

Watershed Science and Mapping Workshop Outline

July 9-12th, 2008

Participants: Tom Butler, Dave Ketter, Kit Pennell, Alex Carlson, Dan Lieberman, Janis Wignall, Caitlin McNulty, Paula Epstein, Debbie Gilliam, Sue Neese, Sam Wignall, Peter Butler, KC Nattinger, Meghan West, and Chris DeSisto.

Lead Teachers for High School Field Science Program: for Sequim, Crescent and Port Angeles Districts: Tom Butler and Jon Mowe (Crescent), Dave Ketter and Laura Gould (Sequim), Alex Carlson, Dan Lieberman and Deb Volturmo (Port Angeles).

Lead Staff: Dwight Barry, Darek Staab, Jeff Ward, Mark Wigmosta, and Andre Coleman

Wednesday

9:00 am - 5:30pm **Daily Focus:** River System Components and Models: what are the processes and connections that support the functions and dynamics of a watershed.

Activities Overview: Investigating links between climate and watershed conditions by exploring the Dungeness River and taking a tour of the Battelle Lab. We will visit 2 field sites on the Dungeness River to study changes in watershed from the rugged headwaters to the lower floodplain.

- Introduced our staff educators and overall goals for the workshop.
- Darek led a community mapping exercise, where the teachers to draw where they are from in the region and list one watershed lesson they love to lead with their students.
- Dwight shared 2 quick films about the Solutions Network and Hybrid Model – overview videocast by PC students and fun videocast on rivers and salmon.
- Visit the USGS gauge on the Dungeness River: 1. Discuss methods and collection of water flow and links with forecasting river flow, 2. Darek led a lesson on river processes (see FLOODS lesson with six processes discussed), 3. Had lunch next to the hatchery.
- Visit the Railroad Bridge Park in the lower Dungeness Valley: 1. Share recent hydrograph for the Dungeness River and discussed link with in stream habitat available, 2. Darek led a Habitat Mapping lesson, where 3 groups mapped current habitat (woody debris, sediment deposits, channel structure), 3. Groups shared their maps, observations, and predictions on changes to habitat based on high and low flows.
- Visit the Battelle Lab in Sequim: 1. Solutions Network overview by Jeff Ward, 2. Hybrid Model overview by Mark Wigmosta, 3. Tour of Battelle office and shoreline labs by Jeff Ward.
- Returned to Peninsula College for wrap up and preview for day two.

Thursday

8:30 am – 5:00pm **Daily Focus:** Mapping and River Forecasting 101: collecting key parameters from the mountains to build an understanding of our river systems

Activities Overview: Studying the dwindling snowpack, link with soils, and runoff down the watershed. We will be in the headwaters, investigating: snowpack layers, sampling methods and locations, and the use of gps units for a field study map.

- Dwight introduced gps units, the coordinate system, and using coordinates.
- Dwight and Chris led an activity to use gps units and find objects on campus.
- Visit to Hurricane Ridge: 1. Dwight led an overview on headwaters, watershed disturbances, and methods for selecting sampling locations for field data; 2. Dwight and Darek shared two lessons for teachers to follow – a. following the NRCS snow sampling protocol for a snow survey and b. letting teachers create a mini-experiment to study percolation rates of water into different snowpack conditions; 3. teachers were broken into small study groups to follow the two lessons and share their results.
- Visit Peninsula College for Forecasting Experience. Andre and Mark led a short presentation and exercise in waterflow forecasting. Teachers downloaded real time data from USGS, created hydrographs, and ran a version of the hybrid model.

Friday

8:30 am – 5:00pm **Daily Focus:** Elwha River Ecological Connections and Restoration: exploring sites, parameters and methods of the Elwha Ecosystem study.

Activities Overview: Investigating locations and conditions in the Elwha watershed, from the upper dam to the lower floodplain. We will visit the Glines Canyon Dam, Middle River, and Elwha Dam, adding to our mapping and data collection effort.

- Darek led an overview for the day – Ecosystem Restoration and key processes that support the restoration.
- Visit the Glines Canyon Dam on the Elwha River: 1. Discuss the history of the restoration effort from pre-dam to deconstruction schedule, 2. Discussed studies and impacts around the upper reservoir (delta, temperature change, and change in downstream and upstream migrations), 3. Ask teachers to consider other processes or connections that we can study moving down stream.
- Visit a gravel bar and riparian forest patch down stream of the park boundary, teachers were split into 2 groups for 2 lessons: 1. teachers followed a sediment transect study to quantify sediment size and patterns, and 2. teachers discussed links with flooding and riparian forest conditions by doing a riparian forest transect and observing the links between disturbances and species diversity.
- Visit a landowner Josephine Pederson, who owns the yurt, farm house and side channel just down stream of the levy and upstream of the Little River confluence: 1. shared the history of her property and importance of the side

- channel habitat, and 2. heard stories about Josephine's comfort with the dam removal and dynamics living next to the river.
- Visit the Elwha Dam: 1. shared techniques for removing the dam, 2. shared some of the cultural history of the region and significant sites around the dam, 3. discussed challenges with building and restoring the area.
 - Returned to Peninsula College for a Mapping Exercise: 1. Chris shared NASA's version of Google Earth and methods to use it with students, 2. Dwight shared Google Earth, including how to access information, create points of interest, and making a simple mashup for students and projects.

Saturday

8:30 am – 4:00 pm **Daily Focus:** River Study Applications: bringing NASA data and regional river studies back to your classroom

Activities Overview: Completing our Elwha River survey by visiting the mouth of the river and shoreline of the Strait of Juan de Fuca. We conclude the day and workshop by breaking up into small groups, planning out a field project for students and sharing resources and curriculum for further studies.

- Visit to the Hunt Road Housing Association in the Lower Elwha River Valley: 1. Met with James Starr, who is a landowner and fisheries biologist who has tracked conditions in the river and next to the lower river; 2. hike along the river, making observations with the following question "what riparian diversity and management is needed to create log jams and other processes for restoration"?; 3. Teachers were split into small groups and created mini restoration plans (spacing and species) for a large field which had been carved out of the riparian forest and protected with artificial log jams constructed by the Lower Elwha Klallam Tribe. Teachers shared their plans and predictions for change in that area of the valley. Group stopped at a new side channel recently carved out of the forest by flooding and the river – introduced the Hyporheic Zone.
- Visit to the Mouth of the Elwha River: 1. Stopped on the levy enroute to the beach and shared a 1939 aerial photograph of the mouth and compared it with a current estuary map, 2. discussed erosion, deposition and management of the beach during lunch, 3. broke the teachers into 2 groups for a beach profiling protocol, allowing teachers to measure sediment deposition and changes with beach topography and nearshore habitat, 4. broke teachers into 5 groups and discussed use of a 7-day future forecast and stakeholder perspectives on water management (groups were tribal elders, commercial fisherman, hydro electric dam operators, river side landowners, mill workers) – held a mock town hall meeting to discuss the forecast and issues.
- Closed the workshop with a planning session for the local teachers. Darek discussed the goals of our school year program, options for teachers outside of the area, and facilitated a question and answer session.
- Fill Out Evaluations and Final Thoughts

Key Notes:

- 30 Clock hours are available for attending all the instructional contact hours. We had several teachers pursue clock hours.
- Field lunches and transportation was provided for all days and all participants.
- Workshop letter, agenda, directions, overview paper and equipment list were mailed to all participants prior to the workshop.
- Website work is in development for our teacher network and resources for students.