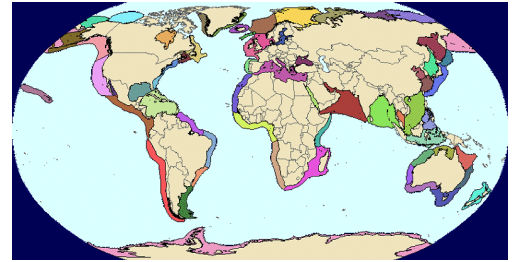


Class meetings on Tu-Th @ 2pm; W01-0058

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Course Description: 40 years of CZM – are we designing for disaster or success?

In general, coastal ecosystem management is a complex study and practice that integrates multidisciplinary natural and social sciences. It requires continuous exploration and knowledge about the relationships between habitats, applied ecology, climate, oceanography, watersheds and all types of human activities that affect coastal ecosystems as well as coastal communities (e.g. urban development, tourism, fisheries, protected areas, aquaculture, agriculture, etc.). There are numerous issues facing the world's coastlines and the key question is whether the coasts can be managed to successfully and sustainably absorb the pressures. Understanding of coastal ecosystem's "function, health and resilience" is an imperative for successful applications in adaptive coastal ecosystem management. Although it is a huge challenge to manage world's coasts, we do have the knowledge, science and technology to use coastal resources in a sustainable way. My premise in teaching this course is that "*The environment sets the limits for sustainable development and coastal stewardship.*"

Background for Discussion: "Coastal management arenas in the past 40 years established profound phrases that seemingly capture the substance and urgency of the habitat component of the larger coastal and ocean planning equations. Examples include: ecosystem-based management, no net loss of wetlands, precautionary management, adaptive management, effective stewardship, compensatory mitigation, sustainable tourism, sustainable fisheries; phrases that all fit under Integrated Coastal or/and Ocean Management and Planning. However, projects that directly eliminate habitat, or watershed decisions that indirectly eliminate even larger habitats, continue to occur at high rates with relatively few constraints on the issuance of permits for new projects. A variety of problems, widely known in the permitting world, yet absent from workshops and conferences, are present and require urgent attention. Commonly, environmental impact assessments are little more than explicit efforts to justify any project, any time. Cumulative impacts are still rarely considered in any detail, even in thick, expensive documents regarding environmental sites that have already endured a dozen prior anthropogenic disturbance events. Millions of dollars have been spent on monitoring of human use impacts, commonly using protocols that often do not meet minimum standards of scientific rigor. Mitigation is simply the cost of doing business with a similar absence of quality monitoring, particular in terms of long term "compensation". Lobbyists for various industries have an order of magnitude more influence with decision makers than any other expert or user-group. Without explicit recognition and action regarding these unmentionable issues, integrated coastal and recently ocean management and planning and its entire component phrases will remain a theoretically robust and functionally hollow paradigm. What is the answer? What would nature do? Ultimately, the environment sets the limits of our world's sustainable development. Therefore it is our responsibility to address the question: How does nature 'feel' about and respond to what we do and how we do it?" (Frankic, 2009)

Chapters and Texts from below books will contribute to your assignments:

1. Introduction to Coastal Zone Management. T. Beatley, D.J. Brower, and A.K. Schwab, Island Press. 2002.
2. Ecology and Management of Coastal Waters. Gilbert Barnabe and Regine Barnabe-Quet, Springer, 2007.
3. Biomimicry – Innovation inspired by nature. Janine Benyus, 1997. www.biomimicryinstitute.org
4. Gaining Ground – A History of Land making in Boston. Nancy Seasholes. MIT Press. 2003.
5. A Lasting Impression – Coastal, Lithic, and Ceramic Research in New England Archeology. Edited by Jordan E. Kerber. **Native Peoples of America**. 2002.

Grade Evaluation and Policies:

Grading will be based on three papers/essay (20% each), working group's study project and presentation (30%); attendance/preparedness/participation (10%).

Your final letter grade will be based on the following percentile ranges:

92 - 100 = A

81 - 91 = B

70 - 80 = C

To be successful in this course, you are expected to attend class regularly, prepare for class by reading assigned work prior to class meetings, participate in discussions and group class assignments; participate in the field trips; and ask questions in/out of class.

Teaching Goals & Objectives:

The students will be introduced to: (1) a comprehensive but brief overview of different types of coastal ecosystems; (2) the brief history of coastal management; (3) different uses and impacts on coastal ecosystems, (4) major issues facing coastal areas today and emerging issues of importance in the future; (5) an overview of major international, federal and state coastal laws and policies; (6) basic principles and methods in adaptive coastal ecosystem management, based on the best available knowledge and technologies for optimal and sustainable uses of coastal resources; and (7) students will learn a basic use and applications of GIS in coastal management.

The prerequisite to engage and enjoy this course is to think critically, eloquently and to be curious. **There will be several field trips scheduling depends on weather and tides (boat and field trips, Deer Island visit).**

COURSE ASSIGNMENT DESCRIPTIONS**What, where, why, how and when?**

Note: your three assigned papers can be related and build on each other!

#1 Nature Case Study (12 font, times, 5 pages not including references, tables, figures): Preferable from the list of *Species/habitats of Concern in MA/NE region*:

<http://www.mass.gov/dfwele/dfw/nhosp/nhosp.htm>

Student is required to develop 'a profile' about an animal/plant species or/and a habitat and its conservation management regime that has been established to protect the animal/plant or habitat. This profile should include the following information:

- 1) Information on the "life cycle/ecology" of the species/habitat;
- 2) Characterization of the abundance and distribution of the species or habitat (use GIS maps)
- 3) Characterization of the habitat needs/requirements and/or migration patterns of the species;

#1 DUE ON Sept 27

#2 - Coastal Issue Case Study (5 pages same as above): describe a particular issue or problem facing coastal environments preferable in MA (e.g., wetland loss/restoration, beaches loss, human health, biodiversity loss, brown fields, etc), or NE region in terms of the available knowledge (sciences) and

Technology; identify relevant state and federal policies or programs that are currently in place to address the issue you select as your paper's topic. In your paper include characterization of the relevant 'ecosystem based management' related (or any other type of existing management) to the coastal issue you are addressing; or selected species or habitat; and provide an overview and assessment of potential future scenario of selected species or habitat in light of your approach; please provide recommendations and suggestions what would you do! <http://www.mass.gov/czm/>;
<http://www.mass.gov/envir/massbays/pdf/sob2004.pdf>

#2 DUE ON Oct 18

#3 - Policy Essay: 3-page policy essay should be written as if the student is a policy analyst for a state (e.g. MA CZM, DCR, DOER) or federal agency (e.g. EPA, NOAA, USGS), and should focus on: 1) a statement of the problem, 2) how state or/and federal policy addresses or fails to address the problem, and 3) recommendations for program development in the policy and management areas.

#3 DUE ON Nov 15

Problem examples: Sea level rise and coastal erosion issues; Impacts from the MWRA discharge to Massachusetts and Cape Cod Bays? Levels of toxic contaminants in tissues of shellfish in Massachusetts and Cape Cod Bays? Restoration efforts and improvements to coastal wetland areas? Invasive marine species in MA and Cape Code bays; local beaches and human health risks; energy uses in coastal areas; climate change and impacts, etc.

#4 Working group assignment: BAY EXPO (5 page report document and 15 min presentation to be scheduled)

#4 DUE ON Dec 6

Competition and evaluation will be based on how to best assess, develop and apply your team's green and sustainable vision of the Bay Expo part of the Boston Harbor and future part of the UMB campus! What does the sustainable campus need? What type of natural habitats, water quality, boats, and infrastructure? How about sea level rise, pollutions and energy adaptations? Who are local communities – past and present?

- Find out about traditional knowledge and Native American history and presence in this area?
- Group Work will start on Sept 13;
- **Group presentations** (use your own imagination and inspiration)
- Your work will provide useful comments, suggestions to the UMass Boston, City of Boston, the GBH team, public and surrounding nature and contribute to the future sustainable universities and Green Harbors;
- Get involved and establish an ownership of your living, working and studying place!

The working group course assignment will introduce students to a holistic science approach to coastal ecosystem research, education, and stewardship. The purpose of your approach is to help students, scientists, policy-makers and communities ensure that "the environment sets the limits" for human activities on the coast. The working group project will introduce a holistic *process* that includes the full range of both analytic and intuitive knowledges, holistic *content* including geological, chemical, biological and ecological data, and holistic *communities* (scientists, local citizens, and in particular, indigenous communities).

Including time in the field and in GIS lab, students will work together to integrate each of their own special knowledge areas/expertise (chemistry, biology, policy, geology etc.) into a comprehensive and interdisciplinary simulation of holistic science, education and stewardship addressing a selected environmental issue in Boston Harbor.

Successful completion of the working group project may enable the group to present and publish their results or any other desired venues.

Please check and join the Green Boston Harbor Project: www.gbh.umb.edu

Related Readings:

- Adger, W.N. 2000. Social and ecological resilience: are they related? *Progress in Human Geography* 24, 3: 347-364.
- Berry, W. The Idea of Local Economy. Orion (Winter 2001).
<http://www.orionmagazine.org/index.php/articles/article/299/>
- Clark J.S., et al. 2001. Ecological Forecasts: An Emerging Imperative. *Science* 293. 27 July: 657-660.
<http://www.sciencemag.org/cgi/content/full/293/5530/657>
- Dulvy, N.K., R.P. Freckleton, and N.V.C. Polunin. 2004. Coral reef cascades and the indirect effects of predator removal by exploitation. *Ecology letters* 7: 410-416
- Frankic, A. and L.Greber. 2011. A Holistic Science Approach to Living within Coastal Ecosystems in Boston Harbor and Beyond. *The International Journal of Environmental, Cultural, Economic and Social Sustainability*. Vol 7, #3, 2011, <http://www.Sustainability-Journal.com>, ISSN 1832-2077
- Hershman, M.J., et al. 1999. The Effectiveness of Coastal Zone Management in the United States. *Coastal Management* 27: 113-138.
- Jackson, J.B.C. 2001. What was natural in the coastal oceans? National Academy of Sciences colloquium, "The Future of Evolution," held March 16-2000. Irvine, CA: 5411-5418.
<http://www.pnas.org/cgi/content/abstract/98/10/5411>
- Jackson J.B.C., et al. 2001. Historical Overfishing and the Recent Collapse of Coastal Ecosystems. *Science* 293. 27 July: 629-63.
- Malone, T.C., R. O'Malley, and M. G. Altalo. 2007. Quantitative Assessments of the Condition of Marine Ecosystems: The Need for the Coastal Module of the Global Ocean Observing System. NOAA/IO
- Meadows, D. 2009. Economics and Limits to Growth: What's Sustainable?
<http://www.energybulletin.net/node/51127>
- Norton, B. 1995. Ecological Integrity and Social Values: At What Scale? *Ecosystem Health* 1, 4:228-241.
- Noss, R.F., E.T. LaRoe III, and J.M. Scott. 1995. *Endangered ecosystems of the United States: A preliminary assessment of loss and degradation*. Biological Report 28. US Department of the Interior. Washington, DC.
<http://biology.usgs.gov/pubs/ecosys.htm>
- Pew Ocean Commission. 2004. *America's Living Ocean*. <http://www.pewoceans.org/>
- US EPA. 1996. *Environmental Indicators of Water Quality in the United States*. Office of Water.
<http://www.epa.gov/bioindicators/>
- U.S. Commission on Ocean Policy. 2004. *Preliminary Report*. <http://oceancommission.gov/>
- Watson, R. and D. Pauly. 2001 The Systematic Distortion in World Fisheries Catch Trends.
<http://www2.fisheries.com/archive/members/dpauly/journalarticles/2001/systematicdistortionsworldfisheriescatchtrends.pdf>

Attendance Policy:

Attendance is mandatory and will be monitored. Attendance will be considered when deciding borderline grades. **Any excused absence requires a neatly written or typed explanation of why you will miss or have missed and must have supporting documentation** (Dr. excuse, tow bill, etc.). It is your responsibility to submit the documentation during office hours and discuss the missed test, class or assignment with me when you return to class and before the end of the semester – no exceptions. For matters regarding academic dishonesty and misconduct, please refer to the UMASS Boston Code of Student Conduct: www.umb.edu/student_affairs/programs/judicial/csc.html
www.cpcs.umb.edu/support/student-support/red_book/policies_academic_dishonesty.html

If you have a disability and feel you will need accommodations in order to complete course requirements, please contact the Ross Center for Disability Services (Campus Center 2nd floor, Room 2010, at 617-287-7430.