BIOE 107
Ecology
Winter Quarter 2011

Becoming a Practicing Ecologist: Reading, Synthesis, and Writing

The purpose of this exercise is get you started on reading the scientific literature in ecology, thinking about and synthesizing the findings and interpretations of what practicing ecologists have published, identifying important new questions, and designing research projects to answer those questions.

We will go about this exercise in the following way. Listed below are 5 ecological themes that are topical and relevant to conservation and resource management on the one hand and subject to varying levels of scientific debate on the other. Under each theme you will find the titles of 5 papers from the scientific literature that have either been seminal in establishing the theme or contain some subsequent debate over the substance and meaning of the science.

The first part of your assignment is to look over these 5 themes and pick one that interests you. The next step will be to read each of the 5 papers, keeping notes on what was done, what was concluded, and how convincing you find the arguments. The next step will be to prepare your written report. The report can be no longer than 2 single spaced pages using 12 pt font (about a thousand words). On the first written page please provide a concise integrated synopsis of the 5 papers—the observations from nature, the main analyses and interpretations of data, and the contended issues. On the second page you will provide an outline of a research project that could be done to answer some question that might help resolve the contended issues. Don't worry about what is or isn't technically or logistically possible; think instead about what should be done to answer your question in the least ambiguous way you can imagine.

The papers are posted as PDFs on the class web site. To access them, go to http://bio.classes.ucsc.edu/bioe107/WritingAssignment.html. Begin whenever you wish; earlier is usually better and safer than later, but that's up to you. Your papers are due by 5pm on 1 March (we need the time to read and grade them before the end of the quarter). Please send them as pdf attachments to me (jestes@ucsc.edu) AND both Walter (heady@biology.ucsc.edu) and Ben (bpweitzm@ucsc.edu).

Remember, this short paper will constitute 15% of your final course grade. Your grade on the paper will be based on three main criteria—the effectiveness with which you are able to extract and summarize the key issues from reading the papers; the creativity and clarity of thought that goes into the research proposal; and the organization and clarity of your written prose.

1. The Ecological Effects Of Whales And Whaling

Springer, A.M., J.A. Estes, G.B. van Vliet, T.M. Williams, D.F. Doak, E.M. Danner, K.A. Forney, and B. Pfister. 2003. Sequential megafaunal collapse in the North Pacific Ocean: an ongoing legacy of industrial whaling? *Proceedings of the National Academy of Sciences* 100:12223-12228.

Wade, P., V. Burkanov et al. 2007. Killer whales and marine mammal trends in the North Pacific—a re-examination of evidence for sequential megafaunal collapse and the prey-switching hypothesis. *Marine Mammal Science* 23:766-802.

Springer et al. 2008 Springer, A.M., J.A. Estes, G.B. van Vliet, T.M. Williams, D.F. Doak, E.M. Danner, and B. Pfister. 2008. Mammal-eating killer whales, industrial whaling, and the sequential megafaunal collapse in the North Pacific: a reply to critics of Springer *et al*. 2003. *Marine Mammal Science* 24:414-442.

Wade, P, J. Ver Hoef, and D. DeMaster. 2009. Mammal-eating killer whales and their prey—trend data for pinnipeds and sea otters in the North Pacific Ocean do not support the sequential megafaunal collapse hypothesis. *Marine Mammal Science* 25:727-737.

Estes et al. 2009 Estes, J.A., D.F. Doak, A.M. Springer, T.M. Williams, and G.B. van Vliet. 2009. Trend data *do* support the sequential nature of pinniped and sea otter declines in the North Pacific, *but* does it really matter? *Marine Mammal Science* 25:748-754.

2. Bottom Up And Top Down Control In Food Web Dynamics

Hairston, N., F. Smith, and L. Slobodkin. 1960. Community structure, population control and competition. *American Naturalist* 94:421-425.

Murdoch, W. 1966. Community structure, population control and competition—a critique. *American Naturalist* 100:219-226.

Strong, D. 1992. Are trophic cascades all wet? Differentiation and donor-control in speciose ecosystems. *Ecology* 73:747-754.

Pace, M. J. Cole, S. Carpenter, and J. Kitchell. 1999. Trophic cascades revealed in diverse ecosystems. *Trends in Ecology and Evolution* 14:483-488.

Polis, G., A. Sears, G. Huxel, D. Strong, and J. Maron. 2000. When is a trophic cascade a trophic cascade. *Trends in Ecology and Evolution* 15:473-475.

3. Overfishing The World's Oceans

Pauly, D., V. Christensen, J. Dalsgaard, R. Froese, and F. Torres Jr. 1998. Fishing down marine food webs. *Science* 279:860-863.

Myers, R. A., and B. Worm. 2003. Rapid worldwide depletion of predatory fish communities. *Nature* 423:280-283.

Baum, J. K., R. A. Myers, D. G. Kehler, B. Worm, S. J. Harley, and P. A. Doherty. 2003. Collapse and conservation of shark populations in the Northwest Atlantic. *Science* 299:389-392.

Burgess, G., L. Beerkircher, et al. 2005. Is the collapse of shark populations in the Northwest Atlantic Ocean and Gulf of Mexico real? *Fisheries* 30:11-26.

Baum, J., D. Kehler, and R. Myers. 2005. Robust estimates of decline for pelagic shark populations in the Northwest Atlantic and Gulf of Mexico. *Fisheries* 30:27-29.

4. Megafaunal Extinctions And Rewilding

Martin, P. 1973. The discovery of America. *Science* 179:969-974.

Alroy, J. 2001. A multispecies overkill simulation of the end-Pleistocene megafaunal mass extinction. *Science* 292:1893-1896.

Grayson, D. and D. Meltzer. 2003. A requiem for North American overkill. *Journal of Archaeological Science* 30:585-593.

Barnosky, A., P. Koch, R. Feranec, S. Wing, and A. Shabel. 2004. Assessing the causes of Late Pleistocene extinctions on the continents. *Science* 306:70-75.

Donlan, C. J., J. Berger, C. E. Bock, J. H. Bock, D. A. Burney, J. A. Estes, D. Foreman, P. S. Martin, G. W. Roemer, F. A. Smith, M. E. Soulé, and H. W. Greene. 2006. Pleistocene rewilding: an optimistic agenda for twenty-first century conservation. *American Naturalist* 168:660-681

5. Reserve Size And The SLOSS Debate

MacArthur, R. and E.O.Wilson. 1963. An equilibrium theory of insular zoogeography. *Evolution* 17:373-387.

Diamond, J. 1975. The island dilemma: lessons of modern biogeographic studies for the design of natural reserves. *Biological Conservation* 7:129-146.

Connor, E., and D. Simberloff. 1983. Interspecific competition and species co-occurrence patterns on islands: null models and the evaluation of evidence. *Oikos* 41:455-465.

Lubchenco, J., S. Palumbi, S. Gaines, and S. Andelman. 2003. Plugging a hole in the ocean: the emerging science of marine reserves. *Ecological Applications* 13(suppl):3-7.

Hilborn, R., K. Stokes, J.-J. Maguire, T. Smith, L. Botsford, M. Mangel, J. Orensanz, A. Parma, J. Rice, J. Bell, K Cochrane, S. Garcia, S. Hall, G. Kirkwood, K. Sainsbury, G. Stefansson, and C. Walters. 2004. When can marine reserves improve fisheries management? *Ocean and Coastal Management* 47:197-205.