ESM 595TT: Biodiversity in Forest and Ocean Ecosystems (2 units)

Dimensions of Biodiversity Distributed Graduate Seminar (DBDGS)

Instructor: Sarah Lester (lester@msi.ucsb.edu)

Collaborators: Sandy Andelman, Vice President and Director, Tropical Ecology, Assessment & Monitoring (TEAM) Network, Conservation International and Center Associate, NCEAS, UCSB; Jorge Ahumada, Technical Director, Tropical Ecology, Assessment & Monitoring (TEAM) Network, Conservation International

Meeting day/time: Tentatively Mondays 9-11am (but subject to change to accommodate student schedules)

Instructor approval required: Email lester@msi.ucsb.edu if you are interested in enrolling in the seminar.

OVERVIEW
This graduate seminar is part of an integrated multi-campus effort to explore the dimensions (genetic, functional, and taxonomic) of biodiversity and create fundamental advances within biodiversity science. The innovative distributed graduate seminar model involves multiple parallel seminars at universities around the country or world each pursuing complementary research questions in which large datasets are synthesized and analyzed, with cross-campus collaboration and synthesis creating further scientific discovery. Students will develop a collaborative group research project with the guidance of the instructor, focused on the relationship between biodiversity and environmental or anthropogenic drivers and/or the relationship between biodiversity and ecosystem function, resilience, or ecosystem services. Students will also connect with students participating in the seminar at other campuses to exchange ideas and develop cross-dataset synthetic analyses. There will be the opportunity for a couple of the students to participate in in-person multi-campus working groups, and all students will have the opportunity for virtual interaction with other campuses. The UCSB seminar will have two parallel groups (4-5 students per group) focused on 1) tropical forests and 2) global marine fisheries or aquaculture. The research projects will likely extend into winter and possibly spring quarters.

TROPICAL FOREST FOCUS
This group will focus on the Tropical Ecology Assessment and Monitoring (TEAM) Network database (http://www.teamnetwork.org). TEAM is a global observing system for biodiversity and its threats in tropical forests. TEAM collects data on tree and liana biodiversity, above-ground carbon, terrestrial vertebrate diversity, and climate and land use change at 18 sites throughout the tropics covering key environmental gradients. Collaborators on this project will include Jorge Ahumada and Sandy Andelman from Conservation International, lending in-depth knowledge about the TEAM dataset. Students will work collaboratively to develop research questions; potential focal questions include:

- How will tropical forests and in particular short-term productivity (tree growth, mortality, and recruitment) respond to changes in climate?
- What is the relationship between taxonomic and/or functional diversity and productivity in tropical forests?
- What are the effects of environmental drivers on different dimensions (taxonomic, functional) of biodiversity and how do these affect productivity and carbon storage?
- Are forests in similar environments (e.g. precipitation regimes) functionally equivalent (i.e. similar distribution of wood densities)?
MARINE FOCUS
This group will have considerable latitude in selecting a research focus and datasets. The group will likely focus on questions related to global fisheries and/or aquaculture, exploring the link between biodiversity and seafood provisioning/food security. Potential focus questions include:

- What is the relationship between both taxonomic diversity and functional diversity (and possibly genetic diversity) and seafood production (e.g., using FAO global fishery catch records)? How is this relationship modified by disturbance and/or institutional variables?
- What is the relationship between both taxonomic diversity and functional diversity and the ability of targeted fish stocks to rebuild during fishery closures?
- What is the relationship between taxonomic diversity and different metrics of functional diversity for global fish stocks?
- How does the relationship between diversity and productivity differ between cultivated seafood systems (mariculture) and wild capture fishery systems?
- How do proposed activities in a multi-use marine spatial plan affect one another (positively or negatively) through their impacts on biodiversity and resulting changes in different ecosystem services (food provisioning, carbon storage, energy provisioning, storm protection, nutrient cycling, recreational/cultural values, etc.)?

PARTICIPATING UNIVERSITIES
- University of Connecticut
- University of California, Berkeley
- University of California, Los Angeles
- University of California, Santa Barbara
- University of North Carolina
- Oregon State University
- University of Washington
- University of Michigan
- Virginia Institute of Marine Science, College of William & Mary
- Pontificia Universidad Catolica de Chile

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