

Arctic Environmental Sampling Workshop

Ilisaġvik College, Barrow, Alaska

August 3rd – 7th, 2015

This 5-day workshop introduces students and environmental professionals to environmental data collection and sampling methods in the Alaskan Arctic. Course instruction is relevant to compliance, environmental assessments, permafrost engineering, with the objective of providing attendees with practical, marketable skills in the growing environmental sector, with a focus on the Arctic. The workshop will cover elements of:

- hydrology and discharge measurements
- water quality and laboratory analytical methods
- groundwater sampling
- water and soil sampling
- wetlands delineation
- contaminated site evaluation
- permafrost studies



Instructors

- Dr. Birgit Hagedorn, University of Alaska Anchorage, ASET Laboratory Manager and Environmental Geochemist
- Ben Applegate, University of Alaska Anchorage Environmental Scientist
- Dr. Keith Torrance, UMIAQ LLC - Environmental Geologist

Detailed Course Outline

Section 1: Surface water characterization

Day 1: Classroom: Safety in the field orientation. Best practices, PPE, handling hazardous chemicals. Outline a watershed nearby. Calculate/estimate catchment area (GIS, mm paper, weight). Description of stream: channel, flow path, shoreline environment (e.g. vegetation barren, erosion). Theory of discharge measurements and methods e.g. flowmeter, floating, Manning method.

Field: Inspect a watershed and select best location to perform a discharge measurement.

Describe stream characteristics, measure stream channel wetted perimeter, perform discharge measurements using the three methods discussed. Install in stream data logger.

Day 2: Classroom: Compare different methods of discharge measurements, estimate relative errors.

Standard field water quality parameter: turbidity, pH, conductivity, alkalinity – total dissolved solids – oxygen content. How to use water quality tools, YSI probe, colorimetric test kits. Discuss sampling methods, filtering, storage, and shelf lives. Analyze total dissolved solutes using drying oven. Titration of alkalinity using pH meter or indicator.

Field: perform water quality measurements using the different tools. Calibration of multi-parameter meter.

Collect samples for diverse array of analysis (e.g. metals, anions, organics, and mercury). How to maintain and store analytical equipment.

Section 2: The subsurface environment – groundwater soils and permafrost

Day 3: Classroom: Definition of soil water (vadose and saturated zone). Measure soil moisture (different techniques) drying and in situ (e.g. TDR) probes. Measure soil conductivity (piezometer method) and groundwater table (wells). Arctic soils classification and description (e.g. organic content, grain size, moisture, color). Patterned ground formations and permafrost (frost boils, sorted stripes, polygonal ground). Criteria for identifying wetlands.

Field: excavate soil pit and describe. Examine permafrost outcrop on shoreline. Collect soil samples using an auger for soil moisture. Install wells in transect from stream. Perform water conductivity measurements.

Compare different soils and locations (e.g. wet and dry, vegetated, barren) perform water table measurements. wetland delineation exercise south of Barrow airport.

Section 3 Contaminated Site Assessment

Day 4: Classroom: Soil contamination, detection, assessment, remediation. Phase I and Phase II environmental site assessments.

Field: Soil tracer experiment on selected sites to understand transport in soils. Application of food color on soil surface followed by excavation and mapping of flow pathways.

Visit to an ADEC-listed contaminated site at NARL. Field observations. Instruction on the collection of soil samples and the measurement of volatiles using a Photoionization Detector (PID).

Day 5: Classroom: Recording observations and report writing. Review of course materials and final exam

The cost of the course is \$1,450 per student which includes accommodation at Iliasagvik College, PPE and course materials. Please apply for financial assistance, with preference for North Slope residents. On completion of the course, students will receive a course certificate which is recognized by other training programs in the State of Alaska.

For additional information and to register email Kathy Leary at kathy.leary@iliasagvik.edu