management issue where shoreline improvement planning is being addressed using CMECS habitat maps. Since then, the data has been used for many planning, management, and regulatory reasons both federally and locally. She has found that the use of maps has been particularly useful in developing interest for the use of the data from a lay audience, particularly decision-makers. One benefit of CMECS is that it is a layered system, and more data can be added as it is developed. Susan's presentation can be found on the OPC website:

[http://www.opc.ca.gov/webmaster/ftp/project\\_pages/ecological\\_classification/SchlosserOPCCC\\_22720.pdf](http://www.opc.ca.gov/webmaster/ftp/project_pages/ecological_classification/SchlosserOPCCC_22720.pdf)

#### **5. Presentations on CMECS Components: Data Availability, Crosswalks, Known Issues**

##### **Benthic Biotic Component**

*Lisa Krigsman, NOAA's National Marine Fisheries Service*, gave a presentation on her experience developing predictive habitat maps for some key benthic biotic species within the Santa Barbara Channel. She explained that although she has not cross-walked her data using CMECS, it may be possible to do so. She found some data missing in CMECS that should be added before it can fully be applied to the West Coast. One example of this data gap involved echinoderms, including sea urchins and sea stars. She shared that it would be helpful if the coral garden faunal bed and mixed colonizers biotic group had some type of diversity index to accompany the definition of these groups. She suggested that brachiopods also be added to the faunal reef bed or faunal bed. Lisa brought up some serious concerns for Biotopes within CMECS and urged that more attention be given and better explanations shared with this component of CMECS before it is applied to a West Coast pilot. Lisa's presentation can be found on the OPC website:

[http://www.opc.ca.gov/webmaster/ftp/project\\_pages/ecological\\_classification/CMECS\\_BBC\\_for\\_web.pdf](http://www.opc.ca.gov/webmaster/ftp/project_pages/ecological_classification/CMECS_BBC_for_web.pdf)

### **Geoforms and Surface Geology Components**

*Guy Cochrane, U.S. Geologic Survey*, gave a presentation on the differences between the CA Seafloor Mapping (CSMP) approach to mapping benthic habitats and CMECS. He noted that when CSMP began, CMECS was not yet developed, and Gary Greene's method for classifying benthic habitats was used. Geoforms are classified similarly in both systems and cross-walking the data into CMECS would be fairly straightforward. Surface geology is classified slightly differently in CMECS, but nothing would be lost in the cross-walk to CMECS. Oceanographic regimes match well. Energy regimes can be addressed using a modifier in CMECS. The CSMP "seafloor character" map does not easily translate into CMECS because the CSMP numerical rugosity values use a variable approach. CMECS does not have induration, but it could be included as a modifier. Also, process information would be lost (e.g., landslide, scouring information), unless added to CMECS. The benefit of CMECS over other classification tools is that modifiers can be created for items that are not already in the classification scheme. Guy's presentation can be found on the OPC website:

[http://www.opc.ca.gov/webmaster/ftp/project\\_pages/ecological\\_classification/Cochrane\\_CA\\_CMECS\\_2010.pdf](http://www.opc.ca.gov/webmaster/ftp/project_pages/ecological_classification/Cochrane_CA_CMECS_2010.pdf)

### **Water Column Component**

*Toby Garfield, San Francisco State University Romberg Tiburon Center*, gave a presentation on the development of the water column component, noting some of the limitations of CMECS for classifying the water column features. He explained that the CMECS water column component is very preliminary, not well defined, and needs work and he highlighted some of the changes that are already underway. He described CMECS as a mapping tool, not a dynamic classification tool. He explained that the water column does not always have definable areas or zones, and variability needs to be built into CMECS somehow to account for this. Toby's presentation can be found on the OPC website:

[http://www.opc.ca.gov/webmaster/ftp/project\\_pages/ecological\\_classification/CMECS\\_WCC\\_and\\_Systems\\_tg2.pdf](http://www.opc.ca.gov/webmaster/ftp/project_pages/ecological_classification/CMECS_WCC_and_Systems_tg2.pdf)

Following the presentations the following clarifications and points were discussed:

- Dynamic processes need to be represented somehow, possibly as similar to a food web.
- CMECS is an ecological classification framework with an eye toward mapping. The intent of CMECS is to create a universal terminology first and foremost, and a mapping tool second.
- CMECS uses some mapping terminology. This might discourage some possible users from applying the standard for describing dynamic oceanographic processes.
- CMECS is not intended to have ecological knowhow. The meaning has to be inferred based on the objectives of a project.
- CMECS is not sufficiently able to classify dynamic systems because it treats physical space as the most important element to capture.

## **6. Breakout Groups: Discussion on Comparative Advantages/Disadvantages of CMECS**

For this part of the workshop, participants split up into three breakout groups: Geoforms and Surface Geology, Benthic Biotic and Surface Geology, and Water Column. Each group discussed a series of unique questions and reported back their thoughts and findings to the full group. Below is a summary of the findings of each breakout group.

### **Geoforms and Surface Geology**

1. *What are the advantages/disadvantages of applying the geoform and surface geology components on the west coast?*

#### Advantages

- CMECS provides a potential common language
- It is relatively easy to cross-walk data into CMECS

#### Disadvantages

- CMECS is not structured to account for the dynamic movement of the surface seafloor substrate (e.g., sand).
- There is no obvious habitat classification for sandy bottoms.
- CMECS has not been tested in a pilot beyond near-shore waters along the West Coast.

2. *What are the advantages/disadvantages of using CMECS to address the variety of scales of information needed by managers?*

#### Advantages

- CMECS is easily scalable, with the assumption that data is scale independent.

#### Disadvantages

- It is unclear how or where data quality and density information is reported and communicated through CMECS. This includes information beyond metadata. This type of comparable information is essential to report somewhere within CMECS so that the user can accurately interpret the data.
- The CMECS bedrock definition is not useful or appropriate for management needs. 50% bedrock definition does not work for BOEMRE.
- It is unclear where the boundary is in defining the substrate (e.g., how to define large areas of bedrock with 1cm of mud on top).

3. *What are the primary issues involved with cross-walking California seafloor mapping data into the CMECS framework?*

- Definitions for soils should use marine-based nomenclature.
- A laymen's guide to CMECS would be helpful.
- A time-series of maps should be developed to get information on a temporal scale.
- CMECS may not be the most useful tool for defining change over time. However, CMECS should not be expected to answer all questions.

- More information is needed on how CMECS could support Coastal Marine Spatial Planning (CMSP).

### **Benthic Biotic**

1. *What are the advantages/disadvantages of using CMECS to address the variety of scale of information needed by managers?*

#### Advantages

- CMECS has a variety of user-defined spatial scales that are easily applied.
- Temporal scales can be described through multiple applications of CMECS over time.
- CMECS establishes a foundation by allowing future studies to use same terms, units, or criteria and provides a point of comparison.
- CMECS can be used to create predictive maps.
- CMECS can be applied to other data models that might include temporal scales.
- CMECS provides a dictionary that is not tied to mapping.
- CMECS is more all-inclusive, where other classifications are more specific (e.g., classifies only wetlands).

#### Disadvantages

- It is unclear how to incorporate data of different resolutions. A common denominator is needed. Good metadata is needed.
- Do temporal modifiers need to be adjusted in CMECS framework?
- CMECS is too tied to mapping (e.g., layers). It could be more useful to managers if it was not so closely linked to maps.

2. *What would be the process for developing “biotopes” for the West Coast?*

- Biotopes need to be better defined for the West Coast.
- Biotopes should be defined on a case-by-case basis; no static definitions.
- Biotopes were intended to be defined by proper sampling and analysis.
- A pilot project will help inform how to define biotopes and whether or not defining biotopes will be useful.

3. *What are the advantages/disadvantages of using CMECS ecological classifications to begin to define functional ecosystem or community units (e.g., rocky intertidal or kelp & shallow rock)?*

- It is unclear whether or not functional ecosystems need to be defined separately from biotopes.
- The advantage of the benthic biotic component is that there is room for change based on research and development of CMECS. A pilot study would help to further develop CMECS.
- An advantage of CMECS is that there is utility in standardizing a classification method.

## Water Column

### 1. *What are the advantages/disadvantages of applying the water column CMECS component on the West Coast?*

#### Advantages

- California has a maturing ocean observing system (OOS) with an abundance of data on the Water Column that could be used in CMECS now. OOSs are already integrating data and displaying real-time data.
- CMECS as a taxonomy application is based on management questions and can integrate water column features that aren't typically considered by management and the biological sciences.
- CMECS is a good platform for developing a common language among disciplines.
- CMECS is helpful in making connections between biota and hydroforms, something still lacking in most analysis.
- National standard is adaptive; flexible enough to address regional/local questions
- CMECS would push the science – force the development of a common language

#### Disadvantages

- Least developed component-needs refinement, especially for the West Coast
- Very difficult to organize temporal/dynamics aspects of data. How do you draw the “temporal” line on ocean processes (e.g. upwelling torque)? There is a need for better development of the space and time components in the Water Column Component.
- There is a need for definable criteria within CMECS (e.g., eddie persistence) set over some time period; define the permanence of a Water Column feature.
- CMECS' terminology and features are not far enough along to be useful for providing context for biota/habitat.

### 2. *Can CMECS adequately address habitat/species dynamics, including variation in spatial and temporal scales?*

- It is unclear how to adequately express dynamic nature of water column in context with biota.
- Water column components are not applicable to all things.
- CMECS needs definable criteria (like eddies or wave energy) that are set over some time period.
- The level of permanence of a feature needs to be better defined. Do we want to map upwelling if it happens over a few years? Do we want to delineate such processes on a map?

- CMECS could answer questions based on thresholds (much like TMDLs); thresholds would vary for different biota.

**7. Group Discussion: Applying CMECS to Management: How can the CMECS framework foster integration among disciplines?**

*Kathy Goodin, NatureServe, and Mark Finkbeiner, NOAA Coastal Services Center, led a discussion around how the different components of CMECS can be integrated to address management needs. The group brainstormed management questions that CMECS could address for marine protected area monitoring and siting and permitting a renewable energy project. The group acknowledged that the way the CMECS components are integrated will depend on the management question being addressed.*

**8. Group Discussion: What are the critical criteria to consider in developing a pilot project?**

*Pam Rittelmeyer, Ocean Protection Council, shared that OPC is considering supporting a pilot project for developing ecological classifications. She asked the group to provide feedback on critical to consider if the OPC were to pursue a pilot project. The following criteria and recommendations for how to move forward with a pilot project were shared and discussed:*

*Location*

- Most participants recommended choosing a location with the widest range of data and the best data density. A few also suggested choosing a location that is not pristine, like LA County) where a pilot could look at anthropogenic components of the system, like seawalls, trash, etc.
- Choose a location that can test for unique ecological features of California (e.g., estuaries, underwater canyons, upwelling zones).
- Choose a location where you can evaluate how multiple sources of existing data cross-walk into CMECS.
- Choose a location where all components of CMECS can be used in one project.
- Choose a location that includes the upstream boundaries of CMECS (e.g., the upper extent of an estuary). This is a very relevant management/jurisdictional component.
- Choose a location where a priori knowledge exists.
- Several participants suggested choosing the entire Monterey Bay as the location of the pilot project. The Bay could be characterized as a whole, and MPAs could be characterized as well. This pilot could approach various management questions at once.

*Level of Data Availability*

- Most participants recommended that the pilot project should be in a data rich area, especially for biological data, because that would provide plenty of information to evaluate the components of CMECS. This will also be the more cost effective approach because the state won't have to invest in up front data

collection. A pilot in a data rich area will help to define biotopes in a more reliable way.

- A few participants countered that the pilot should be in a data poor area because this is representative of more of the state's coastline. It is important to understand how effective an ecological classification standard can be in a region where more information is needed. Others added that a data poor environment can be artificially created by withholding data, and that in turn can validate the CMECS approach.

#### Size

- The pilot should be sufficiently large to test as many CMECS components as possible.
- The pilot should be sufficiently large to capture a range of habitats.

#### Scope

- The pilot should look at both regional management scales and local scales.
- Consider doing two pilots, and use the same analysis in different locations with different ecological conditions. A possibility would be the Santa Barbara Channel and the North Central Coast.
- The pilot should use multiple observational technologies.
- The pilot should test CMECS' ability to produce something more than maps.

#### Management Opportunities and Funding

- Since CMECS is a tool to inform a study, it is most important to identify the questions that the pilot project will address first, and then choose an appropriate location accordingly.
- The pilot should test the question: Does this taxonomy work for us? This is an opportunity to shape the policy dialogue, as some of the refinements (e.g. modifiers) would become part of the national standard.
- Consider combining the pilot with the NOAA Integrated Ecosystem Assessment (IEA) data collection effort along the central coast.
- Consider addressing existing management issues that already have funding. For example, there is a new trawl fishery opening in the central coast and this could be useful to evaluate.
- Evaluate CMECS in the pilot project so California can help shape federal standards.
- Consider whether critical thinking and application of CMECS provides opportunities to engender new questions in the marine environment.

#### Collaboration

- Collaborate with other data collection efforts in areas inside and outside California.
- Work with key management agencies on the pilot project to assure that all are interpreting CMECS definitions and guidance the same way.

Participants also recommended that OPC identify a number of *metrics* by which the success of the pilot could be evaluated. Suggested metrics included:

- Ease of use of information for scientists and managers.
- Whether or not biotypes are developed that are useable to managers.
- Degree to which CMECS is advanced.
- Degree to which science is advanced. E.g., degree to which understanding of offshore biology and geology is advanced.

**9. Closing Remarks and Next Steps**

*Sheila Semans, OPC*, thanked participants for attending and providing valuable input. She explained that over the next several months, OPC will be considering the input received and continue to evaluate the potential for CMECS in California and whether or not to support a pilot project. There is no specific timeline for implementation at the moment. If OPC arrives at an approach for a CMECS pilot project, the OPC will likely hold additional meetings on each of the components to further evaluate more specific issues.

## APPENDIX 1 – WORKSHOP PARTICIPANTS

Adrienne Harris, Morro Bay National Estuary Program  
Annie Gillespie, Morro Bay National Estuary Program  
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Lisa Gilbane, Bureau of Ocean Energy Management, Regulation and Enforcement  
Lisa Krigsman, National Marine Fisheries Service  
Liz Whiteman, MPA Monitoring Enterprise, OST  
Marilyn Latta, State Coastal Conservancy  
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### **OPC/OST Workshop Staff:**

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### **Facilitators:**

Eric Poncelet, Kearns & West  
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## **APPENDIX 2 – WORKSHOP AGENDA**