Final report

Advancement of the Coastal and Marine Ecological Classification Standard to Final Draft:

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Executive Summary

This project has advanced the Coastal and Marine Ecological Classification Standard (CMECS) from the review draft stage to the final draft stage of the FGDC Standard Approval Process. NatureServe coordinated the process by working with NOAA, and members of the CMECS Implementation Group (IG) and the CMECS Working Group (WG) to address public and peer review comments, solve technical issues that arose from the comments, and revise the CMECS standard to reflect the suggestions made during the public review process. During this project NatureServe, the IG, and the WG revised the CMECS structure and content to incorporate reviewer comments (over 800 suggestions from more than 31 agencies/ individuals) into the Standard. We completed the revision of the CMECS framework and made all necessary changes and additions to the units in each of the five components. Changes reflect specific suggestions from reviewers. We addressed all reviewer comments, and formally documented our responses. A completed standard and responses to comments were delivered to FGDC in January, 2012. As part of our outreach strategy we gave presentations on CMECS at Coastal GeoTools Conference (March 2011), Coastal Zone Conference (July, 2011), and EMECS conference, August, 2011). We also completed a set of webinar materials on CMECS and presented them to the California State Coastal Conservancy and the Ecosystem Based Tools Network.

Project Narrative

The project was completed according to the schedule and process outlined in the project proposal. There were no major challenges encountered – mostly due to the extreme dedication and hard work of the CMECS Implementation Group (IG) and the CMECS Working Group (WG) – see Annex 1 for a listing. The IG took the lead in on working with issue teams to develop proposals in response to the nearly 800 comments we received from 31 individuals or agencies. Issue teams addressed each of the components separately. Throughout the process, we convened regular WG meetings to allow for approval of all proposals. We also held a 5 day workshop called "CMECS Camp" (see below) to allow IG and WG members to work together on specific issues. The issue teams developed revised versions of the all four CMECS components (Biotic, Substrate, Geoform, and Water Column) and both settings (Aquatic Setting and Biogeographic Setting. These teams conducted their own research, consulted additional experts as needed, and considered the public comments in developing their latest versions. The result was an updated "Version 4.0" of CMECS that was delivered to FGDC for approval in January, 2012 along with a response report documents how each comment was addressed during the comment review and revision process. The public may access Version 4.0 available at http://www.csc.noaa.gov/benthic/cmecs/CMECS_Version%20_4_Final_for_FGDC.pdf, and the "Response to Comments" document is available at http://www.csc.noaa.gov/benthic/cmecs/.

Overview of Revisions

The following are the highlights for revisions made to each component. All of these proposed changes have received vetting through the Implementation Group and Working Group. Table 1 summarizes the updated CMECS Structure.

Table 1. CMECS Settings and Components.

Biogeographic Setting (BS)	Aquatic Setting (AS)	Water Column Component (WC)	Geoform Component (GC)	Substrate Component (SC)	Biotic Component (BC)
Realm *Province* *Ecoregion*	*System* *Subsystem* *Tidal Zone*	**Layer Subcomponent**	**Tectonic Setting Subcomponent**	*Substrate Origin* *Substrate Class* *Substrate Subclass* *Substrate Group* *Substrate Subgroup*	*Biotic Setting* *Biotic Class* *Biotic Subclass* *Biotic Group* *Biotic Community*
		Salinity Subcomponent	**Physiographic Setting Subcomponent**		
		Temperature Subcomponent	**Level 1 Geoform Subcomponent** *Geoform Origin* *Level 1 Geoform* *Level 1 Geoform Type*		
		Hydroform Subcomponent *Hydroform Class* *Hydroform* *Hydroform Type*	**Level 2 Geoform Subcomponent** *Geoform Origin* *Level 2 Geoform* *Level 2 Geoform Type*		
		Biogeochemical Feature Subcomponent			

Biotic Component (team members: Kathy Goodin, Mark Finkbeiner, Larry Handley, Giancarlo Cicchetti; additional experts consulted: Tom Hourigan, Dan Dorfman, Kathleen Sullivan-Sealy, David Palandro)

- Corals were reorganized according to growth morphology and updated to reflect deep-water/cold-water reef units.
- National Vegetation Classification association units were incorporated for vegetated classes at the biotic community level.
- Algae were organized according to growth morphology.
- Faunal beds were organized according to their response to the substrates in which they occur (attached on hard surface or living in or on soft sediments).

Substrate Component (team members: Giancarlo Cicchetti, Mark Finkbeiner, Kathy Goodin)

- The Wentworth size system was incorporated into this component.
- The Folk system (a follow-on to Wentworth) is being used to describe sediment mixes.
- Substrates were organized according to their origin: Biogenic, Geologic, and Anthropogenic.

Geoform Component (team members: Mark Finkbeiner, Kathy Goodin, John King, Emily Shumchenia, Guy Cochran, Larry Handley; additional expert consulted: Phil Schoenberger)

- New units proposed during the public review were incorporated.
- A spatial scale framework was established
- Deep-Water/Cold-Water coral morphologies were added to existing coral forms.
- Additional units from the west coast and from geological dictionaries were incorporated.
- Geoforms were organized according to their origin: Biogenic, Geologic, and Anthropogenic.

- The old physiographic provinces were removed in lieu of having a Biogeographic Setting as a major organizer. New physigographic provinces based on morphology were created.
- A tectonic setting subcomponent was added.

Water Column Component (team members: Chris Madden, Garry Mayer, Becky Allee, Saundra Upchurch, Mike Rasser, Kathryn Ford, Ed Rutheford, Jan Kurtz)

- An organizing framework for this component and subsequent units was developed. Layering, salinity, temperature, hydroforms and biogeochemical features are all now identified as subcomponents of this component. All units were defined and described.
- Hydroforms were reorganized based on feedback from the WCC workshop hosted b NOAA that was held in January, 2011.

Biogeographic Setting (Kathy Goodin, additional experts consulted: Mark Spalding, Helen Fox)

- The Marine Ecosystems of the World system was adopted to form this new setting because of its global focus.

Sub-Benthic Component (eliminated)

- This component was eliminated from CMECS and users will be encouraged to use existing FGDC soils standard and USDA emerging subaqueous soils standard if they have the need to classify subaqueous soils.

Workshops:

We held one workshop to further our work on the Standard.
a) June 6-10
b) CMECS Camp – hosted by NatureServe
c) NatureServe Headquarters, Arlington VA
d) CMECS Camp
e) <u>In-Person Attendees</u>

NOAA: Becky Allee, Mark Finkbeiner, Garry Mayer
NatureServe: Kathy Goodin, Chris Madden
USGS: Larry Handley
University of Rhode Island: John King, Emily Shumchenia
US Army Corps of Engineers: Jan Kurtz

<u>Phone-WebEx Attendees</u>
USGS: Guy Cochran
EPA: Giancarlo Cicchetti
NOAA: Ed Rutheford
BOEMRE: Mike Rasser
University of Southern Mississippi: Steve Lohrenz

f) 14 attendees
g) The workshop resulted in major revisions to the framework and all units. We completed responses to all comments from the Geoform and Water Column component, and made significant headway in responding to comments regarding thresholds for the Biotic Classes and Subclasses, and Water Column Component. We endorsed the decision to use the Wentworth and Folk classifications as the basis for the Substrate Component and decided to eliminate the Sub-benthic component from CMECS. Participants commented that this was perhaps one of the most productive workshops of their careers!

Final Products

We completed the writing of the standards document and the comment response document and delivered it to the FGDC in January, 2012. The standard document was vetted through the WG and a professional editor prior to delivery.

Outreach

As part of our outreach strategy we gave presentations on CMECS at Coastal GeoTools Conference (March 2011), Coastal Zone Conference (July, 2011), and EMECS conference, August, 2011). We also completed a set of webinar materials on CMECS and presented them to the California State Coastal Conservancy and the Ecosystem Based Tools Network.

Next Steps

As a follow-up to the production of Version 4.0the CMECS IG intends to develop 1) an implementation plan that identifies a strategy for long-term governance and maintenance of CMECS (including the implementation of the dynamic content standard approach), 2) a series of user guides that will help with implementation using different technologies, 3) and updated online catalog of CMECS units and 4) a plan to fully develop CMECS units for the Great Lakes.

The IG will continue to function as the steering committee for CMECS, but it is desirable for additional agency representatives to help support their efforts. The exact governance structure needs to be determined by the agencies. NatureServe will continue to support these efforts as funding is available. FGDC could be of assistance in this process by helping to identify stakeholder agencies and individuals willing to serve on the committee.

Feedback on Cooperative Agreements Program

The Cap Program provided the necessary assistance at a critical phase of CMECS development. The funds supported NatureServe to lead the effort at a time when dwindling federal funds made it difficult for federal IG members to devote the level of resources needed to complete the project. This funding allowed NatureServe to continue working on the project at a time when agency funds were diminished. The project would have been delayed or even abandoned had the CAP funds not come when they did.

The CAP staff was attentive to our needs during the project and responded to information requests in an efficient manner. The CAP program manager requested monthly update conference calls. This was perhaps more often than needed given the duration of the grant and the relatively small amount of funding. We appreciated that they made themselves available, but would suggest that quarterly calls are sufficient to report on progress.

The only major challenge of this process was coordinating the work of a group of volunteers. CMECS represents only a small portion of most IG member's job duties their ability focus their attention fully on CMECS was limited. Likewise the WG is an all-volunteer group and it was difficult to get sustained focus from all individuals on the WG. The process could have gone faster and more efficiently if we had the ability to direct and pay for the time of the participants and to meet face-to-face more frequently. We felt very lucky to be able to have CMECS camp, as it was a very efficient and productive event. That said, the project progressed according to the pace we anticipated – mostly due to the dedication and hard work of IG members.

Annex 1

CMECS Implementation Group (IG) and Working Group (WG) Members

***INDICATES ALSO A MEMBER OF IG*

Member	**Affiliation**
Allee, Rebecca J. *	NOAA
Battista, Tim	NOAA
Bradley, Mike	University of Rhode Island
Cicchetti, Giancarlo*	US EPA
Cochrane, Guy R.	USGS
Cross, Jeffrey N.	NPS
Diaz, Robert	Virginia Institute of Marine Science
Finkbeiner, Mark *	NOAA
Ford, Kathryn H.	Massachusetts Division of Marine Fisheries
Goodin, Kathleen *	NatureServe
Handley, Lawrence R.*	USGS
King, John	University of Rhode Island
Koski, K V.	NOAA
Kurtz, Janice C	US EPA
Lohrenz, Steven E.	University of Southern Mississippi

Long, Mike	US EPA
Madden, Christopher J.*	NatureServe Contractor
Mayer, Garry F.*	NOAA
McCreedy, Cliff	NPS
Miller, Katharine B.	NOAA
Morrison, Duane N.	US Army Corps of Engineers
Moses, Christopher S.	NOAA
Odell, Jay	The Nature Conservancy
Rutherford, Edward	NOAA
Sullivan- Sealey, Kathleen	University of Miami
Simons, James	Texas Parks and Wildlife Department
Stolt, Mark H.	University of Rhode Island
Upchurch, Saundra	South Carolina Department of Natural Resources
Weber, Jeffrey A.	Oregon Department of Land Conservation and Development
Wilen, William O.	US FWS
Wozencraft, Jennifer M.	US Army Corps of Engineers