

Homework Assignment #6 (Due May 28, 2009)

- 1) For your term paper or proposal, and also for the optional Wikipedia extra credit, you are expected to provide references to peer-reviewed sources. Based on your research so far, choose one of your reference sources, and provide a properly formatted reference. Please include the name of the citation style you are using (e.g. *Science*, *Limnology and Oceanography*, etc.)
- 2) For a long time, we thought that many marine organisms had relatively restricted territorial ranges (for example, it was thought that the Northern Elephant Seal stayed near the west coast of the United States, and that White Sharks did not travel very far). We now know that this isn't true, because of the Tagging of Pacific Pelagics (TOPP) program and other research efforts that have tagged these organisms. Go to the TOPP website (<http://www.topcensus.org>), choose an organism, and find one of its tracks. Describe its behavior, and explain what you think it is responding to in the environment (i.e. why is it going to certain locations? How does it respond to patchiness in the environment?)
- 3) Why isn't there a classic "spring bloom" in the North Pacific?
- 4) Explain the difference between "fishing down the food chain" and "fishing through the food web"
- 5) After reading the Jeremy Jackson PNAS paper, explain whether you think his conclusions about what we can do are good or bad (i.e. is it feasible to do what he suggests, and would it "fix" the oceans), and discuss, based on what you've learned in class, whether you think the article is correct or overly simplistic.
- 6) Define the following terms:
Hardy Plankton Recorder; trophic cascade; apex predator; critical depth, recruitment

Graduate-Level Questions:

G1. You've probably heard Dr. Bruland talking about "developing your chemical intuition". You should also have an intuitive feel for what typical biological values are for the ocean. Give ballpark values (and units) for the following: 1) average surface chlorophyll at the MBARI M1 mooring, 2) surface chlorophyll during a red tide, 3) nitrate concentration at 100 m, 500 km offshore, 4) nitrate concentration at the surface, 500 km offshore, 5) a typical carbon:chlorophyll ratio for phytoplankton, 6) a typical phytoplankton and zooplankton growth rate for Monterey, 7) the proportion of total primary production by the $<5 \mu\text{m}$ size class (explain where you are), 8) a typical concentration of viruses in the coastal ocean, 9) a typical half-saturation constant for nitrate uptake by phytoplankton, 10) the diffuse attenuation coefficient in a coastal and open ocean region.