



BUCKNELL ON THE

# SUSQUEHANNA 2012

## People, Landscapes, & Nature

ENST 291

May 14 to June 3, 2012

from the Chesapeake to the Puget Sound

[www.departments.bucknell.edu/environmental\\_center/bots2012/](http://www.departments.bucknell.edu/environmental_center/bots2012/)



### PEOPLE

Learn about native peoples and the watershed, European settlement and colonization of the region, growth of river communities, urbanization, and natural resource extraction. Discover how people both change and are changed by the river and the bay.

### LANDSCAPES

Learn about the natural history of the Susquehanna River and the Chesapeake Bay, the evolution of its landforms and the web of geologic, hydrologic, and biologic process that continue to shape it today. See how man has transformed that landscape.

### NATURE

Paddle the river, kayak on the ocean, sample the waters of the bay from a research boat, hike the forests and wetlands in the watershed. Learn about the plants, aquatic life, stream processes, and wetland communities on both the Atlantic and Pacific oceans.



# BUCKNELL ON THE SUSQUEHANNA



## People, landscapes, and nature ... from the Chesapeake to the Puget Sound

The Susquehanna River is the greatest contributor of fresh water to the Chesapeake Bay, the largest estuary in the United States. The Puget Sound is the second largest estuary, an arm of the Pacific Ocean that extends inland where it meets 19 different river basins. The Bay and the Sound experience tidal flows and there is a changing mixture of fresh and salt waters.

These watersheds have been the home of Native Americans for thousands of years, who relied upon the rivers and forests for their livelihood. But from the earliest European settlements to the 21st century, these regions have undergone vast changes in land use, including logging, oil and natural gas development, coal mining, agriculture, industrialization and urban growth.

Since the 1970s, the overall health of the rivers and coastal areas have been gradually improving in distinct ways, especially as abandoned mine discharge and sediment and pollutant runoff is addressed and reduced. Of great importance is the continued monitoring of the estuaries and regulation of water withdrawals from

the basin and the quality of discharges to the estuaries. Another benefit has been the implementation of best management practices (BMPs) by the agriculture, timbering, mining, and natural gas industries.

The difficulties these watersheds face are complex and the Susquehanna River and Puget Sound face enormous pressure from many different directions. Additional research and awareness is needed, especially of its hydrology and physical habitat, and how dissolved oxygen fluctuations, heavy metals and endocrine disruptors are affecting aquatic life. Also of concern is the potential impact of the development of natural gas reserves in the Marcellus Shale, which underlies much of the watershed's headwater regions.

The mission of *Bucknell on the Susquehanna* is exacting that: to provide students a life-changing, field-based experience that's *on the river, throughout the watershed, and across the bay and nation*.

**Come join us!**  
**May 14 - June 3, 2012**

*Be part of  
the adventure!*



This unique, interdisciplinary, field-based learning experience explores fundamental questions:

- *What is the history of these watersheds - the rivers and estuaries, their aquatic ecosystems, the communities and people who live within them?*
- *How do they impact each other? How are they changing?*
- *What does the future look like?*

## An interdisciplinary, watershed-based learning experience



### GET YOUR FEET WET!

There's no better way to learn than by immersing yourself in the moment. ***Bucknell on the Susquehanna*** is just that - a field based sojourn across the watersheds to identify key factors threatening its health and how the Chesapeake compares to the Puget Sound and other watersheds around the world. Travel to new places, discover new things, and interact with environmental leaders across the country.

### People, landscapes, and nature ... from the Chesapeake to the Puget Sound

- Study the fascinating history of Native American and early European settlements along the river and visit sites today.
- Learn about logging on watersheds across the United States and how scientists are documenting its impact on streams over 100 years later.
- Learn about the legacy of mining - both gravel and coal - on the watershed.
- Visit Marcellus natural gas well and meet environmental scientists and geologists working in this field.
- Visit hydroelectric and nuclear power facilities in the Susquehanna and the Puget Sound watersheds and compare.
- Spend four days on the river, learning about the natural history of the Susquehanna River on a two-day overnight river sojourn. Paddle and snorkel the river to learn about its hydrology, geology, and ecology up close.
- Visit an active coal strip mine and learn state-of-the-art mine reclamation and AMD treatment technologies.
- Agriculture is the number one threat to the Chesapeake Bay; visit a working dairy farm within the watershed and learn about nutrient management and trading, and reduction.
- Learn about engineering marvels in the watershed, including bridges across the Susquehanna, hydropower and nuclear power facilities.
- Study the aquatic life in the river - from macro invertebrates and mussels in the river bed sediments to fish and plants and how these natural ecosystems are impacted by land use and climate change.
- Learn about the importance of floods in watersheds, prehistoric mega-floods and the largest historical floods on record, and how they have shaped the landscape, the estuaries, and river and coastal communities therein.
- Go sea-kayaking in the Puget Sound and learn about urban volcanic hazards surrounding Mount Rainier.

Explore the river-bay connections





## Course Leaders

DR. BENJAMIN R. HAYES  
*Susquehanna River Initiative*

DR. PETER R. WILSHUSEN  
*Environmental Studies*

DR. R. CRAIG KOCHER  
*Geology*




## Discover global watershed connections you never knew existed

Explore parts of Chesapeake Bay and Puget Sound which includes vast stretches of deep, open waters, shallow bays and inlets, and muddy to sandy to rocky sediments underneath. Travel from the forested uplands down to the estuaries and discover fascinating connections including:

- *The Sargasso Sea and catadromous eels and their relationship to endangered mussel communities in the Susquehanna river.*
- *Forests and anadromous fish species - witness shad and salmon migrate upstream from the Atlantic and Pacific oceans.*

- *Earth's moon, meteorites, and the Chesapeake Bay.*
- *Engineering feats and infrastructures built across the river and bay areas, including bridges, hydroelectric dams, vast canal networks, and fish passageways and flood control levees.*
- *Blue crabs in the Chesapeake, mussels in the Susquehanna River and geoducks in the Puget Sound.*
- *Native peoples who live in the islands and forests along the river and coastal areas, and their struggle to survive and protect these regions.*
- *You, the river, its communities, and the Chesapeake Bay!*



EXPLORE	INTERPRET	PAST	PRESENT	FUTURE
	<p><b>Natural and urbanized corridors</b> Study rivers and coastal areas up close, journal your observations, and make interpretations.</p>	<p><b>Geologic past to the 20<sup>th</sup> century</b> From plate tectonics to glaciers, floods, logging, canals, railroads, mining, dams, nuclear power and big industry.</p>	<p><b>Conservation</b> Accompany leading environmental professionals into the field and collect data which helps to understand and protect the rivers and estuaries.</p>	<p><b>Global change</b> Study the models that predict how global change is impacting these watershed and evaluate alternatives for the future. Find ways you can make a difference.</p>