SUMA 5770

Course Title

Sustainable Management of Forests

Schedule: Refer to the Directory of Classes (DoC)

Instructor Information: Ralph Schmidt, ralphcschmidt@gmail.com, 914 645 9600. I will respond to student emails within 24 hours during the work week (ideally).

Course Overview

One in three seems to be the indicative number. 30% of earth's land area is covered by forests (5000 years ago it was 50%); one third of current total CO_2 emissions are reabsorbed by forests; one third of humanity cooks with wood every day; agroforestry is the preferred system for these same 2 billion people. Hundreds of millions of indigenous peoples have their native land in forests. The biodiversity score is much higher: more than half of all of earth's species are found in forests (about 25% are in the oceans); forests are the major system for fresh water conservation; and the traded value of global forest products is about $300 billion. Finally, to be in the forest (especially with your eyes open) makes life worth living.

Forests are therefore intimately connected with climate, water, biodiversity, food production, global poverty, indigenous people, and human spiritual well-being; not to mention the major global industries based on them. They are best understood when considered holistically, and that is the approach of this course. We will examine all the issues mentioned above and their connections with forests to develop a comprehensive understanding of them. We will study both forest ecology and economics and business. We will examine indigenous peoples' vision and view of forests and nature. We will delve deeply into the role of forests in climate change; forests both absorb and produce CO_2 emissions. We will consider temperate, tropical and boreal forests. On Saturday field trips we will learn to measure forest biomass, commercial volume and carbon content. We will learn to financially analyze forest business ventures. Students will produce reports at the end of the course on one of the connections outlined above or on a country of interest. Mid semester, students will develop analytical work products on measurement and financial analysis.

Without an understanding of forests, one's grasp of all the issues mentioned above is incomplete. Also forests provide a rather straight-forward context for understanding and analyzing many issues that are critical to all areas of sustainability. We will utilize the forest context to better understand, for example, management of water, biodiversity, poverty alleviation, environmental justice, forest industries and the global carbon cycle and climate. In other words, skills acquired here will be useful in other fields of study.

The instructor managed forest projects for UNDP in many countries for many years. He also lived and worked in Colombia, Puerto Rico, Italy, Australia, and Argentina for 16 years. We will weave these experiences into our study of principles. I (to switch the pronoun) am also available throughout the semester for any career discussions students may wish to pursue.

Diversity Statement

It is our intent that students from all diverse backgrounds and perspectives be well-served by this course, that students' learning needs be addressed both in and out of class, and that the diversity that the students bring to this class be viewed as a resource, strength and benefit. It is our intent to present materials and activities that are respectful of diversity: gender identity, sexuality, disability, age, socioeconomic status, ethnicity, race, nationality, religion, and culture.

Learning Objectives

Students will learn:

1. To understand the basic functioning of forest ecosystems, soil and water conservation, nutrient retention and recycling, the essential role of biodiversity in trophic interactions, growth and productivity, and the determinants of forest types;
2. To understand the interactions of forests with: water, biodiversity, wood production, agroforestry, carbon sequestration, and homelands for indigenous peoples;
3. To appreciate the role of biodiversity in sustaining humanity and the natural world;
4. To understand economic principles as they apply to forests;
5. To financially analyze the benefits and costs of private forest investments, and public forest policies;
6. To measure, analyze and report data on forest growth, biomass, commercial volume and carbon sequestration;
7. To understand the role of trees and forests in climate change mitigation and adaptation;
8. To be informed on global markets developing for forest carbon sequestration;
9. To understand the differing role of forests in developed (usually temperate) and developing (usually tropical) countries;
10. To think effectively about what constitutes sustainability for forests, and what are the consequences of achieving it, or not.

Course Schedule

Week	Subject Matter	Reading Assignments (to be completed before the next week)	Other Assignments
1	Introductions; the eight major benefits of forests and issues that surround them; growth, dynamics and architecture of forests	Perry *et al.* pp. 1 - 40	Each student will make a five minute introduction on their academic background and major interests.
2	Types of forests across the globe and in the US; succession and disturbance; climate change and fires	Perry *et al.* pp. 41 – 68; 79 – 92.	Each week two students will together make a 5 minute report highlighting an especially interesting aspect of the reading assignment.
3	Forest Biodiversity	Perry *et al. pp.* 108 – 130; 140 - 155	
4	Deforestation; subsistence farmers and forest; agroforestry	Perry *et al.* pp. 170 – 215	
5	Forest economics; timber industry and markets in developed countries	Field pp. 1 – 50.	
6	Forest investment analysis; net present value, discounted cash flow, rate of return	Field pp. 51 – 96	
7	Optimal rotations for financial return, for biomass production, for carbon sequestration	Field pp. 97 – 140.	
8	The Science of forest carbon; micro and macro	Field pp. 141 – 159; 211 -229.	Final paper topics and outlines are due.
9	Measuring forest carbon	Ashton *et al.* pp. 1 -4; 31 -44; 51 – 72; 77– 89.	

10	Managing forests for carbon sequestration	Ashton *et al.* pp. 90- 101; 109-131; 139 – 152.		
11	Current forest carbon programs and policies	Ashton *et al.* pp. 165 – 176; 183 – 201; 205 -222.		
12	Forest dwelling indigenous people	Ashton *et al.* pp. 285-302; 305 – 318; 321 – 334.	Final papers are due.	

Note. I cannot overemphasize the importance of completing and understanding the reading assignments as scheduled. It is critical to students' understanding and learning.

Reading:

David Perry, Ram Oren, and Stephen Hart; Forest Ecosystems; Second edition; 2008; Johns Hopkins Press.

Barry Field; Natural Resource Economics; Third Edition; 2016; Waveland Press

Mark Ashton, Mary Tyrrell, Deborah Spalding, Bradford Gentry; Managing Forest Carbon in a Changing Climate; 2012; Springer

Evaluation: Student evaluation depends on the quality of the final report and class attendance and participation.

Further Reading: The books below are listed in chronological order. I find all of them excellent, and they help to bring the study of forests up to date. They are listed titles first which are mostly self-explanatory.

The Treeline – The Last Forest and the Future of Life on Earth. 2022. Ben Rawlence. St. Martin's Press. If you read one book on this list, this is the one. He visits six countries and reviews what's happening to the boreal forests and tundra and the indigenous people within them. Disturbing or terrifying, your choice. A poetic book, and full of scientific information.

Finding the Mother Tree - Discovering the Wisdom of the Forest. 2021. Suzanne Simard. Knopf. For those with mothers. Great research on mycorrhizae in the Pacific Northwest.

Entangled Life. 2021 Merlin Sheldrake. Random House. Serious research on mushrooms. Literally a mind-blower.

The Uncommon Knowledge of Elinor Ostrom. 2021. Erik Nordman. Island Press. Only woman to win the Nobel prize in economics. Debunks the tragedy of the commons.

Forests Adrift – Currents Shaping the Future of Northeastern Trees. 2020. Charles Canham. Yale University Press. A lifetime of research on northeastern (US)trees.

The Age of Wood. 2020. Roland Ennos. Scribner. Homo sps. use of wood for a half million years.

Natural Resource Economics: The Essentials. 2020. Tom Tietenberg and Lynne Lewis. Routledge. This covers the same territory as the Field book, but is a bit denser. Those with strong economics background may prefer this one.

The Language of Plants: Science, Philosophy and Literature. 2019. Monica Gagliano, John Ryan, Patricia Viera. University of Minnesota Press. See the motto over Schermerhorn Hall.

The Financial Ecosystem. 2019. Satyajit Bose, Guo Dong and Anne Simpson. Palgrave Macmillan. Our brilliant colleague.

Climate Change and Biodiversity. 2019. Thomas Lovejoy and Lee Hannah. Yale University Press. The century's leading authority on biodiversity.

Breakpoint: Reckoning with America's Environmental Crises. 2018. Jeremy Jackson and Steve Chapple. Yale University Press.

Forest Bathing – Shinrin-Yoku. 2018. Li Qing. Penguin. Japanese forest immersion for healing mind and body.

The Structure and Dynamics of Human Ecosystems. 2017. William Burch, Gary Machlis and Jo Ellen Force. Yale University Press.

Why Forests? Why Now? 2016. Frances Seymour and Jonah Busch. Brookings Institution Press. Focuses on Tropical Forest Carbon Cycles.

Nature's Fortune – Investing in Nature. 2015. Jonathan Adams and Mark Tercek. Island Press. Mark Tercek was head of The Nature Conservancy; this focuses mostly on financial management of water projects.

Norwegian Wood- Stacking Wood the Scandinavian Way. 2015. Lars Mytting. Abrams. Those Vikings -still unique.

The Sixth Extinction. 2014. Elizabeth Kolbert. Holt and Company. "Trouble ahead, trouble behind." Jerry Garcia.

The River of Life: Sustainable Practices of Native Americans and Indigenous Peoples. 2014. Michael Marchand et. al. Michigan State University Press.

Working Together. 2010. Amy Poteete, Marco Janssen, Elinor Ostrom. Princeton U Press. Research on communities sustaining natural resources.

The Value of Life – Biological Diversity and Human Society. 1997. Stephen Kellert. Island Press