"Cascadia"
Map Source Ecotrust

IOP: Introduction to Pacific Northwest Regional Ecology
Early Fall Start, University of Washington
Instructor: Cindy Updegrave

231 Johnson Hall
206-685-1960
cupdegra@u.washington.edu

Field experiences:
Olympic Peninsula, September 11-14
The Cascades, September 27

Course description:

We will study the temperate coastal rainforest of the Cascadia ecological region, beginning at the Pacific Ocean on the Olympic Peninsula, and after crossing the Cascade Mountains, explore the rain shadow and the sagebrush-steppe ecosystems.

On the first weekend field trip, we will stay at the Olympic Park Institute on Crescent Lake, visit Neah Bay, the Northernmost point of the continental US and home to the Makah Tribe, where we will tour their archeological museum, experience Makah culture and learn about the Cascadia earthquake of 1700 that sent a tsunami to Japan. We will hike through old-growth Douglas fir forest to Sol Duc Falls and visit Sol Duc Hot Springs in the Olympic National Park. We will return to Seattle by way of Bainbridge Island, where we will visit IslandWood, a sustainably built learning center. On the ferry trip into Seattle, we will learn about the Seattle Earthquake Fault.

On the second trip, we will spend a day traversing the Cascades learning about the geology and making stops in key ecosystems.

Learning Goals:

- Develop plant identification skills
- Practice making direct observations in nature
- Develop drawing, writing, question asking and listening skills
- Observe a variety of the ecosystems found in Washington State
- Develop an understanding of ecological processes in the Pacific Northwest: watersheds, forest ecology, ecological forestry management practices
- Develop an understanding of the geological processes that shape the Pacific Northwest: glaciers, volcanoes, earthquakes
- Interact with the First Nation cultures of the Pacific Northwest
- Learn about sustainable practices in the region
- Create a nature journal

Student Responsibilities:

1. Contribute thoughtfully to each day's discussion and work.
2. Complete all assignments in a timely manner while ensuring that the work is of a consistently superior standard.
3. Participate in class activities and discussions.
4. Turn in a portfolio of course work.

Attendance will be taken at all scheduled meeting times.

Portfolio Elements:

Organize these components in a binder or folder:

- **Personalized Cover**
- **Native tree identification -**combination of drawings, notes and pressed materials when appropriate
- **Nature Journal-** This will be a chronological journal of the field trip which includes observations, thoughts, feelings and drawings. http://www.newhorizons.org/strategies/environmental/matsumoto.htm
- **Worksheets-** on the concepts and questions created for the field trips.

Assessment of Learning:

Your final assessment in this course will be based on your performance on the following:

- Participation
- Quality of completed assignments
- Nature Journal
- Portfolio

OLYMPIC PENINSULA/ NEAH BAY TRIP
Introduction to the Temperate Rainforest, the Marine Environment, Northwest Native Culture, Archeology, Earthquakes and Tsunamis

Day 1: Thursday September 11

Schedule: Travel to Olympic Park Institute on Lake Crescent

Topics:

- Overview of the climate, geography, geology, and vegetation of Washington
- Trees of Washington

Activities:

- Nature Journal Workshop
- Core the sediments of the salt marsh at Discovery Bay for tsunami deposits to study in the lab
- Trail through Time walk at Crescent Lake
- Evening Fire

Day 2: Friday September 12

Schedule and activities:

- Breakfast
- Travel to Neah Bay
- Hike to Cape Flattery to see the Pacific Ocean and Tatoosh Island
- Visit Wa'atch Prairie
- Lunch
- Welcome by the Makah Tribe
- Makah Museum Tour
- Native foods dinner with storytelling
- Visit Hobuck Beach for sunset

Topics:

- The Marine Environment
- Trees of Washington
- Culture of the Northwest Coast
- Archeology
- Introduction to Earthquakes and Tsunamis

DAY 3: Saturday September 13

Schedule:

- Breakfast at Olympic Park Institute
- Hike to Sol Duc Falls via Lovers Lane Trail
- Optional soak in the Sol Duc Hot Springs or return to Lake Crescent, for optional hike up Storm King or free time
- Evening Fire

Topics:

- Old-growth forest and salmon ecology
- Ethnobiology
- Geology and Geothermal activity

DAY 4: Sunday September 14

Schedule:

- Breakfast at Olympic Park Institute
- Visit Discovery Bay
- Visit Old Man House on Agate Pass and Chief Seattle's Grave
- Visit IslandWood Environmental Learning Center
- Ferry Ride into Seattle
- Dinner in Seattle

Topics:

- Earthquake and tsunami research methods
- Salt marshes
- The Seattle Fault
- Native stories
- Chief Seattle
- Sustainable design

THE CASCADES
the Ecological Provinces of Washington

September 27

Schedule:

- Cascade Mountains
- Asahel Curtis Trail
- The Pacific Crest Trail at the Pass
- Cle Elum Ponderosa Pine Forest
- Umptanum Ridge Sagebrush

Topics:

- The Trees and Plant Communities of Washington
- Vegetation is related to topography, rainfall and temperature range

September 17: Portfolios due in Research Class

Handouts:

Includes selections from:

Arno, S.F., and Hammerly, R.P. Northwest Trees. The Mountaineers, 1999

Franklin, J.F.; Dyrness, C.T. 1973. Natural vegetation of Oregon and Washington. Corvallis. Oregon State University Press

Old growth forest science:
http://www.fs.fed.us/pnw/pubs/science-update-4.pdf

Second growth forests and management
http://www.fs.fed.us/pnw/scienceupdate1.pdf

Optional Resources:

Lake Crescent:
http://www2.nature.nps.gov/air/WebCams/parks/olymcam/olymcam.cfm

Neah Bay and the Makah Tribe
http://www.makah.com/

Ludwin, Ruth, *Serpent spirit-power stories along the Seattle Fault* and *Dating the 1700 Cascadia Earthquake: Great Coastal Earthquakes in Native Stories*

Pacific Northwest Research Station Publications:
http://www.fs.fed.us/pnw/publications/complete-list.shtml

Field Guides:

Kozloff, Eugene N., Plants and Animals of the Pacific Northwest: an illustrated guide to the natural history of Western Oregon, Washington, and British Columbia . Seattle: University of Washington Press, 1976.

Mathews, D. Cascade-Olympic Natural History. Raven Editions, 1990.

National Geographic, Field Guide to the Birds of North America, 3rd Ed., 2000.

Pojar, J., and MacKinnon, A. Plants of the Pacific Northwest Coast. Lone Pine, 1994.

Pyle, R.M. The Butterflies of Cascadia. Seattle Audubon Society, 2002.

Sibley, D.A. The Sibley Field Guide to Birds of Western North America. Knopf, 2003.

Nature Journal resource:

Karen Matsumoto:
http://www.newhorizons.org/strategies/environmental/matsumoto.htm

Glossary

Geography:

Cascadia, from Wikipedia:

The name Cascadia, which is derived from the name of the Cascade Mountain Range, can refer to:
Geology:
Cascadia subduction zone
Cascadia earthquake, a name with which a great earthquake that took place in 1700 has been dubbed by some geologists
Other:
Cascadia, as a term to refer to the Pacific Northwest
Cascadia, a bioregion consisting of coastal regions of Lower Alaska, British Columbia, Washington, Oregon, and Northern California

Ecology:

Clearcut: A process in which all of the trees in a given area are logged.

Ecological succession, n: Process in which communities of plant and animal species in a particular area are replaced over time by a series of different and often more complex communities.

Ecology, n: The study of the relationships between organisms and their environments, including: the interactions of living organisms with one another and with their non-living surroundings, the flow of matter and energy in an environment, and the structure and functions of nature. Also called *bionomics* . 2. The relationship between organisms and their environment. 3. The branch of sociology that is concerned with studying the relationships between human groups and their physical and social environments. Also called *human ecology* . 4. The study of the detrimental effects of modern civilization on the environment, with a view toward prevention or reversal through conservation. A component of the field of *human ecology* .

Ecosystem, n: An ecological community of various plants, animals, and other organisms, interacting with each other and with the nonliving resources in their environment, all functioning as a unit.

Ecosystem services, n: Services, vital to the support of human life, provided by intact natual ecosystems. These include the purification of air and water, detoxification and decomposition of wastes, regulation of climate, regeneration of soil fertility, and production and maintenance of biodiversity, from which key ingredients of our agricultural, pharmaceutical, and industrial enterprises are derived. **Historically, the nature and value of Earth's life support systems have largely been ignored until their disruption or loss highlighted their importance**.

Ethnobotany, n: The study of indigenous knowledge bases regarding plants and their uses.

Late successional plant species, n: Mostly trees that can tolerate shade and that form a relatively stable complex forest community.

Lichen, n: A *symbiotic* relationship between a fungus and a moss. The moss does most of the work, producing sugars for the lichen's collective metabolic pathways. Lichen are generally low-growing, vary in color from bright orange or yellow to gray or black, and are often found growing on rocks and tree bark. An easy mnemonic to assist recall of the nature of a lichen's symbiosis is: "A fungus took a **likin'** to a moss, and now they live together."

Multiple use: In theory, the management of a forest area not only for its wood, but also for wildlife and habitat, recreational potential, mining rights and possibly grazing areas, scenic areas, etc. This is the policy of the U.S. National Forest Service.

Old-growth forest, n: Virgin and ld, second growth forests containing trees that are often hundreds, sometimes thousands, of years old. These are the richest forest biomes with the widest arrays of niche microhabitats and the broadest biodiversity, especially in the tropics.

Paleoecology, n: The study of ancient ecosystems. Paleoecologists use data from such sources as tree rings, geologic deposits, fossils (pollen is a particularly popular tool), and coral bores to reconstruct the climate and ecology or ancient ecosystems.

Primary producer, n: An organism, such as a plant or microbe, that makes its own food and forms the bottom-most tier in a trophic system. Primary producers are the basis of the food web in most ecosystems. Primary producers are able to convert abiotic raw materials into biotic tissue, either by capturing the sun's energy through *photosynthesis* (plants) or by harnessing the energy in chemical bonds through *chemosynthesis* (some microbes).

Second growth: The next generation of trees after "old growth" trees are cut. May have been reforested naturally or by human beings.

Temperate rain forest: Any forest in the mid-latitudes that receives more than 50 to 60 inches (127 - 152 cm.) of rainfall a year.

Watershed: All the land area drained by a major stream and its tributaries. On a smaller scale, all the land drained by a stream.

Geology

See http://volcano.und.edu/vwdocs/glossary.html

Active Volcano: A volcano that is erupting. Also, a volcano that is not presently erupting, but that has erupted within historical time and is considered likely to do so in the future.

Ash: Fine particles of pulverized rock blown from an explosion vent. Measuring less than 1/10 inch in diameter, ash may be either solid or molten when first erupted. By far the most common variety is vitric ash (glassy particles formed by gas bubbles bursting through liquid magma).

Debris Avalanche: A rapid and unusually sudden sliding or flowage of unsorted masses of rock and other material. As applied to the major avalanche involved in the eruption of Mount St. Helens, a rapid mass movement that included fragmented cold and hot volcanic rock, water, snow, glacier ice, trees, and some hot pyroclastic material. Most of the May 18, 1980 deposits in the upper valley of the North Fork Toutle River and in the vicinity of Spirit Lake are from the debris avalanche.

Eruption: The process by which solid, liquid, and gaseous materials are ejected into the earth's atmosphere and onto the earth's surface by volcanic activity. Eruptions range from the quiet overflow of liquid rock to the tremendously violent expulsion of pyroclastics.

Fault: A crack or fracture in the earth's surface. Movement along the fault can cause earthquakes or--in the process of mountain-building--can release underlying magma and permit it to rise to the surface

Holocene: The time period from 10,000 years ago to the present. Also, the rocks and deposits of that age.

Lahar: A torrential flow of water-saturated volcanic debris down the slope of a volcano in response to gravity. A type of mudflow, see Mudflow:

Mudflow: A flowage of water-saturated earth material possessing a high degree of fluidity during movement. A less-saturated flowing mass is often called a debris flow. A mudflow originating on the flank of a volcano is properly called a lahar.

Plate Tectonics: The theory that the earth's crust is broken into about 10 fragments (plates,) which move in relation to one another, shifting continents, forming new ocean crust, and stimulating volcanic eruptions.

Ring of Fire: The regions of mountain-building earthquakes and volcanoes which surround the Pacific Ocean.

Seismograph: An instrument that records seismic waves; that is, vibrations of the earth.

Seismologist: Scientists who study earthquake waves and what they tell us about the inside of the Earth.

Seismometer: An instrument that measures motion of the ground caused by earthquake waves.

Subduction Zone: The zone of convergence of two tectonic plates, one of which usually overrides the other.

Tsunami: A great sea wave produced by a submarine earthquake, volcanic eruption, or large landslide.

Volcano: A vent in the surface of the Earth through which magma and associated gases and ash erupt; also, the form or structure (usually conical) that is produced by the ejected material.