

Virginia Water Resources Research Center:

Addressing Water Challenges and Opportunities

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Arizona Water Resources Research Center

Brown Bag Seminar

4 November 2015



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Today's Presentation...

1. Virginia's water challenges
2. Water Center overview
3. New interdisciplinary water degree



Water: Complex Challenges...

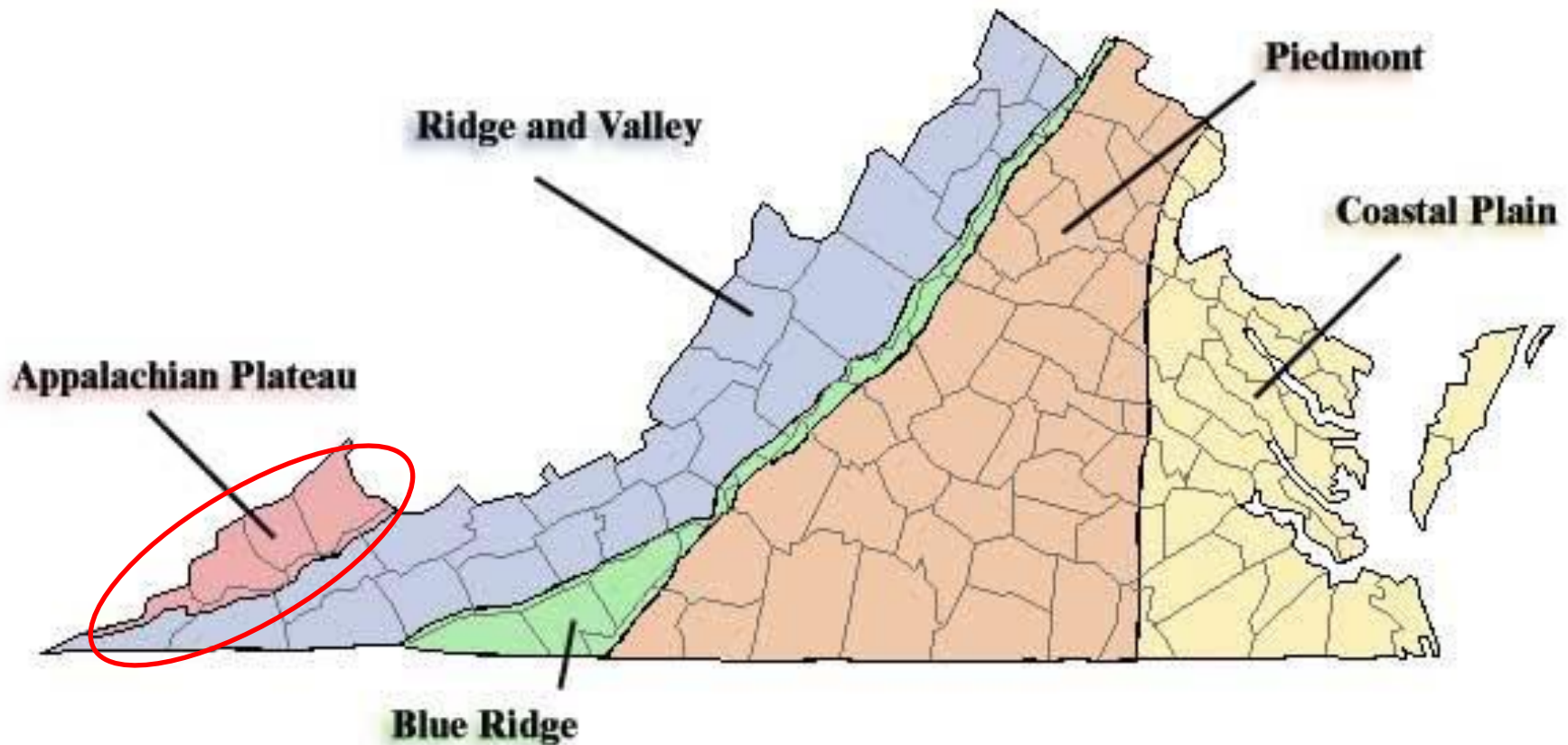


- * Coal mining, water quality, aquatic biodiversity
- * Natural gas extraction & pipelines
- * Coastal zone & climate change
- * Eastern Virginia groundwater availability & saltwater intrusion
- * Rapid urbanization
- * Chesapeake Bay
- * Aging infrastructure
- * Stormwater
- * Water policy, planning, mgt.

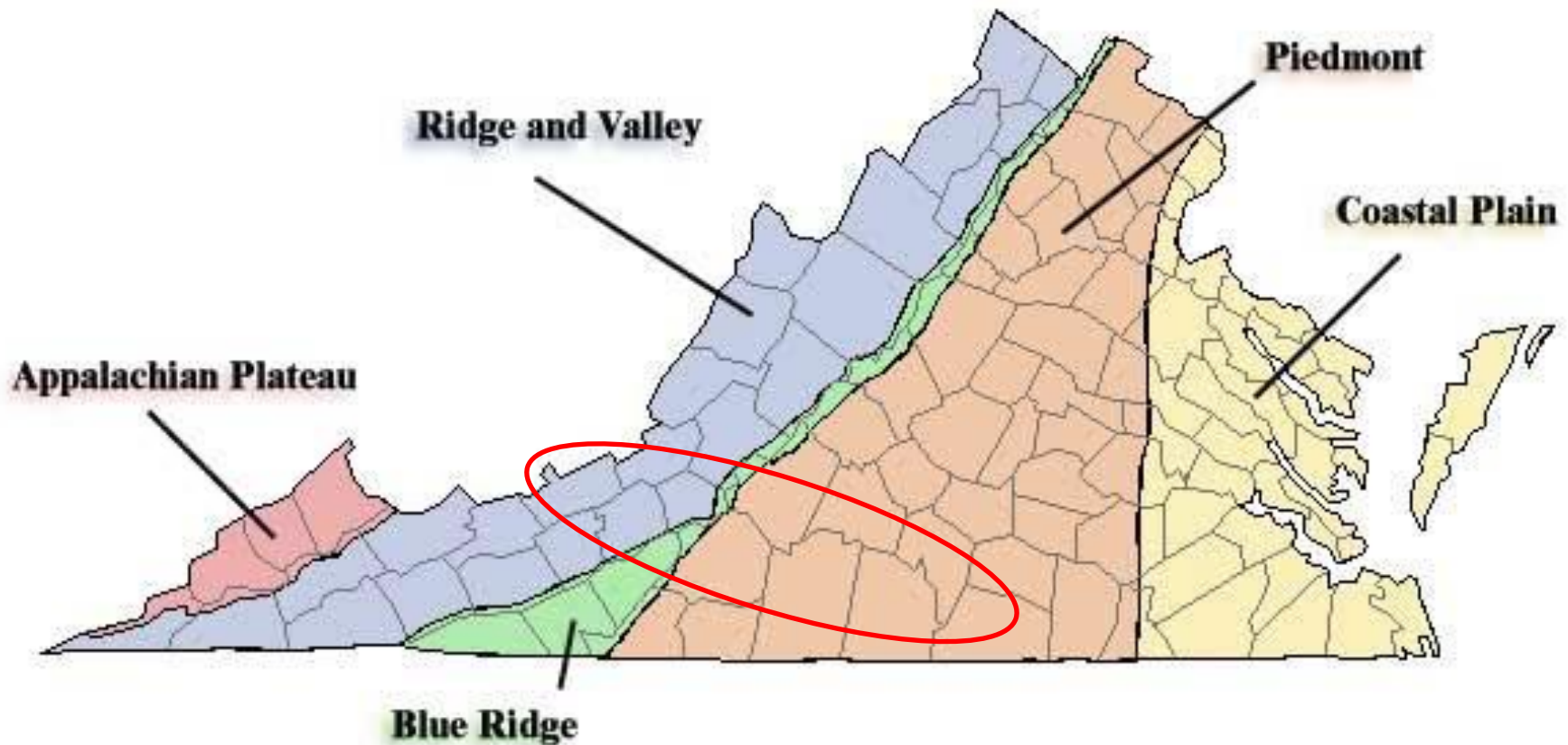


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Coal Mining & Fracking

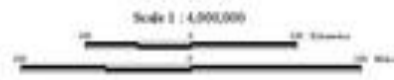
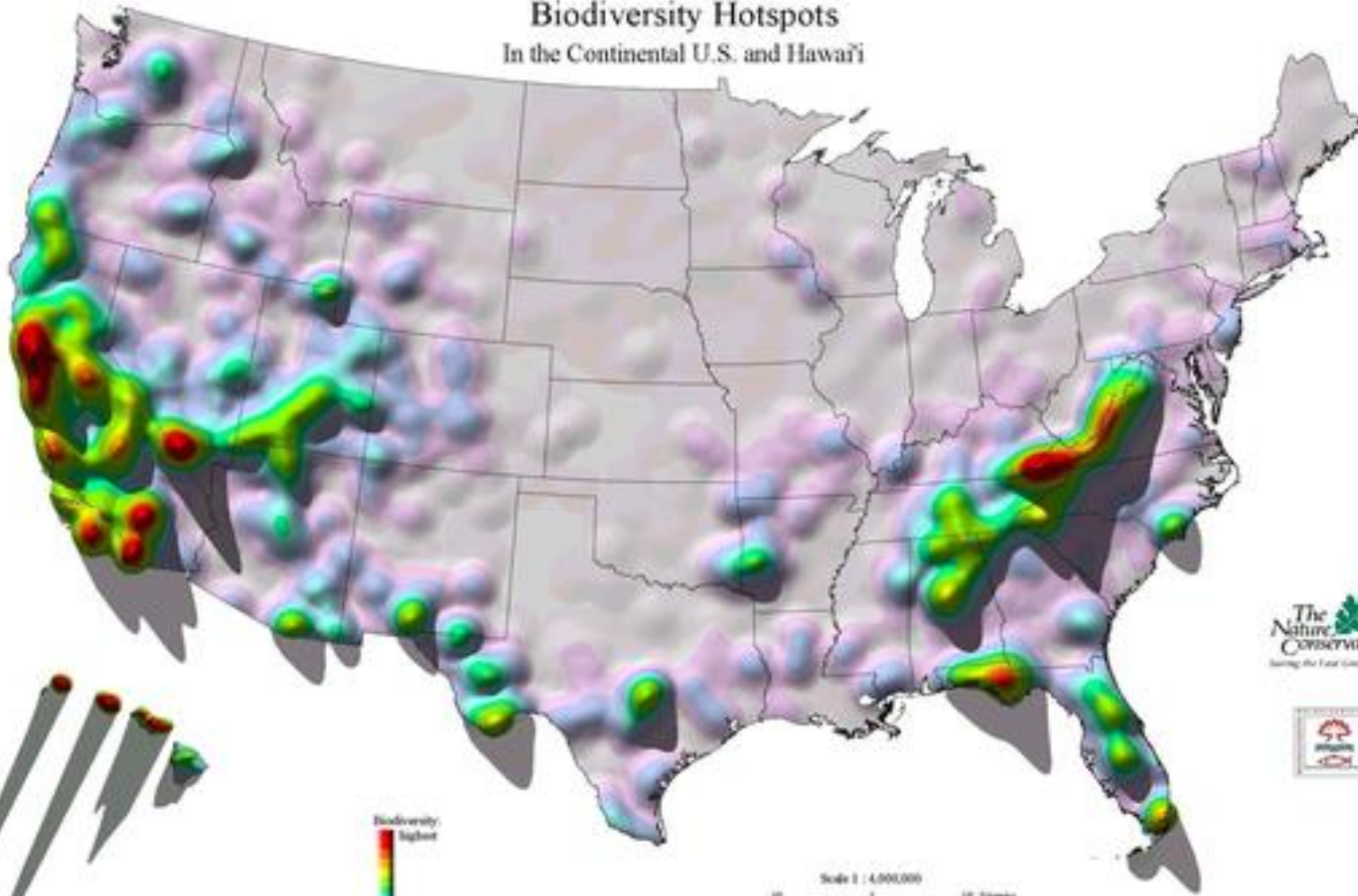


Natural Gas Pipeline



Biodiversity Hotspots (TNC)

Biodiversity Hotspots
In the Continental U.S. and Hawai'i

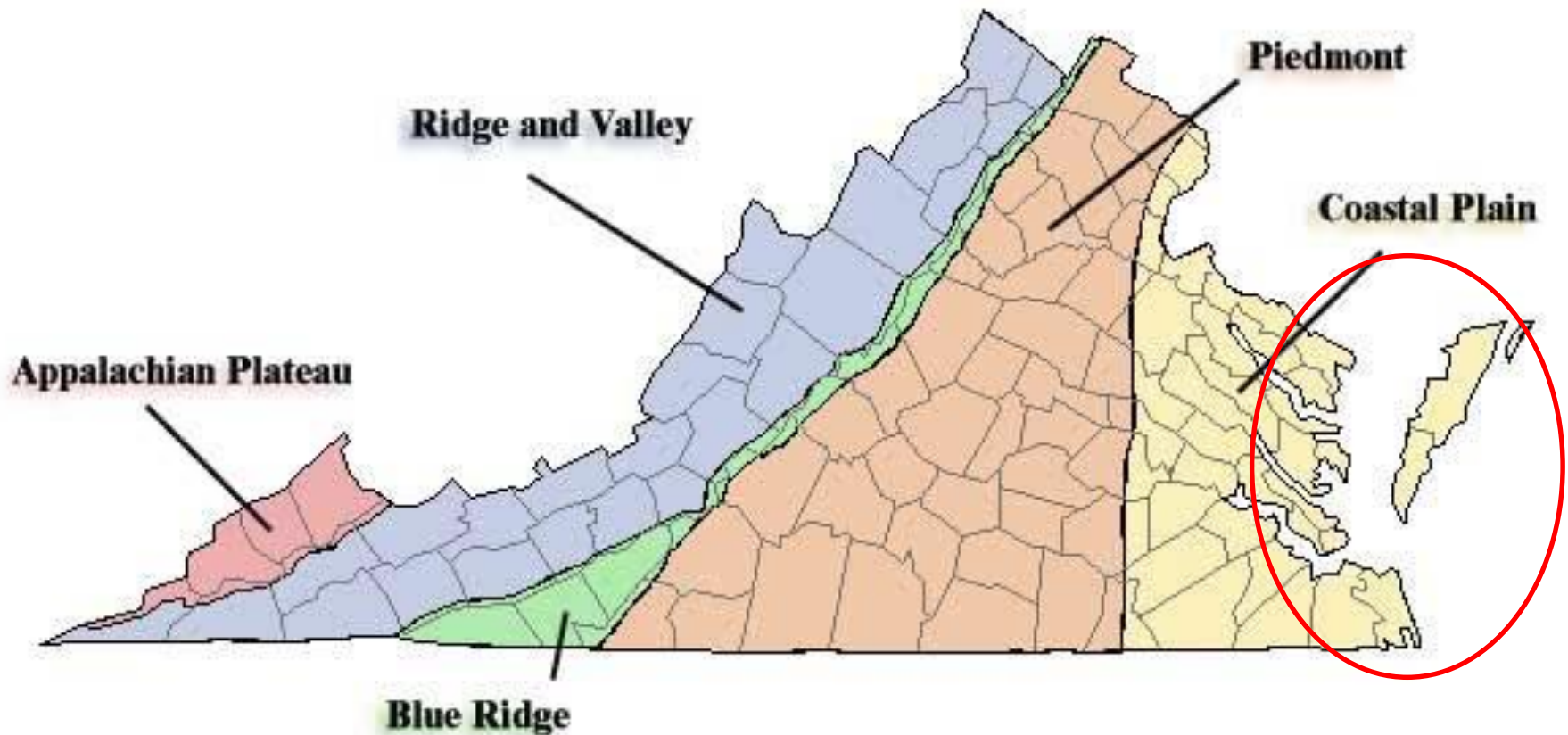


The Nature Conservancy
Saving the Land We Love

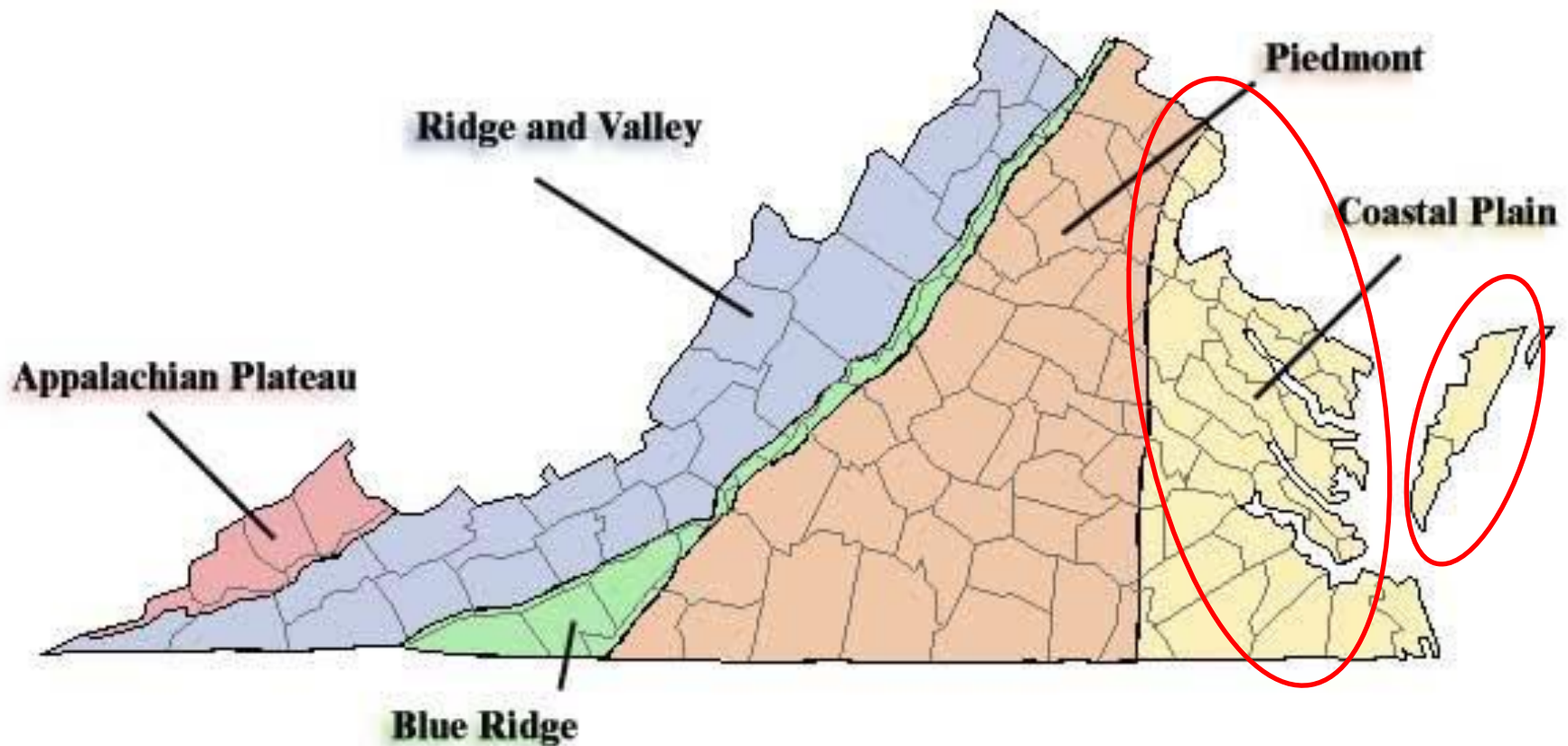


This map was created from data provided by the U.S. Geological Survey and the U.S. Fish and Wildlife Service. The U.S. Geological Survey is the official source of the data. The map is published by The Nature Conservancy. The map is published by The Nature Conservancy. The map is published by The Nature Conservancy. The map is published by The Nature Conservancy.

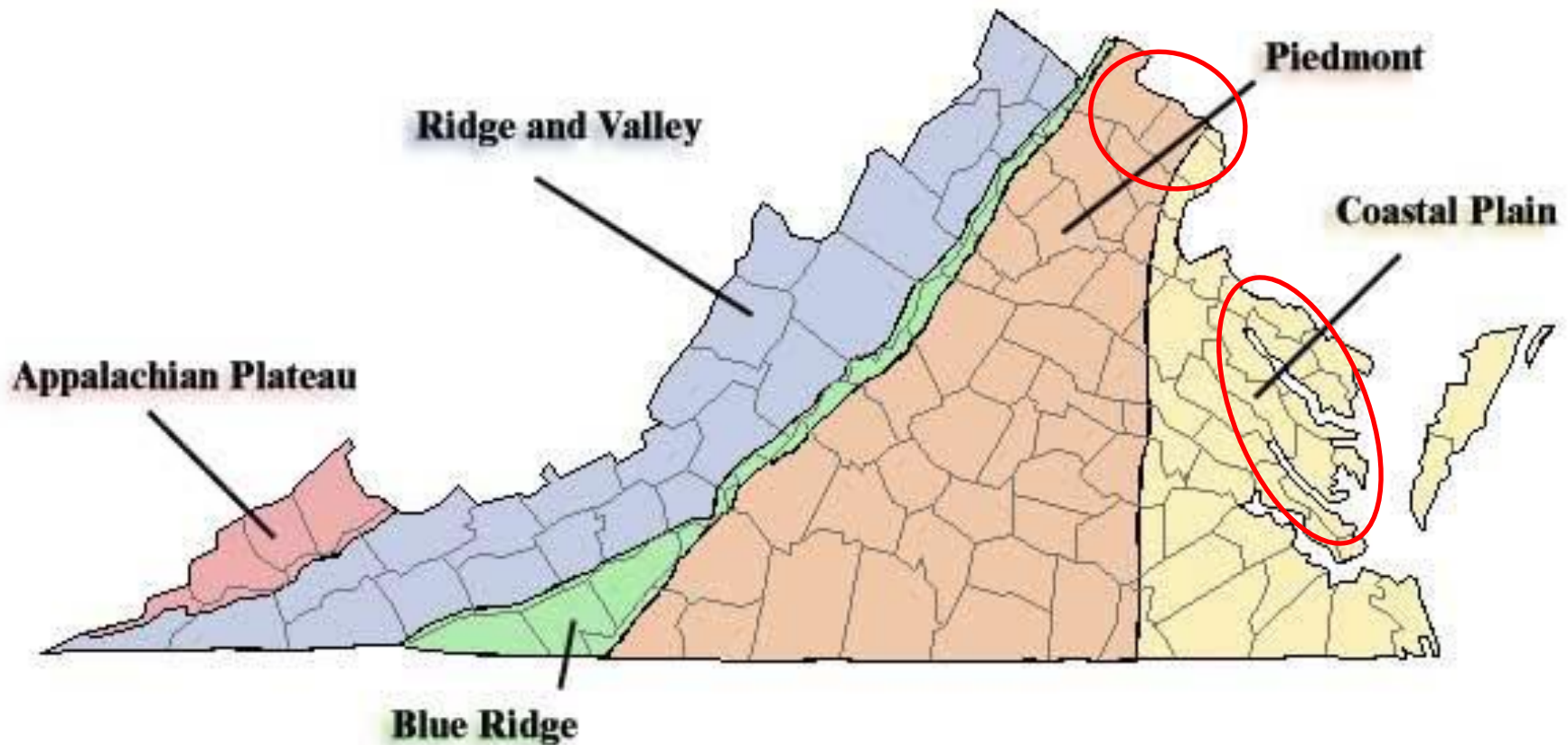
Coastal Zone Resilience



Groundwater

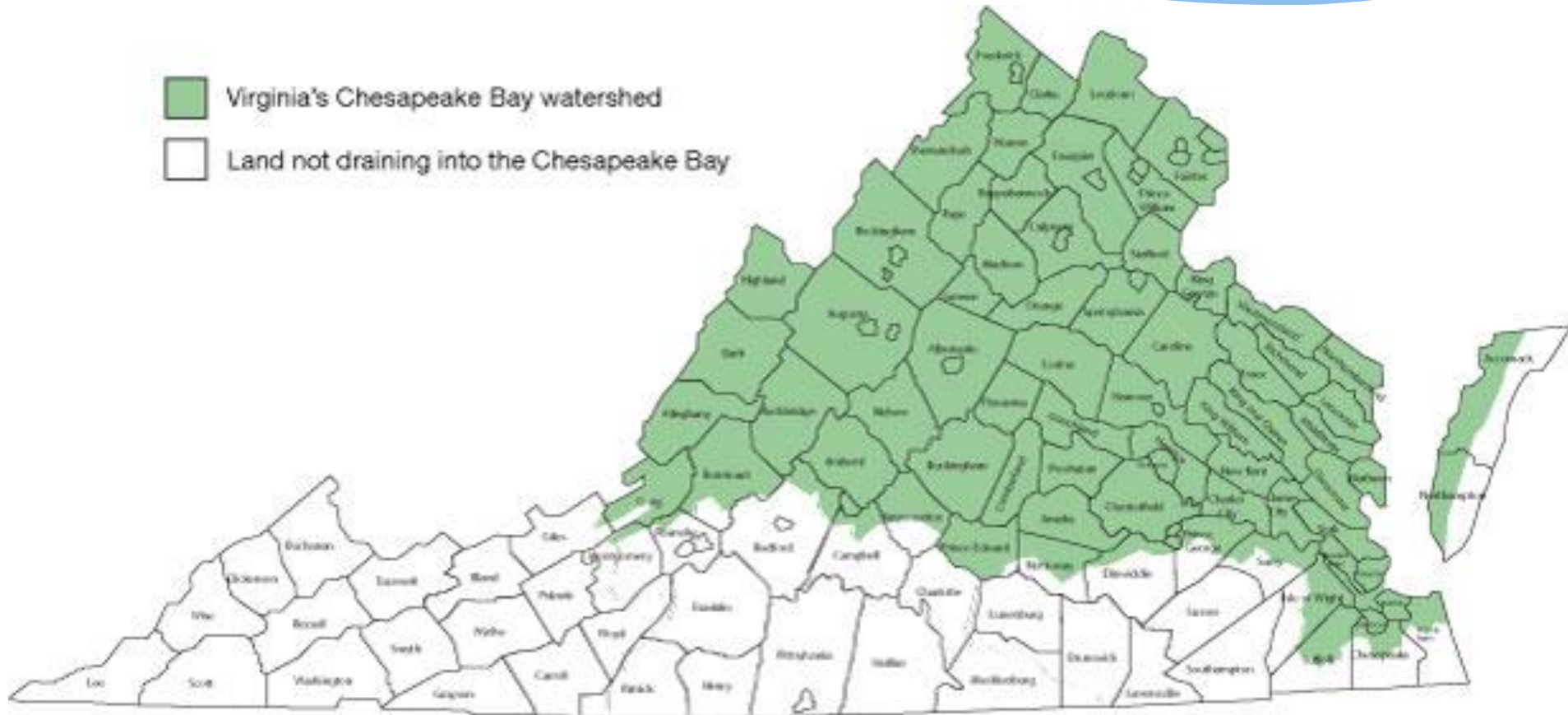


Rapid Urbanization



Chesapeake Bay

- Virginia's Chesapeake Bay watershed
- Land not draining into the Chesapeake Bay



Virginia's Impaired Waters (DEQ)

* Recreational Use

- * Rivers/streams: 48% (10,830 miles)
- * Lakes: 1% (1,118 acres)
- * Estuaries: 3.7% (91 square miles)

* Aquatic Life Use

- * Rivers/streams: 29% (6,469 miles)
- * Lakes: 43% (48,555 acres)
- * Estuaries: 86% (2,114 square miles)

Water Center Background

- * One of the nation's 54 water centers established at universities by the Water Resources Research Act of 1964
- * VA's Water Center established at VT in 1965
- * *A state agency* authorized by the Virginia General Assembly in 1982
- * In College of Natural Resources and Environment - 2005



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Water Center – Our Role



Mission - WRRRA

- ✓ Provide research & educational opportunities to future water scientists
- ✓ Encourage studies of practical solutions to water-resources problems
- ✓ Facilitate transfer of water-resources information to policy- and decision-makers

Functions, Powers, Duties

Established by Code of Virginia:

- * consulting with General Assembly; federal, state, & local agencies; NGOs; private industry; & other potential users of research
- * establishing & administering agreements with other universities of the Commonwealth to carry out research projects
- * disseminating new information & research results

Functions, Powers, Duties

Established by Code of Virginia:

- * **facilitating application & transfer of new technologies**
- * **being a liaison between Virginia & federal research funding agencies as an advocate for Virginia's water research needs**
- * **encouraging development of academic programs in water resources management in conjunction with the State Council on Higher Education**

VWRRC Faculty/Staff

Paul Winistorfer
Dean, CNRE

Statewide
Advisory Board

Stephen Schoenholtz
Director

Kevin McGuire
Associate Director

Inga
Solberg
Fiscal
Officer

Jane
Walker
Research
Associate

Alan
Raflo
Research
Associate

Luke
Juran
Assistant
Professor

Daniel
McLaughlin
Assistant
Professor

Liz
Sharp
Research
Assistant

Vacant
Communic.
Manager

Base Funding – FY 2015

- * **USGS 104b base funding \$92,335**
 - * **Used for information transfer & administration**
 - * **salaries and fringe**
 - * **NIWR dues and undergraduate student support**

Base Funding – FY 2015

- * **Base funding from State \$313,201**
 - * **Salaries and fringe**
 - * **Seed grant program**
 - * **Operating costs and undergraduate student support**

New/Ongoing Research FY15

- * 12 proposals submitted**
- * 9 proposals funded**
- * \$486,296 funding received**
- * 15 Projects currently funded**

FY15 Research Funding Supports:

***8 graduate students**

***6 undergraduate students**

***3 research associates**

***2 student interns**

Walker Graduate Research Fellow

- * Established to honor founding director of the Center
- * Recognizes students in water resources who are pursuing work in a field different from their undergraduate training, or who have returned to school following period of professional work.
- * **The 2015 Fellow is Carlos Mantilla Pena**
Ph.D. candidate in CEE Dept at VT
Investigating residential water meter inaccuracies for a local water utility with goal of implementing a meter-replacement program.



Student Grant Recipients for 2015



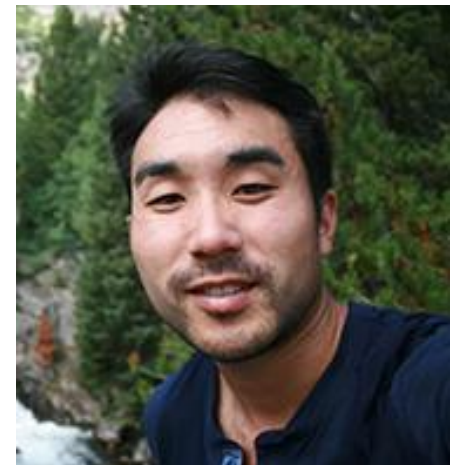
Jon Doubek, Ph.D.
student, Biological
Sciences, VT
Hypolimnetic
hypoxia and water
quality in reservoirs



Brady Ziegler, Ph.D.
student, Geosciences,
VT, Arsenic in a
petroleum
hydrocarbon plumes



Kelsey Fall, Ph.D.
student, VIMS,
Suspended sediment
in eutrophied
estuaries

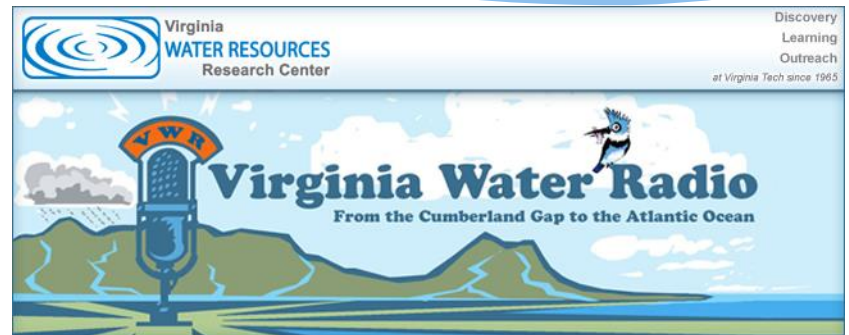


Ray Lee, Ph.D. student,
Forest Resources and
Environmental
Conservation, VT,
Nitrogen export from
forested watersheds

New for 2015 Grant Recipients

Science Briefing Style Final Reports

- 1 page
- Broad audience targeted to stakeholders
- Photos
- Water Radio



Ruby Salts Oyster Farm in Northampton County, Va., the site of University of Virginia student Abby Lunstrum's field work

Fellowships, Assistantships and Internships

Fellowships

- [William R. Walker graduate fellowship](#)

Sustainable Water Scholarships and Research Fellowships

Opportunities are available for undergraduate students enrolled in the Water: Resources, Policy, and Management (WRPM) B.S. program at Virginia Tech.

- **For more information**, please see the [WRPM webpage](#).

Undergraduate Internships at the Center

Undergraduate internship opportunities at the Water Center are year-round research opportunities for **junior and senior level undergraduates at Virginia Tech**. Each year, the Water Center recruits Virginia Tech undergraduates to assist with projects and participate in sponsored research directed by the center's staff.

Students are paid hourly wages. The number of students and wage rates depend on the available resources. The Center typically supports one internship per academic year.

Affiliations

Virginia Tech

College of Natural Resources and Environment

National Institutes for Water Resources

State Water Resources Research Institute Program

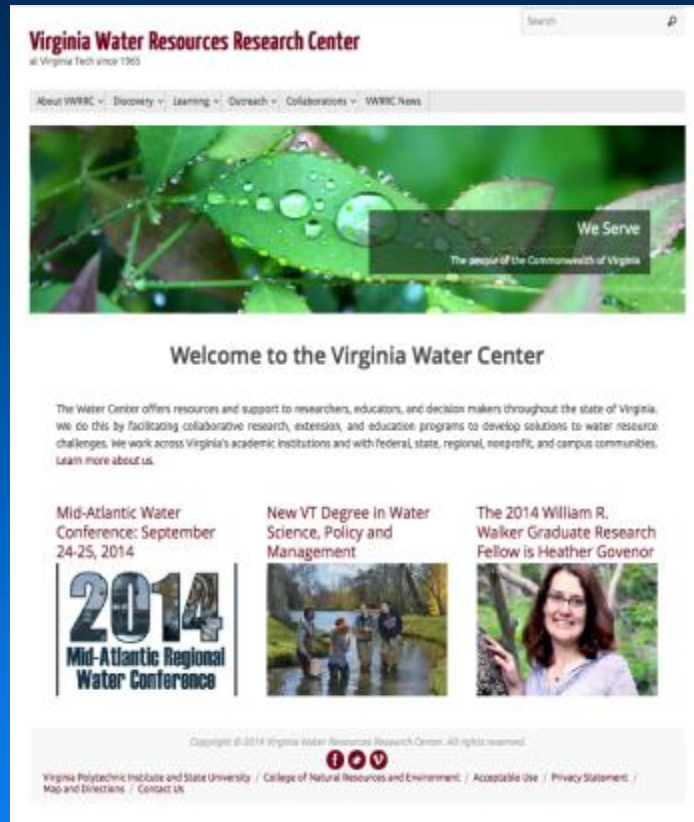
VWRRC News

Water Resources Conference of the Virginias – A Success!

2015 Water Resources Conference of the Virginias, October 5-6

The Walker Graduate Research Fellow for 2015 is Carlos Mantilla Pena

Information Transfer: VWRRC WEBSITE



- Virginia General Assembly Water-related Bill Inventory- 158 in 2015 session
- Water News Grouper- blog posts on water news, events, resources
- Virginia Water Central Newsletter



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www.vwrrc.vt.edu

Virginia Water Radio

- * 3-4-minute “Water Sounds, Music, Information” segments available for radio broadcast each week
- * Weekly radio broadcast on WEHC, WVRU, WUVT
- * Weekly Blog and Podcast
- * K-12

<http://www.virginiawaterradio.org>



Information Transfer

- * **DEQ VA Stormwater BMP Clearinghouse Project**
 - * Reference site for stormwater BMPs for Virginia
- * **Academic Advisory Committee for DEQ**
 - * Nutrient criteria for freshwater streams, rivers
 - * Blackwater swamp water-quality criteria



Conferences

2015 – Water-Energy-Agriculture

2014 – Water Infrastructure

2011 – Coal and Water

2010 - Stormwater

2009 – Climate Change

2008 - Water-Energy Nexus

2007 – Aquatic Communities



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Role at Virginia Tech

- * Teaching - 8 water-resources courses
- * Clearinghouse, coordination for campus water activities – seminars, workshops, proposals, etc.
- * Coordinate interdisciplinary water degree



B.S. Degree in Water



Water is life!



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B.S. Degree in Water

Water: a rapidly emerging area of scholarship connecting society and environment through many systems

- * Energy
- * Food
- * Climate
- * Ecological
- * Health
- * Economic



B.S. Degree in Water

- * Rapidly increasing demand for water
- * Complex interdisciplinary challenges
- * Complex interdisciplinary solutions
- * Expanding career opportunities for students with interdisciplinary training in water



Jobs

- * Expanding job demand (18% growth)
- * Federal and state agencies
- * Municipal water and planning districts
- * Consulting firms
- * Industry (sustainability, green marketing)
- * Non-Government Organizations
- * Graduate school



B.S. Degree in Water

- * Water degree unique to Commonwealth of Virginia and to U.S.
- * Establishes Virginia Tech and the Commonwealth of Virginia as key leaders in education for a rapidly emerging field vital to everyone
- * Launched in August 2015



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Virginia Tech's Response

Five colleges and 10 departments collaborated to develop the water degree:

- * **College of Agriculture & Life Sciences** (Agricultural & Applied Economics, Biological Systems Engineering, Crop & Soil Environmental Sciences)
- * **College of Architecture & Urban Studies** (Urban Affairs & Planning)
- * **College of Engineering** (Civil & Environmental Engineering)
- * **College of Natural Resources & Environment** (Fish & Wildlife Conservation, *Forest Resources & Environmental Conservation*, Geography)
- * **College of Science** (Biological Sciences, Geosciences)



New Water Faculty

1. Water Policy and Economics
2. Ecohydrology
3. Human Ecology of Water
4. Critical Zone Physics
5. Landscape Ecosystem Services
6. Earth Systems Modeling
7. Watershed Modeling

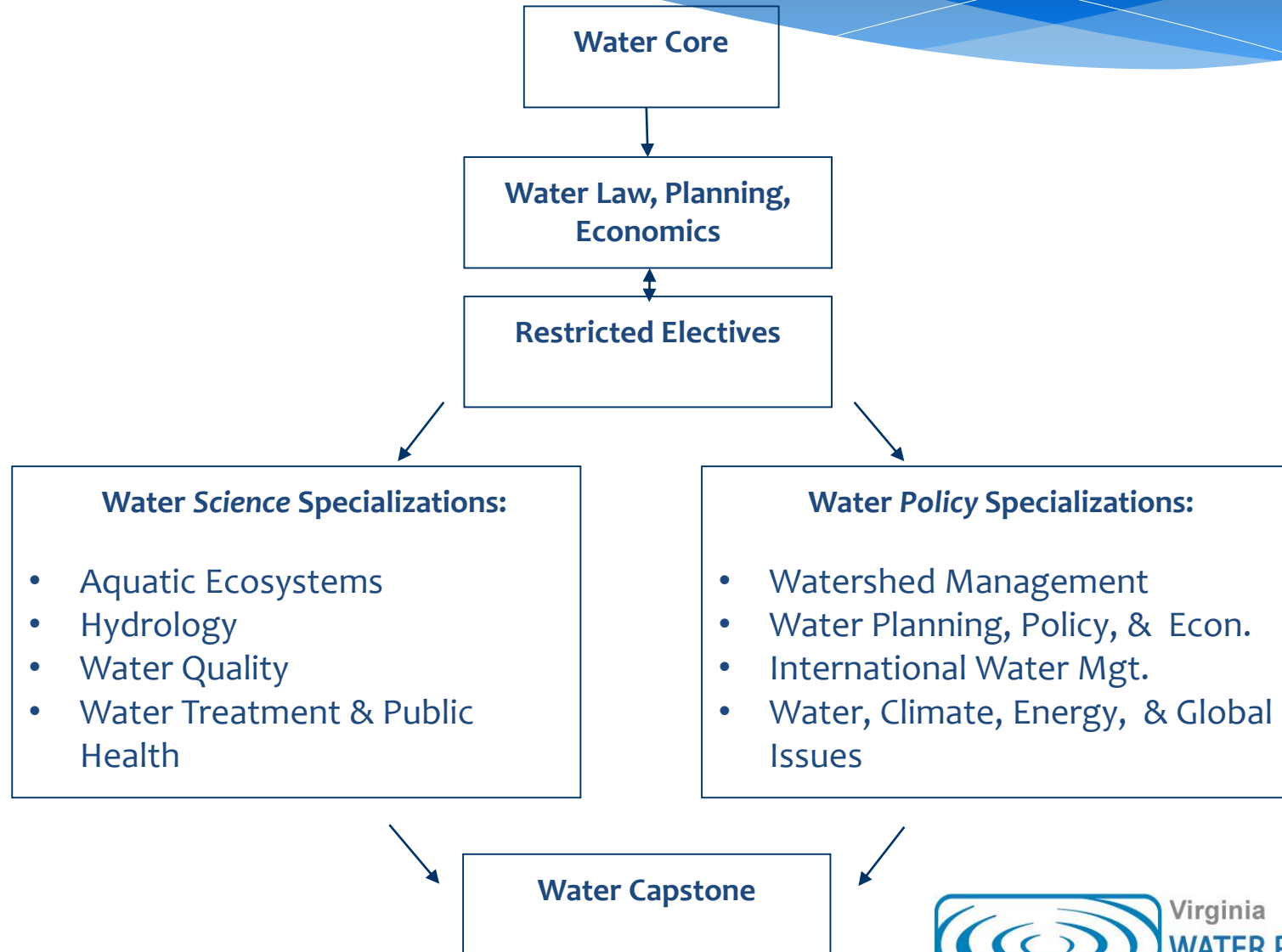


Core Courses

- * Intro to Water Resources
- * Physics & Lab
- * Watershed Hydrology
- * Environmental Science
- * Water Quality
- * Watershed Assessment, Management, Policy



Water Degree Flow Chart



CHECK IT OUT – WATER DEGREE WEBSITE



Water: Resources, Policy, and Management
Planning for a new water degree at Virginia Tech

About | For Students | News | Contact

About



Virginia Tech is taking an interdisciplinary approach to meet the complex challenges of managing water by proposing a new bachelor of science degree that draws upon the resources of five of its colleges. The Virginia Tech Board of Visitors approved the new water degree at its **June 1, 2014 meeting** and the university has requested approval from the State Council of Higher Education for Virginia (SCHEV). The new Bachelor of Science (B.S.) degree in Water: Resources, Policy, and Management has an anticipated start date of **Fall 2015**.

Background

Few undergraduate degree programs provide integrated training in water science, policy, and management; yet, professionals are required to have interdisciplinary expertise in these areas to solve critical problems facing society today and in the future. Although the B.S. degree in Water: Resources, Policy, and Management will be administered by the Department of Forest Resources and Environmental Conservation, within the College of Natural Resources and Environment, it is nonetheless an interdisciplinary program and would be the first its kind in Virginia and unique to any other undergraduate program anywhere in the U.S. The proposed new degree



Virginia Tech welcomes seven new Water Faculty

Virginia Tech

Department of Forest Resources and Environmental Conservation
College of Natural Resources and Environment
Virginia Water Resources Research Center
Virginia Tech



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<http://waterdegree.frec.vt.edu/>

Water: Complex Challenges... Opportunities...



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A photograph of a sailboat on the water at sunset. The sun is low on the horizon, creating a golden glow across the sky and reflecting on the water. The sailboat is in the foreground, and a buoy is visible in the water. The background shows a distant shoreline with trees and a pier.

Thank you!

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www.vwrrc.vt.edu

Chesapeake Bay