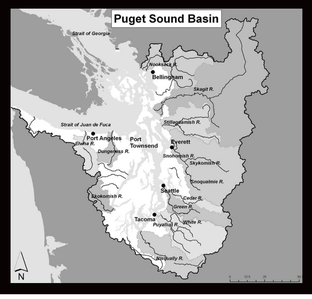


Collaborative Research: Data-driven Inquiry in Geoscience Environmental Restoration Studies (DIGERS)

Principal Investigators: Daniel Zalles, SRI International; David Montgomery, University of Washington
Researchers: Brian Collins, Amir Sheikh; Evaluator: Kathleen Haynie

NEEDS

- How to get more American Indian students engaged in geoscience studies and pursue careers in geoscience
- How to connect students' sense of place to authentic geoscience research
- How to tie student field experiences to the development of student data literacy skills by making explicit the connections between the places they know and spatio-temporal data representations of those places
- How to instill in students an understanding of the systemic nature of the challenges confronting our natural resources (e.g., the social, environmental, and economic characteristics of Puget Sound watershed habitats)
- How to make greater utilization of current scientific research in the classroom and how to maintain the types of productive educator-scientist relationships that make this possible

DIGERS GOALS

- Build interest in environmental science among American Indian and other students
- Connect environmental science to personal and community empowerment
- Create models of data-based inquiry for different student levels (high school, undergraduate)

DELIVERABLES

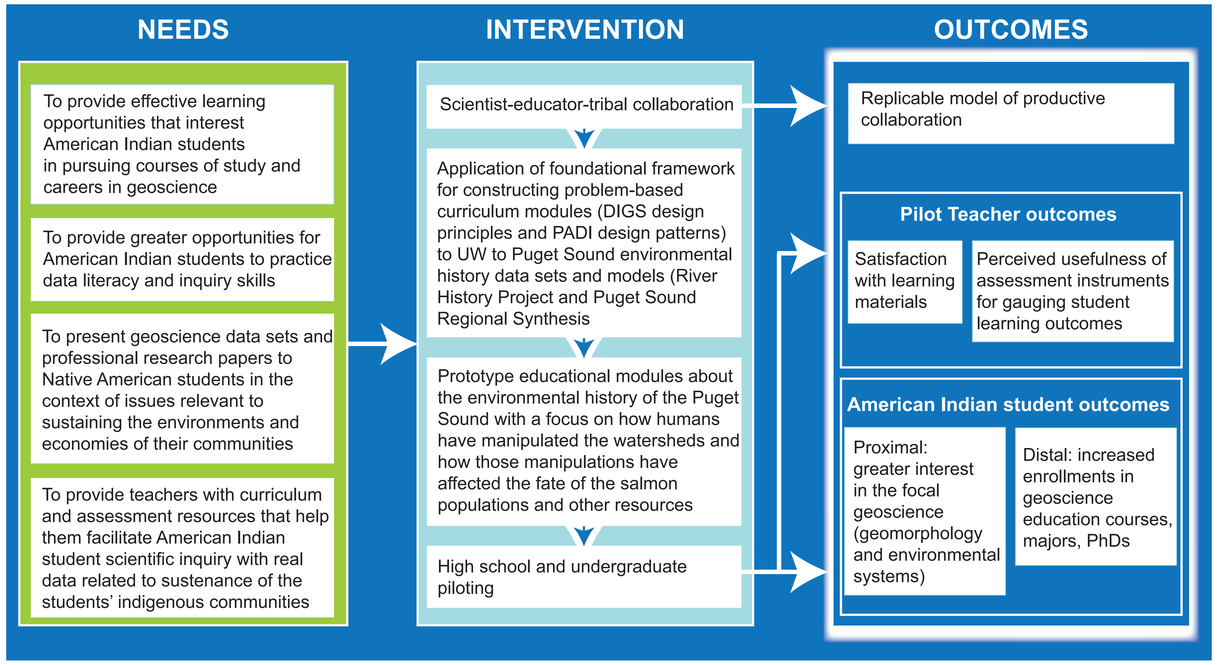
- Undergraduate course at UW
- High school-level units
- Performance assessments
- Design patterns guiding instructional and assessment task development
- Piloting
- Online access to all materials and assessment scoring guides

CENTER FOR TECHNOLOGY IN LEARNING

CTL research and development activities contribute to the knowledge base on effective learning and teaching, and embody research insights in the innovative design, use, and assessment of interactive learning environments. Much of CTL's work is conducted in educational settings such as classrooms, after-school programs, and teacher education programs. Among other things, CTL prototypes new interactive learning environments and tools, explores best practices, and seeks to understand the mechanisms that lead to better teaching and learning.

www.ctl.sri.com

LOGIC MODEL



EDUCATIONAL FOCI

- Place-based (S. Semken, 2005; G. Smith, 2002)
- Environmental history
- Alternative futures (Lombard, 2008)
- Hands-on, field trips
- Earth systems approach
- Relating data visualizations to personal experience at sites
- Triangulating data sources to build historical understanding (combining geomorphology and history)

TOPICS

- What structures the physical and ecological character of the pre-settlement landscape?
- How have human activities changed the physical and ecological character of rivers?
- How do geoscientists investigate historical change to rivers, their ecosystems, and natural resources such as salmon and shellfish?
- How can knowledge of historical landscape change inform habitat restoration planning?
- How can traditional knowledge be used in synergy with scientific data to address these questions?
- What is the role of values in shaping rivers and their resources?
- How can an understanding of landscape history be used in developing and assessing alternative future scenarios?

UNIVERSITY OF WASHINGTON PUGET SOUND RIVER HISTORY PROJECT

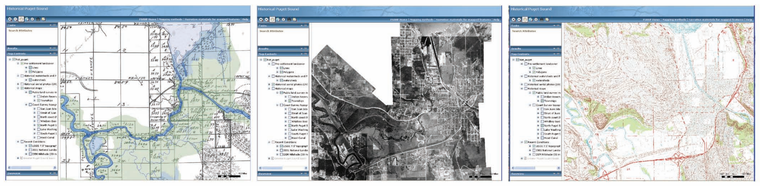
Human activities have homogenized and simplified lowland, temperate rivers. To understand the landscape's geomorphology and ecology prior to these changes, the University of Washington's Puget Sound River History Project studies the river and estuarine landscapes in the Puget Lowland of Washington State before the rise of European settlement around 1850. To "see through" historical anthropogenic change, the project uses a combination of field studies, archival sources, and natural and topographic proxy methods. The pre-Euro settlement landscape had considerable diversity in landforms and geomorphic processes that is not apparent today. This diversity is caused in part by such geologic influences as Ice Age glaciation, lahars, and fault movements. These diverse physical landscapes in turn generated diverse assemblages of ecosystems. The River History Project is also studying the human-caused changes since European settlement began and how these changes affect resources such as salmon. It also investigates how to use knowledge of landscape mechanics, ecology, and history to:

1. Plan river and habitat restoration
2. Develop alternative future scenarios that consider different land uses that make competing claims on how river valleys and estuaries can be used for agriculture, urban development, restoration, and conservation

Data and analyses from the River History Project and allied programs at the University of Washington (e.g., the Puget Sound Regional Synthesis Program) provide the foundation for the DIGERS curriculum and assessment materials.

http://riverhistory.ess.washington.edu/

Screen captures from online GIS atlas:
Black River and south Lake Washington, near Seattle, Washington



Pre-settlement land cover draped over 1862 Public Land Survey plat map | 1940 aerial photographs | Current conditions (USGS topographic map)

Online GIS Atlas

One instructional tool will be an interactive, online atlas for students to investigate how rivers have changed through time. For example, the Black River, near Seattle, historically provided salmon runs and transportation for native peoples who lived along its shores. Several human activities initiated early in the 20th century caused the river to vanish. The GIS atlas is one tool for learning about the river's geomorphology and ecology, and how and why it changed. The atlas will also assist learning on field trips devoted to investigating the river's modern legacy.

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