



TEAM #1

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Course Name

- Biology 101, Introduction to Biology

Course Goals

- Increase students' basic understanding of trophic cascades and their influences on the environment
- Increase students' understanding of current marine and environmental issues and perception of future marine and environmental sustainability
- Increase students' understanding of predator prey relationships and the effects of predation by apex mammals on autotrophs

Paper Citation

- Wilmers, C.C., Estes, J.A., Edwards, M., Laidre, K.L., and Konar, B. 2012. Do trophic cascades affect the storage and flux of atmospheric carbon? An analysis of sea otters and kelp forests. *Frontiers in Ecology and the Environment* 10(8):409-415.

Core Concepts or Phenomena

- Biological systems
- Prey-predator relationships, prey-predator effects (both direct and indirect) on an ecosystem
- Food webs
- Trophic cascades
- Keystone organisms (predators)
- Ecosystem effects
- Nutrient cycling
- Carbon cycle and carbon sequestration
- Photosynthesis
- How manmade changes affect natural processes

Misconceptions

- Students have difficulty:
 - Formulating indirect ecosystem effects (Hogan 2000)
 - Carbon cycling (D'Avanzo 2008)
 - Formulating answers to questions based on relationships within food webs (Webb and Boltt 2010)
- Students tend to visualize relationships as linear, one-way rather than reciprocal and complex (Hogan 2000)
- Students may believe that, in an ecosystem, plants depend on humans/animals instead of the reverse (Beyond Penguins)
- Students may also believe that there is an equal relationship between predators and prey (Beyond Penguins)
- Students may believe that likely manmade problems (high CO₂ emissions) can only be fixed by humans (Beyond Penguins)