

## Natural history and Management of Marine Biodiversity Hot Spots

### Spring 2016: The Gulf of California

2 Units (1:20 hours class session)

Instructors: Octavio Aburto-Oropeza and guest speakers from the Gulf of California Marine Program

Course summary:

The concept of biodiversity hotspots, a term coined by N. Myers, developed from a growing consensus among scientists and conservationists of the emerging global crisis related to rapid declines in biodiversity, widespread degradation and loss of terrestrial and marine habitats, and a growing awareness of the additive effects of climate change. Within the original philosophy was the practical vision that due to the lack of resources or time necessary to protect all species and habitats under threat, we need to prioritize our efforts to protect the greatest proportion of species with minimal cost.

The hotspots concept was immediately attractive as a key priority for conservation planning and has since steered the agendas of conservation agencies globally. It has, however, not been as efficient or effective as once presumed and lacks key components that help explain how this concept can be applied to solve the management of natural resources in these regions.

During this course we will discuss different topics surrounding the natural history and conservation of biodiversity hotspots and regularly summarize which information is important in real-world management.

Each lecture will consist of a 25-30 minutes presentation by the instructor and 50 minutes of discussion / activities of 2 specific papers and related general literature (e.g. newspapers, blogs, etc.) about the topic. Should you come across an interesting article you feel is worthy of discussion, feel free to bring it to class for possible inclusion in the discussions.

**GRADING:** Attendance 20 points (20%), Participation 5 points (5%) and Final project 75 points (75%). The final project will be a short essay about a specific topic related with the region.

**NOTICE:** Due to a field expedition, the first two lectures will be taught on the third week of the quarter, and the last two lectures will be taught on the last week.

Weeks	Discussion topic	Literature
Lecture 1 (4/15)	Hot spots and Ecoregion concepts	<ul style="list-style-type: none"> <li>• Myers, N., Mittermeier, R. A., Mittermeier, C. G., da Fonseca, G. A. B., &amp; Kent, J. (2000). Biodiversity hotspots for conservation priorities. <i>Nature</i>, 403(6772), 853–858.</li> <li>• Spalding, M. D., Fox, H. E., Allen, G. R., Davidson, N., Ferdaña, Z. A., Finalayson, M., et al. (2007). Marine Ecoregions of the World: A Bioregionalization of Coastal and Shelf Areas. <i>BioScience</i>, 57(7), 573–583.</li> </ul>

Lecture 2 (4/15)	Ecosystem-Based Management	<ul style="list-style-type: none"> <li>• McLeod, Karen and Leslie, Hether. 2009. Why Ecosystem-Based Management. In Ecosystem based management for the oceans. Edited by Karen McLeod and Heather Leslie. Washington, D. C.. Island Press. 2009. xxii, 368 p.</li> <li>• E. Ezcurra, O Aburto-Oropeza, M. de los Angeles-Carvajal, R. Cudney-Bueno, J. Torre. 2009. Gulf of California, Mexico. In Ecosystem based management for the oceans. Edited by Karen McLeod and Heather Leslie. Washington, D. C.. Island Press. 2009. xxii, 368 p.</li> </ul>
Lecture 3 (4/22)	Oceanography and Fisheries	<ul style="list-style-type: none"> <li>• A. Giron-Nava, C. Lopez-Sagastegui, O. Aburto-Oropeza. 2015. On the conditions of the 2012 cannonball jellyfish (<i>Stomolophus meleagris</i>) bloom in Golfo de Santa Clara: a fishery opportunity? <i>Fisheries Management and Ecology</i>. 22(3): 261-264.</li> <li>• E. Velarde, E. Ezcurra, M.A. Cisneros-Mata, M.F. Lavin. 2004. Seabird Ecology, El Niño anomalies, and prediction of sardine fisheries in the Gulf of California. <i>Ecological Applications</i>. 14(2): 607-615.</li> </ul>
Lecture 4 (4/29)	Fishing effort and sustainable fisheries	<ul style="list-style-type: none"> <li>• Gelcich, S., T. P. Hughes, P. Olsson, C. Folke, O. Defeo, M. Fernandez, S. Foale, L. H. Gunderson, C. Rodriguez-Sickert, M. Scheffer, R. S. Steneck, and J. C. Castilla. 2010. Navigating transformations in governance of Chilean marine coastal resources. <i>Proceedings of the National Academy of Sciences</i> 107:16794–16799.</li> <li>• Anticamara, J. A., R. Watson, A. Gelchu, and D. Pauly. 2011. Global fishing effort (1950–2010): Trends, gaps, and implications. <i>Fisheries Research</i> 107:131–136.</li> </ul>
Lecture 5 (5/6)	Natural history of mangrove forests and climate implications	<ul style="list-style-type: none"> <li>• Ezcurra, P., E. Ezcurra, P. Garcillán, M. T. Costa, and O. Aburto-Oropeza. 2016. Coastal landforms and accumulation of mangrove peat increase carbon sequestration and storage. <i>Proc. Natl. Acad. Sci. USA</i> in press.</li> <li>• X. López Medellín and E. Ezcurra. 2012. The productivity of mangroves in northwest Mexico: a meta-analysis of current data. <i>J Coastal Conservation</i>. 16(3): 399–403.</li> </ul>
Lecture 6 (5/13)	Coastal habitats, people and fisheries	<ul style="list-style-type: none"> <li>• Aburto-Oropeza, O., E. Ezcurra, G. Danemann, V. Valdez, J. Murray, and E. Sala. 2008. Mangroves in the Gulf of California increase fishery yields. <i>Proc. Natl. Acad. Sci. USA</i> 105:10456–10459.</li> <li>• Octavio Aburto-Oropeza, Gustavo Paredes, Ismael Mascareñas-Osorio, Enric Sala. 2010. Climatic influence on reef fish recruitment and fisheries. <i>Marine Ecology Progress Series</i> 410: 283–287.</li> </ul>

Lecture 7 (5/20)	Spawning aggregations and fishing regulations	<ul style="list-style-type: none"> <li>• Erisman, B., Heyman, W., Kobara, S., Ezer, T., Pittman, S., Aburto-Oropeza, O. and Nemeth, R. S. (2015) Fish spawning aggregations: where well-placed management actions can yield big benefits for fisheries and conservation. <i>Fish and Fisheries</i>. doi: 10.1111/faf.12132</li> <li>• Erisman, B., Mascareñas, I., Paredes, G. (2010) Seasonal, annual, and long-term trends in commercial fisheries for aggregating reef fishes in the Gulf of California, Mexico. <i>Fisheries Research</i> 106:279-288.</li> </ul>
Lecture 8 (5/27)	Conservation of single species and coastal communities	<ul style="list-style-type: none"> <li>• Erisman, B., Mascareñas-Osorio, I., López-Sagástegui, C., Moreno-Báez, M., Jiménez-Esquivel, V., Aburto-Oropeza, O. 2015. A comparison of fishing activities between two coastal communities within a biosphere reserve in the Upper Gulf of California. <i>Fisheries Research</i> 164: 254–265</li> <li>• BARLOW, J., L. ROJAS-BRACHO, C. MUÑOZ-PIÑA, and S. MESNICK. 2010. Conservation of the vaquita (<i>Phocoena sinus</i>) in the northern Gulf of California, Mexico. In: R.Q. Grafton, et al. (eds.), <i>Handbook of marine fisheries conservation and management</i>, p. 205-214. Oxford University Press, New York.</li> </ul>
Lecture 9 (6/3)	Marine protected areas and regional productivity	<ul style="list-style-type: none"> <li>• Sala, E., O. Aburto-Oropeza, G. Paredes, I. Parra, J. C. Barrera, and P. K. Dayton. 2002. A general model for designing networks of marine reserves. <i>Science</i> 298:1991–1993.</li> <li>• Aburto-Oropeza, O., B. Erisman, G. R. Galland, I. Mascareñas-Osorio, E. Sala, and E. Ezcurra. 2011. Large Recovery of Fish Biomass in a No-Take Marine Reserve. <i>PLoS One</i> 6:e23601.</li> </ul>
Lecture 10 (6/3)	The future of the region	<ul style="list-style-type: none"> <li>• María de los Angeles Carvajal, Alejandro Robles, and Exequiel Ezcurra. 2010. Ecological Conservation in the Gulf of California. In <i>The Gulf of California: Biodiversity and Conservation</i>. Edited by Richard C. Brusca. 400 pp.</li> <li>• Wilder, B. T., C. O'Meara, N. Narchi, A. M. Narváez, and O. Aburto-Oropeza. 2013. The need for a next generation of Sonoran desert researchers. <i>Conservation Biology</i> 27:243–245.</li> </ul>