

Syllabus: Geoarchaeology Field School University of Oregon Summer Session, 2009



Dr. William H. Lyons
Adjunct Faculty, Washington State University
email: lyonsw@roadrunner.com

Earth Materials Laboratory
PO Box 104, Albion WA 99102
phone: 509-332-7638

Design of the Course: You will learn to interpret the soils that contain archaeological sites. With hands-on experience, students will learn to understand and approach the geological and soil structures, materials and processes that affect, contain and contribute to archaeological deposits. This is field Geoarchaeology.

The course's three parts—field experience, lecture, and field lab--will each be spread over the weeks of field school. Students are expected to participate fully in field and lab work, do some basic reading as assigned, and attend lectures and meetings. The readings will be distributed as hand-outs.

Course Content I: Field Experience

This will take up the bulk of the time spent with students. We will give each student opportunity through instruction and work in the field to develop proficiency in the following tasks:

- Map reading, orientation, and data recording on maps, using compass and GPS
- Geomorphologic observation and mapping
- Archaeological survey and recording
- Sediment profile preparation, profile description and profile drawing—of geologic sections and also of archaeological excavation units
- Removing, bagging and labeling sediment and soil samples
- Bucket auger probing and profiling

We might do some obsidian, fine grained volcanic or chert source sampling. If we do, students will help plan collecting strategies and will locate, map, bag and label hand samples for submission to chemical laboratories.

Course Content II: Lecture

1. Why Be Smarter Than Dirt? Sediments and Soils in Archaeology

2. Sediments

- quaternary sediments top the geologic column
- stratigraphy
- origins of sediments
- transport mechanisms and their traces in sediments
- several systemic contexts of sediments: their energies, processes, morphologies
- transformations of near-surface sediments
- dating late Pleistocene and Holocene sediments
- sediments as evidence of past environments

3. Soils in Archaeology

- what is a soil
- soil and sediment textures
- soil horizons
- soil and sediment profile description
- soil forming processes
- soil types
- buried soils and horizons in sediment sections
- soil transformations
- soil horizons versus sediment strata
- soil formation as evidence of past environments

4. Sediments in Archaeological Sites

- desert sites
- sites on lake margins and coasts
- anthropogenic deposition and transformation
- rock shelter and cave sites
- recording strata and horizons as features in a site

5. Clay Variety, Chemistry and Contexts

6. Research Design and Presentation

- sediment research design at differing scales of project and field work
- presentation of sediment data to enable analysis

7. Non-sediment Geoarchaeology: Rock Sources of Raw Materials

Course Content III: Lab

Handouts of methods and standards, lab worksheets and some reading assignments accompany lab exercises.

1. Unloading Prometheus: Two Technical Skills to Manage: identifying rocks and minerals, and reading maps and reports from geologists and soil scientists.

2. Profiles: Preparation for Reports, and Interpretation of profiles

3. Particle Analysis

- Particle size distribution, aka. mechanical analysis

sieving wet and dry: fraction separation, drying and weighing
sedimentation: the Bouyoucos hydrometer method
data analysis: by paper computation and by spreadsheet
significance of the largest fraction: sample size and counting error (Rawle n.d.)
interpreting particle size results and statistics

Looking at your clean sand: archaeological evidence in the sand fractions
indicator materials: minerals, rock types, charcoal, glass and pumice, etc.
biological ecofacts
micro-artifacts
sorting by density: contrasting mineral, rock or organic constituents

4. Sediment Chemistry Measurement Basics

pH: paper and probes
Organic carbon: titration and weight loss on ignition
Carbonates: chemical removal and weight loss on ignition
Phosphates

5. Other Analyses and Graphic Reports.

Required Personal Equipment. Each student must bring to field school:

- 1. Hand Lens.** 10x hand lens or loup. These can be obtained from college bookstores, local jewelers, or the internet. A doublet or triplet glass lens is essential; not plastic. You will learn to look at materials carefully.
- 2. Compass.** oil filled, one that rotates on its clear plastic base. For example, the Silva Ranger (c. \$40) is basic archaeological gear.
- 3. A GPS is not required,** but having your own would be a help to you.

A Reading list will be provided to graduate students for their continuing research and studies.