Tidal Marsh Accretion Modeling Workshop

(July 27-30 2010, Sapelo Island GA)

The Tidal Marsh Accretion Modeling Workshop was a three-day workshop hosted by Dr. Christopher Craft of Indiana University. The overarching goals of the workshop were to compare and compile data on marsh accretion rates and drivers of accretion across a range of coastal vegetated systems in the conterminous U.S. that can be used to test Dr. Jim Morris' model of marsh accretion, Marsh Equilibrium Model II (MEM II), and to outline a proposal to calibrate and validate MEM II across a range of costal systems. The workshop was held at the University of Georgia Marine Institute at Sapelo Island, Georgia, from July 27th through July 30th, 2010. There were nine workshop participants and three additional student facilitators/participants. The participants of the workshop included:

Dr. Christopher Craft (host/organizer)	Indiana University (GCE LTER)	
Dr. Steve Pennings	University of Houston	(GCE LTER)
Dr. Jim Morris	University of South Carolina	(PIE LTER)
Dr. Chuck Hopkinson	University of Georgia Sea Grant	(PIE LTER)
Dr. Linda Blum	University of Virginia	(VCR LTER)
Dr. Bob Christian	East Carolina University	(VCR LTER)
Dr. Tom Smith	USGS	(FCE LTER)
Dr. Don Cahoon	USGS	
Dr. John Callaway	University of San Francisco	
Dr. John Rybczyk	Western Washington University	
Dr. Joe Schubauer-Berigan	US EPA	
John Marton	Indiana University	
Ellen Herbert	Indiana University	
Anya Hopple	Indiana University	

Dr. Tom Smith and Dr. Don Cahoon were unable to attend. However, prior to the workshop, Dr. Smith provided preliminary site information and Dr. Cahoon provided data for a presentation given by Dr. Craft. Dr. Joe Schubauer-Berigan (US EPA) also participated, though he was not originally listed as a participant. The three Indiana University students, John Marton (PhD student), Ellen Herbert (PhD student), and Anya Hopple (BSES), acted as workshop facilitators preparing materials, setting up facilities, preparing meals, and sitting in on the workshop sessions. Ellen Herbert served as a

recorder for the sessions and drafted an initial outline of a proposal and budget during the sessions. She will help write the final proposal based on the products of the workshop.

Participants arrived at the Marine Institute on the evening of Tuesday, July 27th (excluding Dr. Craft and his students who arrived on the 25th and 26th, respectively). The workshop started Wednesday July 28th with a brief introduction of participants and goals of the workshop by Dr. Craft. Dr. Morris offered an introduction to the development and use of MEM II, including the data collection methods for model inputs. During this presentation we explored MEM II outputs under various scenarios and tested the limits of the online version of MEM II (http://jellyfish.geol.sc.edu/model/marsh/mem.asp). Participants spent the remainder of the Wednesday session presenting and discussing data on accretion rates and measures of drivers of accretion from their various study sites. Dr. Craft presented data from salt, brackish, and fresh tidal marshes within Georgia Coastal Ecosystems LTER, as well as Dr. Cahoon's data from Cedar Island, North Carolina, and several Gulf Coast salt marshes (Old Oyster Bay, LA, Rookery Bay, FL). Dr. Blum and Dr. Christian presented data from the salt marshes of the Virginia Coast Reserve. In the afternoon Dr. Callaway presented accretion data from natural and restored salt marshes of the San Francisco Bay, California and Dr. Rybczyk presented accretion data from eelgrass beds in Padilla Bay, Washington. Throughout the rest of the workshop, we continued to run scenarios in MEM II based on empirical data from our research sites as well as imagined scenarios.

Thursday July 29th was devoted to the synthesis of the Wednesday session and the development of a proposal outline. We discussed the strengths and limitations of the MEM II model and how it could be used to inform coastal management in the face of global climate change and sea level rise. MEM II was developed and validated for a mono-specific salt marsh (North Inlet, South Carolina) and we discussed the utility of expanding the its use into other types of coastal vegetative systems (e.g. mixed vegetation communities, mangrove, sea grass etc.). Based on presentations from the previous day, which were weighted towards east coast marshes, we discussed additional Gulf and West Coast sites (and partners) which may have long-term accretion data that can be used to validate MEM II.

We outlined a proposal to employ MEM II to answer the following questions:

(1) Can we explain the variation in the responses of coastal marshes to sea level rise in terms of simple physical and biological drivers and physical-biological feedbacks in a parsimonious conceptual framework?

(2) Can this same framework explain the response of other coastal vegetated systems to sea level rise?

(3) Can we predict conditions associated with “vulnerable” coastal vegetated systems?

We discussed data gaps in site-specific data sets and how best to collect this data to fill these gaps to test and validate MEM II. We also discussed the education and outreach component of the proposal, including projects and support for several graduate and Post-doctoral positions to complete various data collection and model validation tasks. We also developed a budget for the project.

Dr. Craft and his students will develop an initial proposal draft with the help of Dr. Morris and other collaborators. We plan to submit a proposal to the NSF Macrosystems Biology Program (http://www.nsf.gov/pubs/2010/nsf10555/nsf10555.htm) in April 2011.

All in all, the workshop was considered a big success by the participants and the organizer. Participants were impressed by execution of the workshop activities, including the planning, scheduling, and logistics of hosting it on Sapelo Island. Everyone felt that, in the proposal outline, we assembled a strong set of research questions as well as personnel, study sites, and methodologies to answer the questions. We will assemble a subset of the participants later in the fall to hammer out the details (sites, partners, data collection) of the proposal.