



Apr 6th, 2:15 PM - 2:30 PM

Experiential education and outreach based on nearshore monitoring of the Elwha River restoration project

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<https://cedar.wwu.edu/ssec/2018ssec/allsessions/575>

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Speaker

Andrea S. Ogston, Ian M. Miller, Chloe Dawson, Emily F. Eidam, Nancy Elder, Hannah E. Glover, Steve P. Rubin, and Melissa Williams

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Elwha River Restoration:

Two Dams have been removed from the Elwha River

- Salmon recovery
- Restore **sediment discharge** to the coast.

How can we communicate the impact of restoration projects to the public:

- **Higher-Education Activities**
- **Outreach Activities Focused on K-12**



Elwha River Restoration – in action

**Start:
Sept 2011**

Photos courtesy National Park Service



Glines
Canyon
Dam

Elwha
Dam



September 2011



October 2012-2013

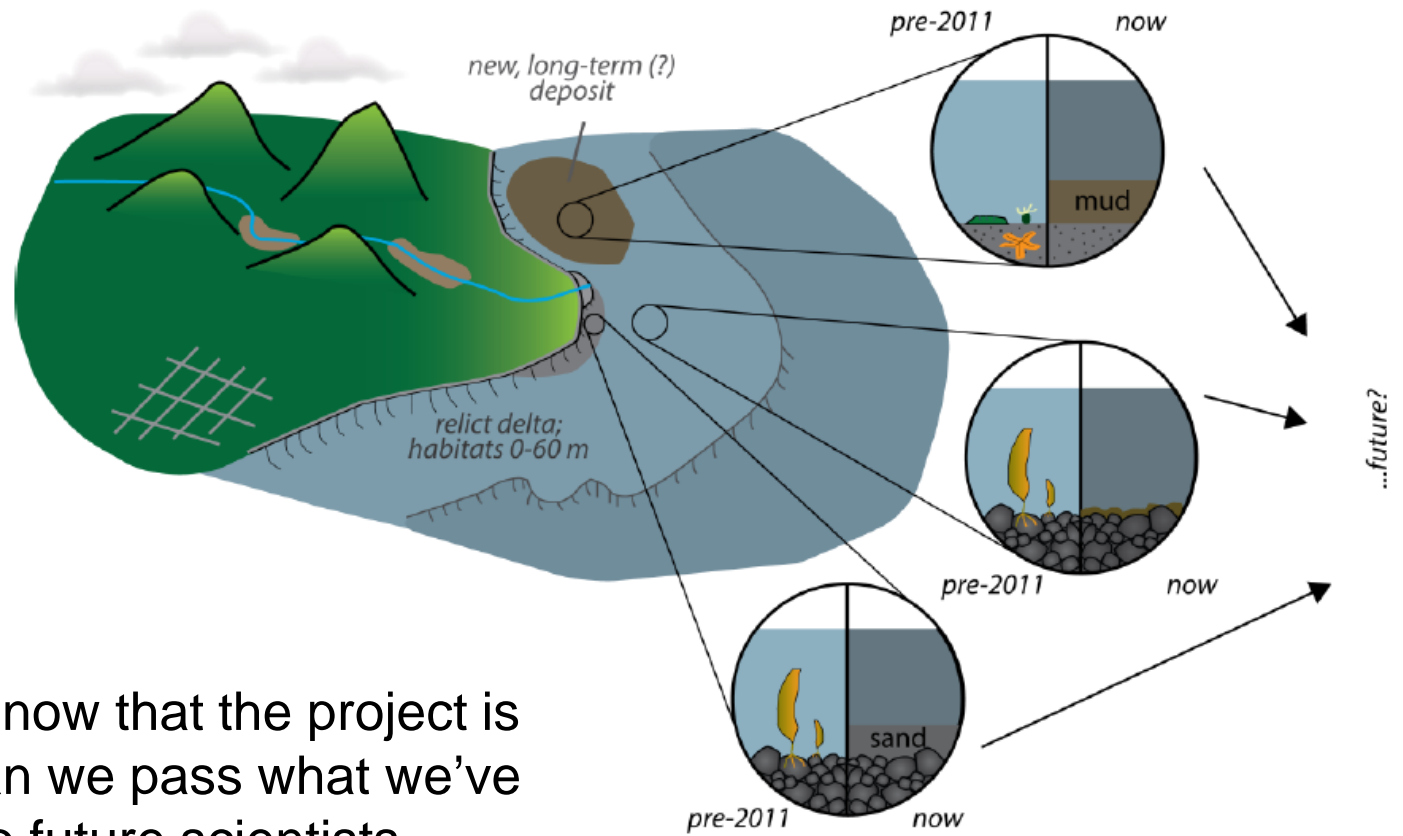


August 2014

**Done!
Sept 2014**

But... where's the mud??

And... what ecosystems sustained short- and long-term impacts (+ and -)?



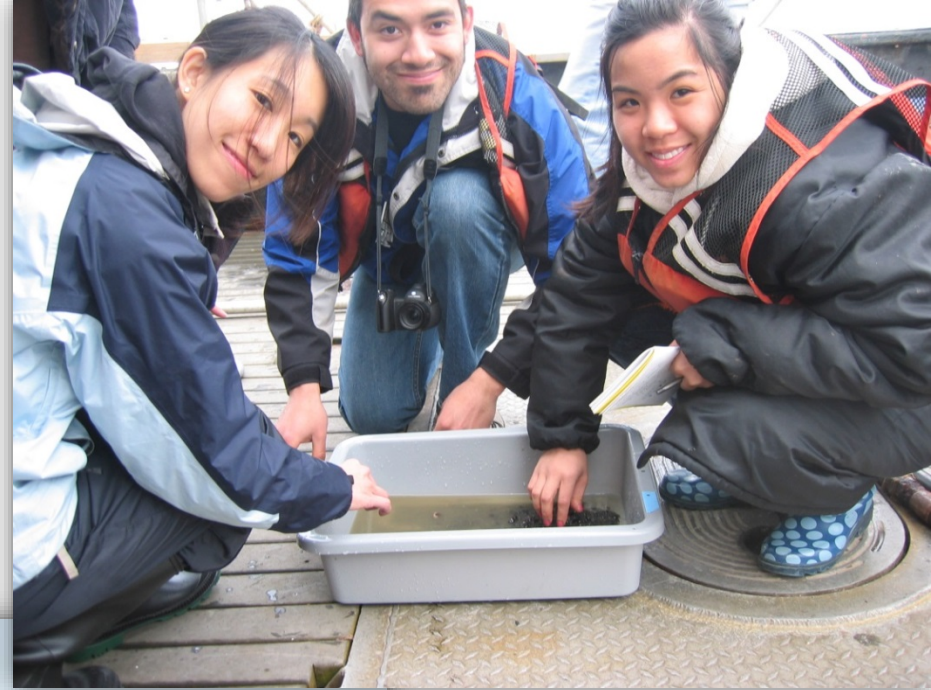
Additionally, now that the project is over, how can we pass what we've learned on to future scientists, managers, and citizens?

Higher Education Activities:

This research program has been
incorporated into:

UW and PC Undergraduate Research

UW Graduate Research



Research vessel time
contributed by UW

Curriculum content
at UW and PC

New Course:
**FHL Research
Apprenticeship**








ABOUT

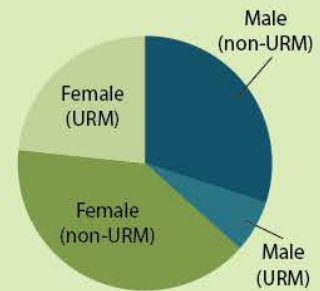


Friday Harbor Labs - Marine Sedimentary Processes Research Apprenticeship

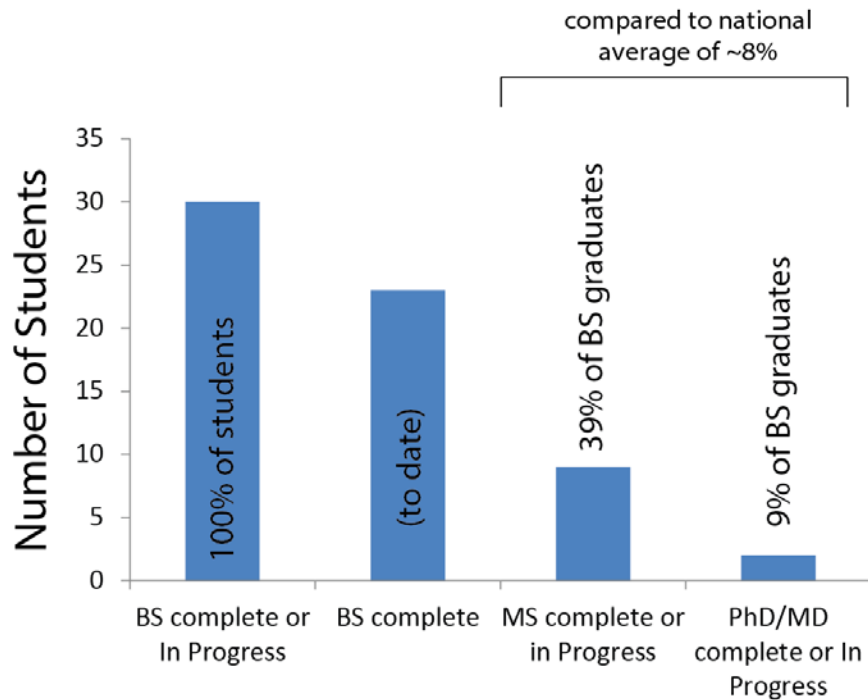
15 credits; research immersion

Course appeal

-  Quarter in residence off campus, at an active marine lab
-  Outdoor/natural laboratory; opportunities for field experience
-  Topic with specific regional interest for geology/ocean majors and non-majors alike
-  Course offered at a level accessible for non-geology/ocean majors
-  Opportunity to focus intensively on a topic for an entire course load/quarter



Student Outcomes:



Survey question: Did any aspect of the class help you on your current path? And do you currently use any of the skills you learned in the class?

“**Designing projects**, and always thinking about the end goal, as well as having the mentorship throughout the process has benefited me a lot especially now that I am expected to be independent.”



“... I felt in control of my own questions and research. This **chance to show self-reliance** has helped me understand how to properly conduct a research project.”

“The class was structured such that basically everything we did was related to the final goal of completing a scientific manuscript of original research.... **The steps taken to achieve this goal were all connected**, which facilitated my learning very well.”

“I **first used Matlab** during this apprenticeship, and now I use it all the time”

“Writing up the report at the end of the class was the most dull, but also likely the most essential part. Writing forces students to sit down and think hard about what they have learned, the results of the research, and **how to communicate those results to the academic community.**”



“...the exposure to academic research helped me realize that I wasn't a good fit for it. The **biggest aspect of the class I still use is collaborative working skills.**”

Research and Community Benefits

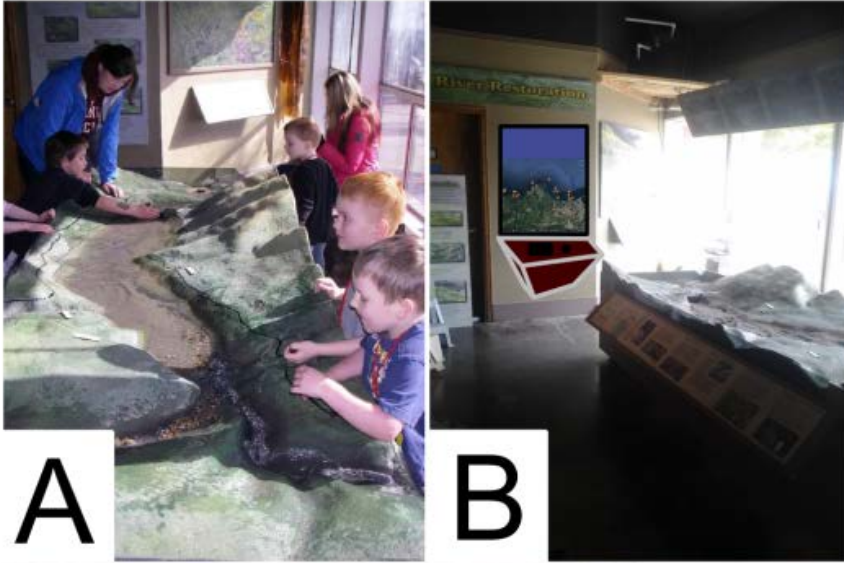
By engaging students in a major research project of regional and environmental significance, we hope to:

- *expand the reach* of the research to a broader subset of future scientists
- raise *awareness* about local and regional scientific issues
- expose students to the range of tasks required to answer research questions, and help them build *scientific research skills*
- help students better *communicate scientific results* to a broad audience
- improve *dissemination* of scientific results

In turn, student participation in the class has enriched the dataset collected as part of the larger research project, stimulated new questions about the impacts of our studies.



Outreach Activities focused on K-12



The **Feiro Marine Life Center's** existing Elwha-focused interpretive material is static (panel A).

We are in the process of adding of a digital interactive display (panel B),



This is based on interactive displays at places like the Monterey Bay National Marine Sanctuaries interpretive center in Santa Cruz, CA (panel C; image courtesy of Lisa Uttal, Director)

At the center of the display is an interactive Web Page.

The “Landing Page” with storylines

In addition to the display at Fiero Marine Life Center, the web page will be accessible from any computer, anywhere.

The screenshot shows a website landing page for "ELWHA NEARSHORE BENTHIC MARINE COMMUNITY SURVEYS". The page features a dark blue header with navigation links: "MONITORING CHANGES IN THE ELWHA NEARSHORE", "CONTACT", "SEARCH", "ELWHA NEARSHORE BENTHIC MARINE COMMUNITY SURVEYS", "Lower Elwha", "HOME", and "ABOUT". The main content area is a grid of six interactive cards, each with a title, a descriptive paragraph, and a representative image. The cards are: 1. "Dive Map" (watch underwater videos), 2. "What Lives Down There?" (organisms at the Elwha river delta), 3. "Coastal Sediment" (release of 30 million tonnes of sediment), 4. "Habitat in transition" (ecological changes), 5. "Creatures Adapting" (animals in a changing environment), and 6. "What we do Underwater" (scientists collecting data). The footer contains logos for USGS, Sea Grant Washington, and the U.S. Environmental Protection Agency, along with the text "© 2018 Elwha".

MONITORING CHANGES IN THE ELWHA NEARSHORE

CONTACT SEARCH

ELWHA NEARSHORE
BENTHIC MARINE COMMUNITY SURVEYS

Lower Elwha

HOME ABOUT

Dive Map
Watch underwater videos from various locations at the mouth of the Elwha river

What Lives Down There?
See some of the many organisms that make their home at the Elwha river delta

Coastal Sediment
Learn about the release of 30 million tonnes of sediment

Habitat in transition
A cascade of ecological changes

Creatures Adapting
How the animals changed as the environment changed around them

What we do Underwater
Check out how scientists dive underwater to collect data at sample sites

USGS
science for a changing world

Sea Grant
Washington

U.S. ENVIRONMENTAL PROTECTION AGENCY

© 2018 Elwha

Each story goes into more detail and provides appealing imagery for a range of knowledge levels.



WHAT LIVES DOWN THERE?

See some of the many organisms that make their home at the Elwha river delta

Near the Elwha River delta, fresh river water mixes with saltwater coming through the Strait of Juan de Fuca and flows over a variety of bottom substrates and kelp beds, providing a broad range of habitat for many organisms. As a result the shallow depths of the Strait of Juan de Fuca nearshore are home to a diverse array of underwater life.

If you were to dive underwater near the Elwha River delta, you might find yourself swimming through an underwater forest of kelp. You may not see any animals yet, but look closely. Do you



sponge

[Home](#)

[What we do Underwater](#)

[Creatures Adapting](#)

[Habitat in transition](#)

[Coastal Sediment](#)

[What Lives Down There](#)

[Dive Map](#)

IMAGE GALLERY



One highlight is the
“Dive Map” with
underwater video



Dive Map

Watch underwater videos from various locations at the mouth of the Elwha river



What Lives Down There?

See some of the many organisms that make their home at the Elwha river delta



Coastal Sediment

Learn about the release of 30 million tonnes of sediment



Habitat in transition

A cascade of ecological changes



Creatures Adapting

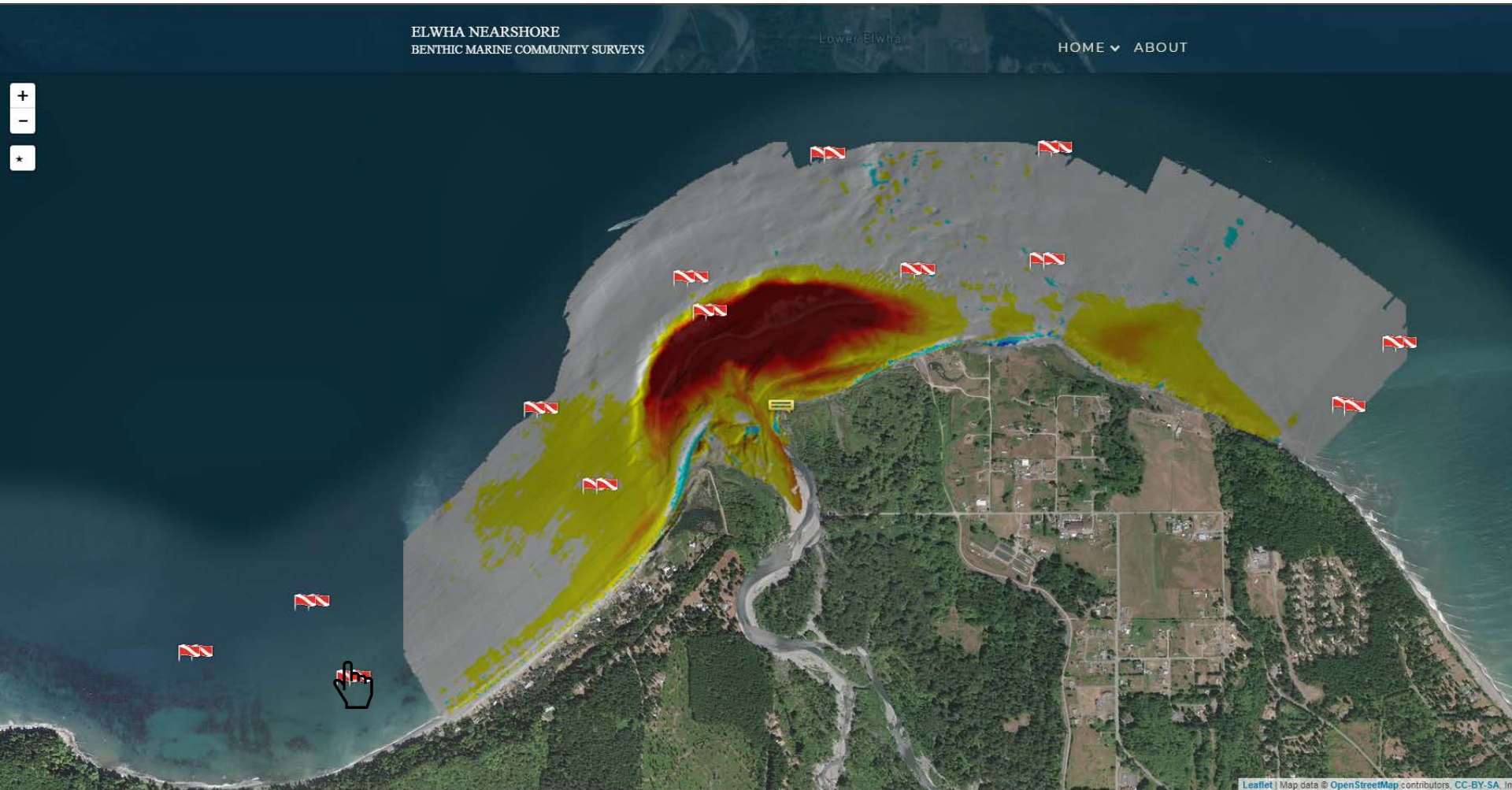
How the animals changed as the environment changed around them



What we do Underwater

Check out how scientists dive underwater to collect data at sample sites

Click on any of the dive sites to see what has happened to marine habitats before, during, and after dam removal





A1 East Transect – 2016



A1 East Transect



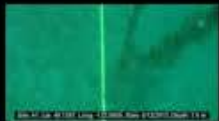
2016



2015



2014



2013



2012



2011



2010

Site: A1, Lat: 48.1387, Long: -123.5855, Date: 8/9/2016, Depth: 8.0 m

Permanent Site: A1 East Transect; Depth: 8.0 Meters (26.1 Feet); Distance from river mouth: 1.8 Kilometers (1.1 Miles) West; Pre/Post Dam Removal: 5 years post-dam removal; Lat/Long: 48.13870775, -123.5855312; Site Description: Transect is in eastern part of Freshwater Bay. Sediment is primarily sand/sandy mud. Previous small boulders appear to be buried. Seaweeds are very sparse. The patch of eelgrass (*Zostera marina*) seen in 2011-2012 has not returned. Feather duster tubeworms *Eudistylia vancouveri* start to be seen towards the western end (1:30 seconds) and past the end point of the transect (2:00 seconds). Another tubeworm, *Diopatra ornata* is common but hard to see on the video (appears as small clumps of seaweed and detritus 1:03 seconds). Location: Elwha River Nearshore, Strait of Juan de Fuca, Washington, USA Editor: Chloe Dawson; USGS Contact: Nancy Elder, Fishery Biologist, Marrowstone Marine Field Station, (nelder@usgs.gov)

Summary:

The Elwha Restoration Project provided a unique opportunity to educate about sedimentary processes during restoration activities at a range of levels:

A research-focused course at the Friday Harbor Labs trains students in restoration impacts and the scientific method

Curriculum elements have been added to courses at Peninsula College and University of Washington (and beyond)

The upcoming Feiro Marine Center display and on-line Elwha Nearshore website will connect with learners of all ages



photos courtesy Niall Twomey & Emily Eidam



COURSE DESCRIPTIONS

OCEAN 492 B | AUTUMN 2018

Marine Sedimentary Processes Research Apprenticeship 2018

Credits: 15

Instructor(s): Dr. Andrea Ogston , Dr. Ian M. Miller

Prerequisites:

Dam removals, and other restoration projects, are becoming an increasingly popular way to restore the habitats of depleted fisheries and river ecosystems. But we do not completely understand the long-term effects our "restoration" will have. Our goal in this research apprenticeship is to use the Elwha River restoration project as a case study to understand:

- how marine sedimentary processes operate near the mouths of rivers;
- how the absence of river sediments has impacted the marine systems; and
- the response of nearshore habitats to the restoration.

COURSES ▾

> Course Descriptions

Spring 2017

Summer 2017

Autumn 2017

Spring 2018

Summer 2018

Autumn 2018

> Applying for an FHL Course

> Academic Calendar

> Costs

Acknowledgements:

Significant credit goes to graduate students involved developing and teaching the courses (including Kristen Lee Webster, Rip Hale). Dr. C. Nittrouer and was co-instructor and developer for the course in 2008. The research apprenticeship program at the Friday Harbor Laboratories is funded by the Mary Gates Endowment and the Henry and Holly Wendt endowment. The scientific program was supported under NSF grant OCE-0960788 and Washington Sea Grant R/ES-65. The UW School of Oceanography helped support ship time for the research cruises.