Environment & Health

MAKING CONNECTIONS THROUGH WATER QUALITY EDUCATION

Sarah Yelton, UNC Superfund Research Program

UNC Superfund Research Program

Advancing the scientific knowledge required to understand and reduce risks to human health associated with high priority Superfund chemicals.

Funded by NIEHS (P42 ES005948)

Biomedical Research

- How dioxins and polychlorinated biphenyls (PCBs) damage DNA
- Metabolism of trichloroethylene (TCE) in the body
- Influence of maternal cadmium exposure on newborn birth weight

Remediation (Cleanup) Research

- How well PAH-contaminated soil is cleaned up using bioremediation
- Development of passive sampling devices to measure longer term environmental exposures

Research Translation
Taking Science into Application

Environment & Health

MAKING CONNECTIONS THROUGH
WATER QUALITY INVESTIGATIONS

Overall Program Emphasis

- Hands-on, **inquiry based** learning
- **Interaction with scientists** and practitioners
- **Field experiences** combined with classroom work
- Building **partnerships**
- Increase comfort in and ability to **teach outdoors**

Overall Program Emphasis

- 2007-2009, 2012-13
- 8th-12th grade science teachers
- Environmental science, health and civics issues related to water quality in NC
- Teachers learn how to address water quality issues in classrooms & in outdoor wetland environments
- Aligned with the NC Essential Standards for science

Partners


Sbrp
Superfund
Basic Research Program


N.C.
ENVIRONMENTAL
EDUCATION


UNC
INSTITUTE FOR
THE ENVIRONMENT


Albemarle - Pamlico
National Estuary
Partnership


NC Project
WET


Sea Grant
North Carolina
www.ncseagrant.org


NC DIVISION OF COASTAL MANAGEMENT


NCAEEC


Public Schools of North Carolina
State Board of Education
Department of Public Instruction


Tomorrow:
A Natural Concept.
The Environmental Education Fund


NORTH CAROLINA
AQUARIUMS


PLT
North Carolina


NORTH
CAROLINA
MUSEUM
of
NATURAL
SCIENCES


North Carolina
Coastal Federation


NORTH
CAROLINA
Wildlife
RESOURCES
COMMISSION


CAAE


NORTH CAROLINA
STATE PARKS


UNC
INSTITUTE of
MARINE SCIENCES


RIVERWORKS
AT STURGEON CITY


Core
Sound
Waterfowl Museum
& Heritage Center

Estuary Explorations

Amy Sauls is our fearless leader for getting in that marsh mud! Or maybe just plain crazy…

Estuary Explorations

Estuary Explorations

Estuary Explorations

Freshwater Ecology

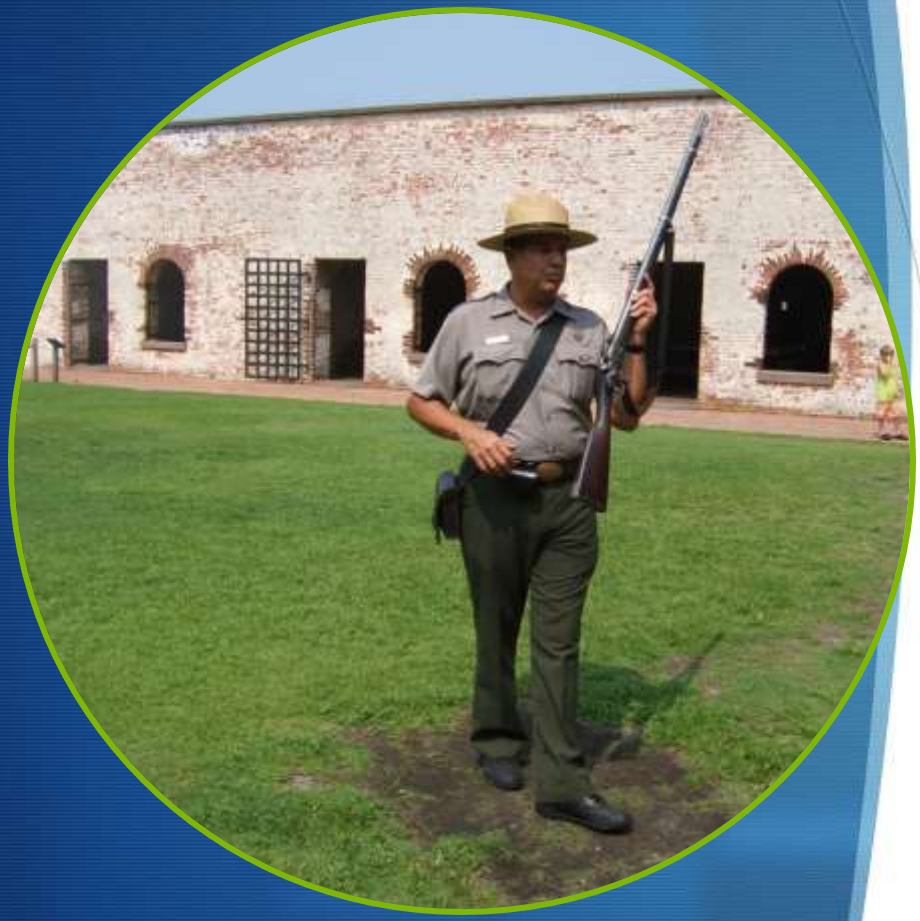
Freshwater Ecology

Freshwater Ecology

Beach Ecology

Beach Ecology

Exploring Rachel Carson Research Reserve



Investigating EE Centers

Fort Macon State Park

Investigating EE Centers

Behind the scenes at Pine Knoll Shores Aquarium

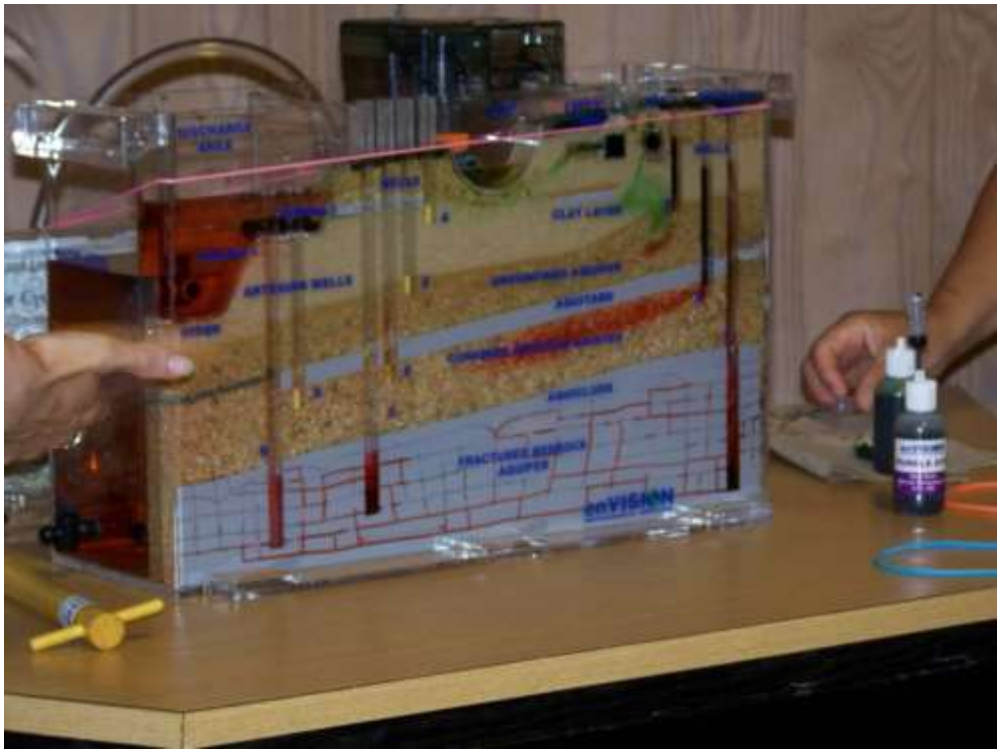
Investigating EE Centers

Aquarium adventures

Understanding Watersheds

Understanding Groundwater

- And the connection to surface water



Learning from Scientists

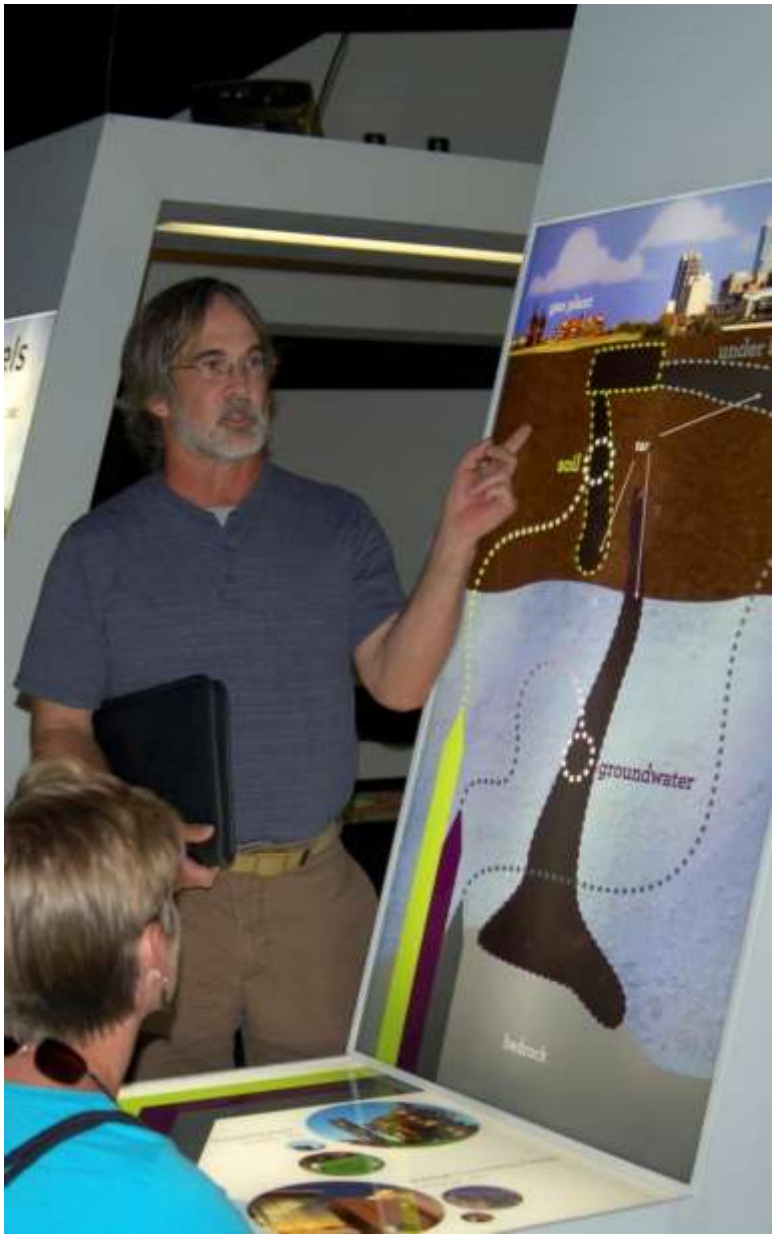
Dr. Hans Paerl (UNC) discusses the Ferrymon program with teachers

Learning from scientists

Dr. Damian Shea (NCSU) explains how his passive sampling device works

Learning from experts

Exploring the tar remediation exhibit at Morehead Planetarium, with NC DENR remediation expert Patrick Watters



Hands-on activities

Examining new technologies

- Dr. Shea explains the iterative process used to develop passive sampling devices and shares some of his prototypes

Understanding the remediation process

- **How do we clean up our earth?** Participants "dig" test wells to locate contamination underground, leading into a discussion of how we clean up contaminated soil and groundwater

Understanding water pollution

Including point and non-point source and ways to clean up hazardous chemical pollution from water

Impacted communities

Learning how communities can be impacted by hazardous waste and ways to address those impacts

Understanding the concept of environmental justice and how it applies to impacted communities

Outcomes

By The Numbers

Since **2007** -

- **$49,000** granted
- Well over **$100,000** leveraged
- **5** Institutes
- **125** middle and high school educators reached from **47** counties
- At least **15,000** students reached through these educators

Program Evaluation

- "The quality of activities, knowledge of content of facilitators, awesome field trips, flow of schedule, accommodations, the group itself all **exceeded my expectations**."
- "Having been to many workshops, **this institute was authentic - hands on and minds on**! The content knowledge was provided and activities supported the content."
- "I feel **so much more comfortable teaching about water quality issues, specifically about NC**. We were given so much valuable information and resources. Thank you for treating us with so much respect, and truly taking care of us all during the institute!!!"

Program Evaluation

- "It was a content rich workshop, full of resources and **opportunities for our students to make a difference addressing real-world problems**."
- "Many of **the activities, lessons, and materials will be incorporated into my teaching** next year."
- "I will **probably use every activity to some degree** in my class, this is great for new teachers."

Program Evaluation

- "I came out of the experience **more knowledgeable and better prepared to incorporate water quality** into my 8th grade science class."
- "**Being able to hear from experts**, being able to visit and actually see places being impacted was excellent"
- I have been able to learn more about **what does "good quality" mean from many viewpoints**. After seeing how the effects of contaminants affect water, whether it is sediments or more serious pollutants, I really feel better able to teach water quality to my students.

Outcomes

- Teachers are **integrating environmental education** about estuarine and wetland issues in their classrooms.
- Teachers are **taking their students outside** more than before the institutes.
- High quality, **research-based materials** are being used to enhance student learning.
- **Schoolyard demonstration projects**/outdoor classrooms are being created and used.

Questions?

Sarah Yelton
Environmental Education Coordinator

UNC Superfund Research Program | *sph.unc.edu/srp*
UNC Institute for the Environment | *erp.unc.edu*

(919) 966-0895
sarah.yelton@unc.edu