Presentation to the Savannah River Site Citizens Advisory Board

Savannah River Ecology Laboratory (SREL) FY16 Update

January 24, 2017

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Professor, University of Georgia (UGA)

The University of Georgia
Savannah River Ecology Laboratory

Objectives

- **Savannah River Ecology Lab (SREL) Mission**
- **Staffing**
- **Funding and Work Scope**
- **Significant Events**
- **Advances**
- **Opportunities For Fiscal Year 2017**
- **Emerging Missions For Fiscal Year 2017**

Consistent with the Facilities Disposition and Site Remediation Committee's 2016 Work Plan

Acronyms

ACP	Area Closure Project
DOE	Department of Energy
DOE-HQ	Department of Energy – Headquarters
DOE-SR	Department of Energy – Savannah River
ERDA	U.S. Energy Research and Development Administration
HVAC	Heating, Ventilation and Air Conditioning
NNSA	National Nuclear Security Administration
SREL	Savannah River Ecology Laboratory
SRNL	Savannah River National Laboratory
SRR	Savannah River Remediation
SRS	Savannah River Site
UGA	University of Georgia
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USFS-SR	U.S. Forest Service – Savannah River

SREL History

1951 - Atomic Energy Commission (AEC) had concerns about environmental impacts resulting from Savannah River Site (SRS) construction and operations.

Dr. Eugene Odum

1951 to present – Funding from AEC, ERDA, and Department of Energy (DOE)

1954 – Established permanent lab on the SRS

1977 – Established current lab facilities

SREL's Mission:

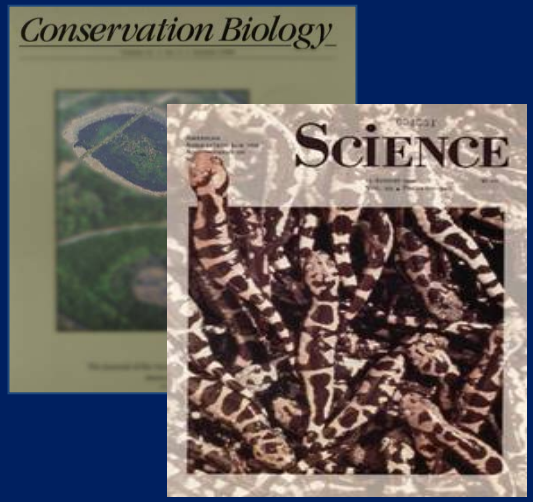
"To enhance our understanding of the environment by acquiring and communicating knowledge that contributes to sound environmental stewardship."

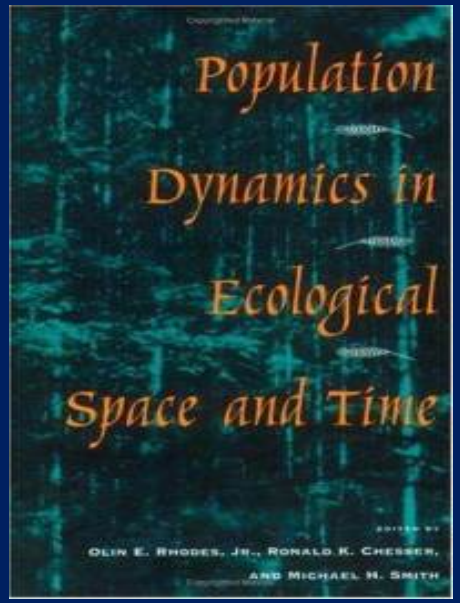
"To provide the public with an independent evaluation of the ecological effects of SRS operations on the environment"

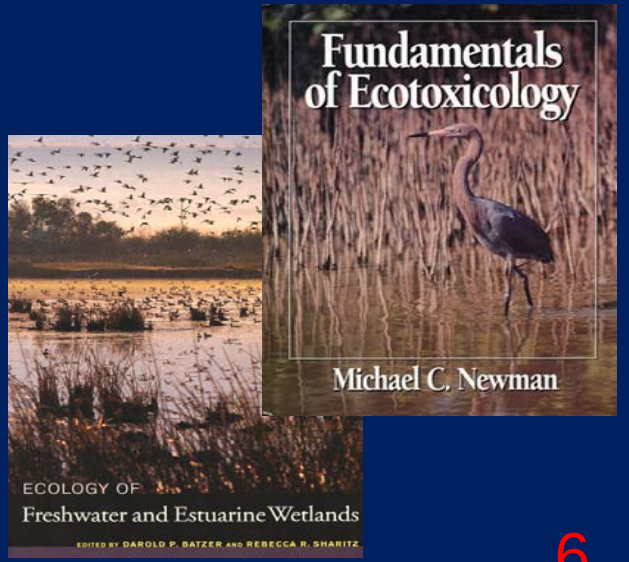
- An interdisciplinary program of field and laboratory **research** conducted largely on the SRS and published in the peer-reviewed scientific literature
- **Education** and research training for undergraduate and graduate students
- **Service** to the community through environmental outreach activities

SREL Research Program's

- >3380 peer-reviewed scientific publications to date
- 64 books







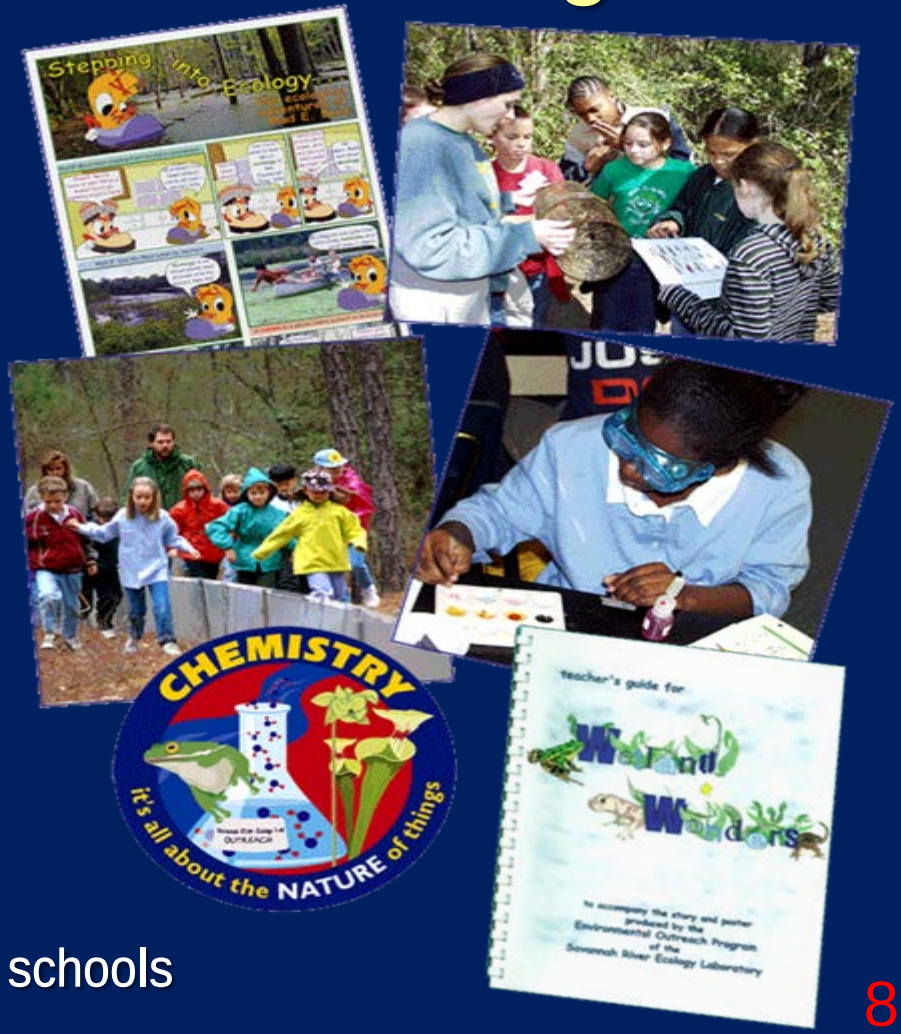
SREL Education Program

Education Programs

- >400 theses and dissertations
  - 198 M.S.
  - 223 Ph.D.
- SREL graduate students have received more than 125 awards
- Over 700 undergraduates representing all 50 states have participated in SREL-sponsored research to date

SREL Environmental Outreach Program

- Integrates SREL research into presentations for the general public
- Provides hands-on classroom and field experience for students
- Conducts educator workshops



In FY16, SREL reached ~ 39,000 people by providing :

- 310 talks
- 31 public tours
- 20 exhibits at local or regional events, and
- 45 “Ecologist for a Day” programs for local schools

SREL in FY16

- UGA Employees
  - Research Faculty – 5
  - Tenure Track Faculty - 7
  - Post Docs – 7
  - Outreach - 6
  - Res. Professional - 9
  - Research Support - 19
  - Graduate Students - 25
  - Undergraduates - 13
  - Admin & Support - 17

103 Staff & Students

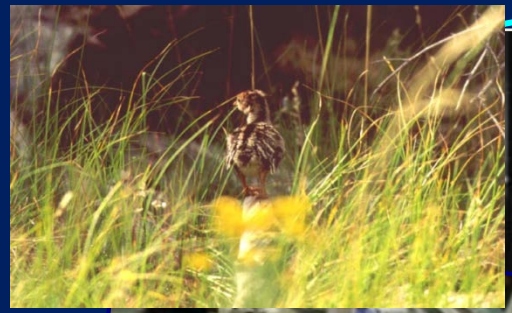
- Facilities & Research Areas
  - A-Area (laboratories, equipment, offices, animal care, storage)
  - Par Pond (low-dose facility)
  - 30 DOE Set-Asides
  - 75 field research sites

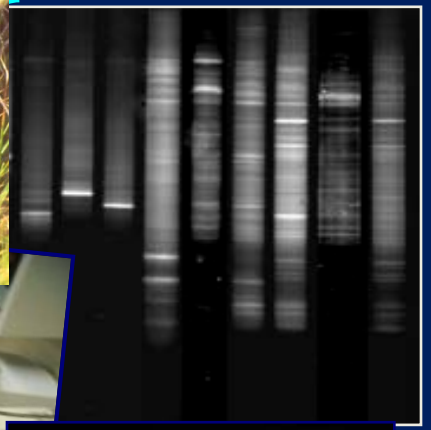
Disciplinary Expertise

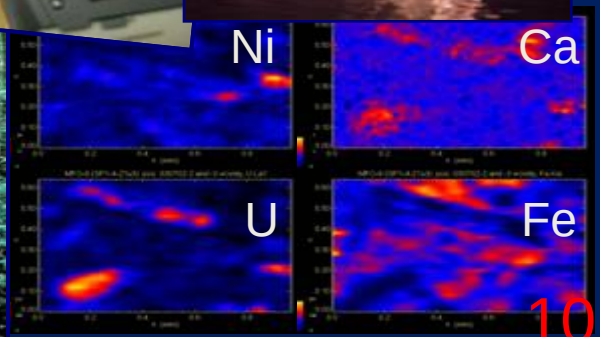
- Aquatic and Terrestrial Ecology
- Geology / Soil Science
- Environmental Microbiology
- Hydrology
- Molecular Biology
- Environmental Chemistry
- Radiation Ecology
- Ecotoxicology and Risk Assessment
- Wildlife Ecology

Current Research Areas

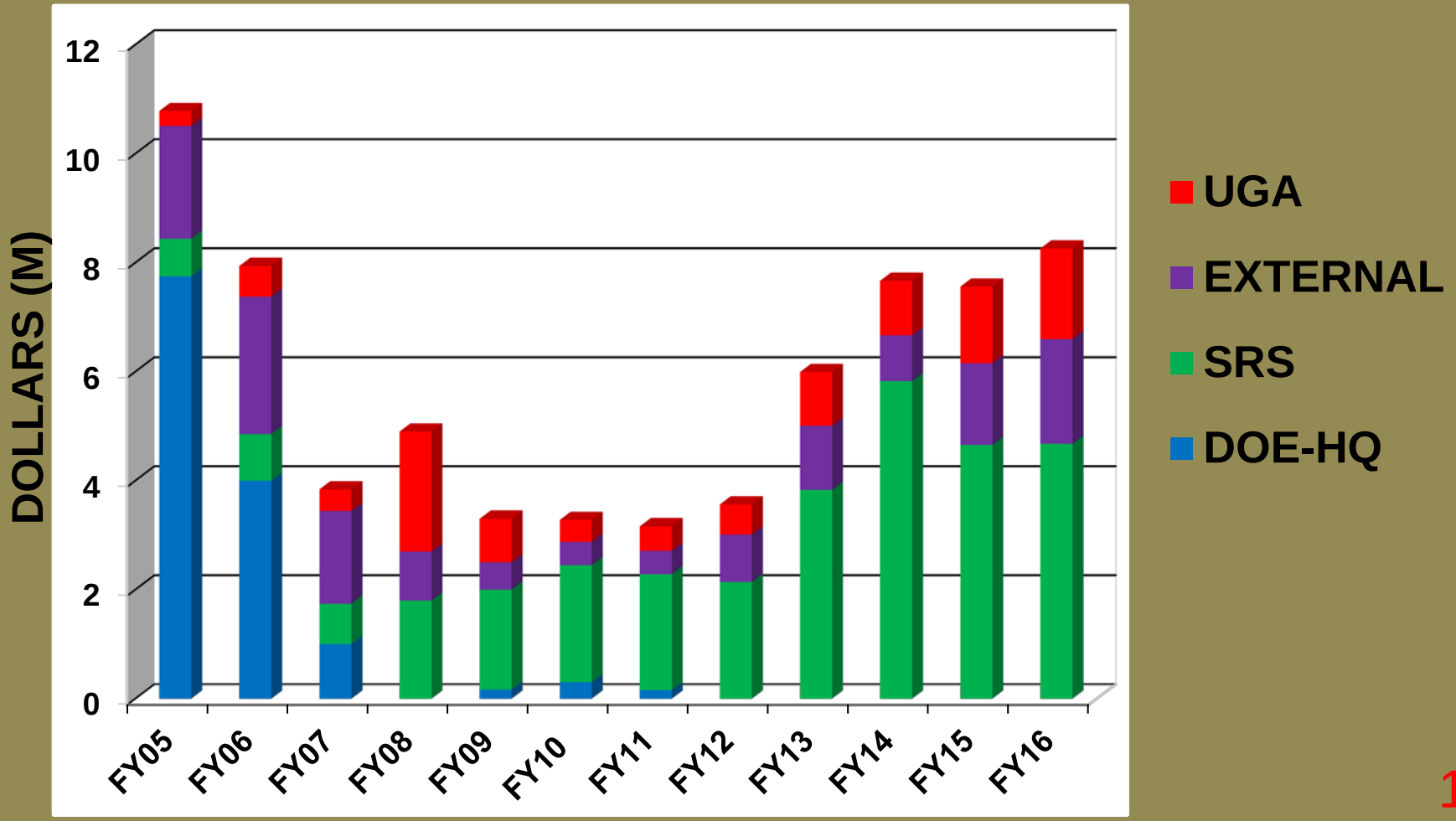
- Characterization and Effects
- Ecological and Health Risks
- Remediation and Restoration







Recent Funding History



Significant Events in FY16

UGA

- Allowed majority (66%) of the 30% Indirect Costs to be retained by SREL
- Cost-Shared 6 faculty positions with SREL
- Provided over 70K in new funding for equipment and personnel
- Cost-shared graduate student and postdoctoral positions

DOE / SRS / External

- Building, equipment, utilities, and site access
- Funding provided by Department of Energy – Savannah River (DOE-SR) under new 5-year Cooperative Agreement
- Funding provided by DOE – National Nuclear Security Administration (NNSA) for Mixed Oxide Fuel Fabrication Facility and Tritium related research
- Continued project funding from Area Closure Project (ACP) and Savannah River Remediation (SRR)
- 1.9 million in external funding from non-SRS sources leveraged

Advancements in FY16

1. Work scope:

Research Set-Asides, Site Use Permitting

Enacted significant land management activities for set asides

Graduate and Undergraduate Education Programs

Advised 47 graduate students and hosted 13 undergrads in new NSF funded Research Experience for Undergraduates Program in Radioecology

Hosted a total of over 84 graduate students conducting research on SRS

Taught 1 course on main UGA campus and 3 at SREL

General Public Outreach and Education Programs

Conducted over 400 public outreach events reaching >39,000 people

Interdisciplinary Research

Initiated collaborative research programs with Savannah River National Laboratory (SRNL), U.S. Forest Service–Savannah River (USFS-SR), UGA, U.S. Department of Agriculture (USDA), U.S. Army Corps of Engineers (USACE) & other university, federal, state, and private partners

Involving research on radionuclide and metal remediation, feral swine control & radioecology

Advancements in FY16

1. Work scope: Continued

Site-wide Source of Ecological Expertise

Provided ecological research support to Area Closures Project, SRR, SRNL, etc.

Scientific Expertise

Added New faculty in Epigenetics and Disease Ecology

International Leadership

Hosted international workshop on the Integration of Ecosystem Science into Radioecology

along with the International Union of Radioecology and the US Association of Ecosystem

Research Centers – over 60 attendees

Scientific Productivity

SREL staff and students published over 100 scientific articles and gave over 175 scientific presentations in FY16

Advancements in FY16

2. Facilities:

Main SREL facilities

Major repairs, paint, carpet and lab renovations
Updated major HVAC systems
Remodeled 10 laboratories

Par Pond Radioecology Lab

Updated HVAC and carpet

3. Scientific Equipment:

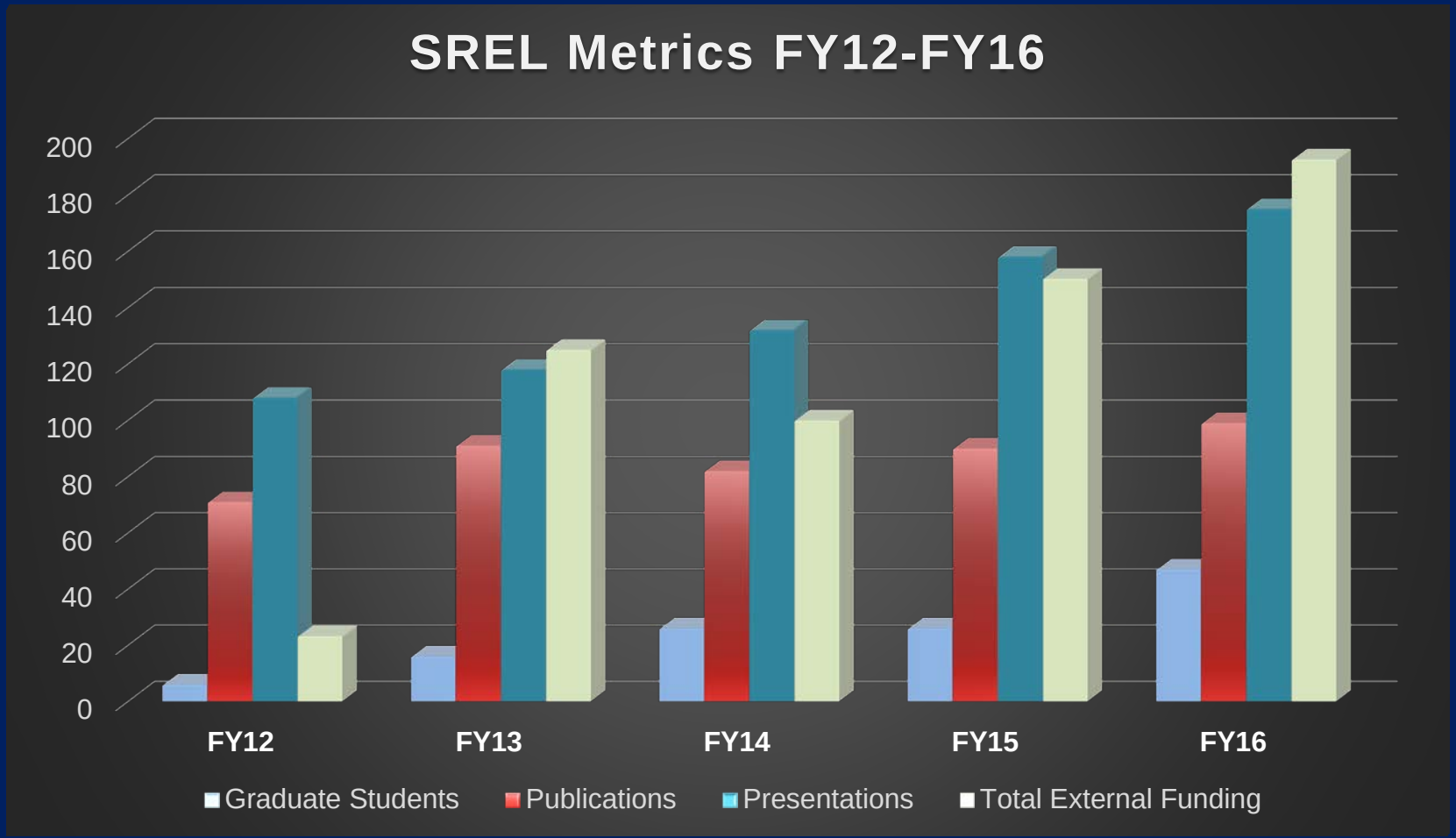
Analytical equipment purchases to enhance research on contaminants of soil, water, and biological materials
Significant upgrades to equipment related to radioecology and wildlife research

Opportunities for FY17

1. **Continued growth in graduate student enrollment**
2. **Continued growth in undergrad experiential learning**
3. **Continued growth in scholarly productivity**
4. **Continued investments in equipment & facilities**
5. **Development of new missions and roles on the SRS:**
   a) Radioecology and Low Dose Radiation Effects
   b) Feral Swine Control on SRS
   c) Metal and Radionuclide Ecotoxicology
   d) Environmental Justice

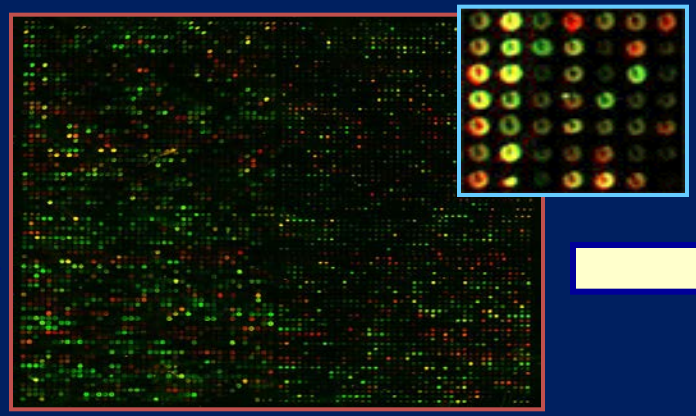
Enhance Graduate Training Using SRS as a Living Laboratory

Scholarly Productivity

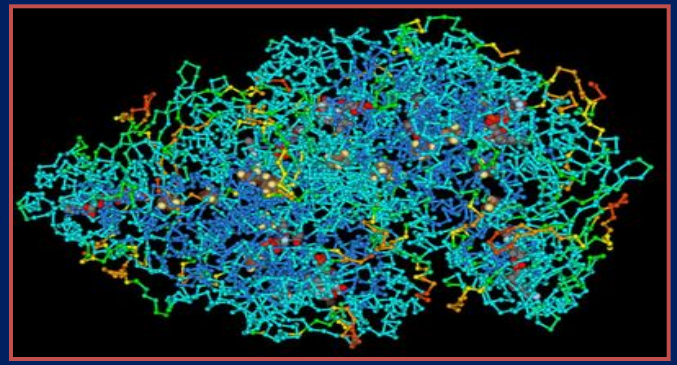


Low Dose Radiation Surveillance and Monitoring Research and Development

DNA molecule



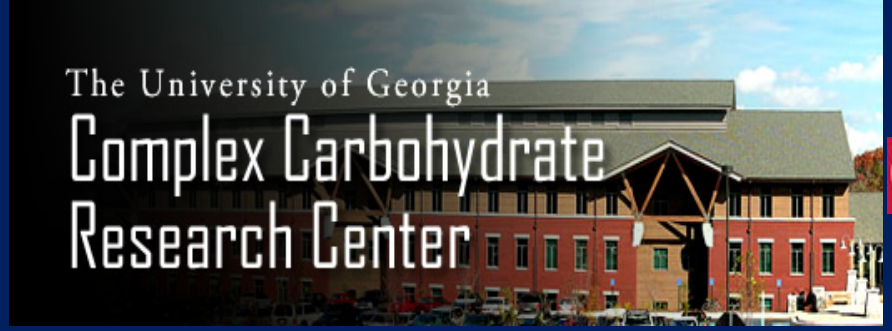
DNA micro array



protein

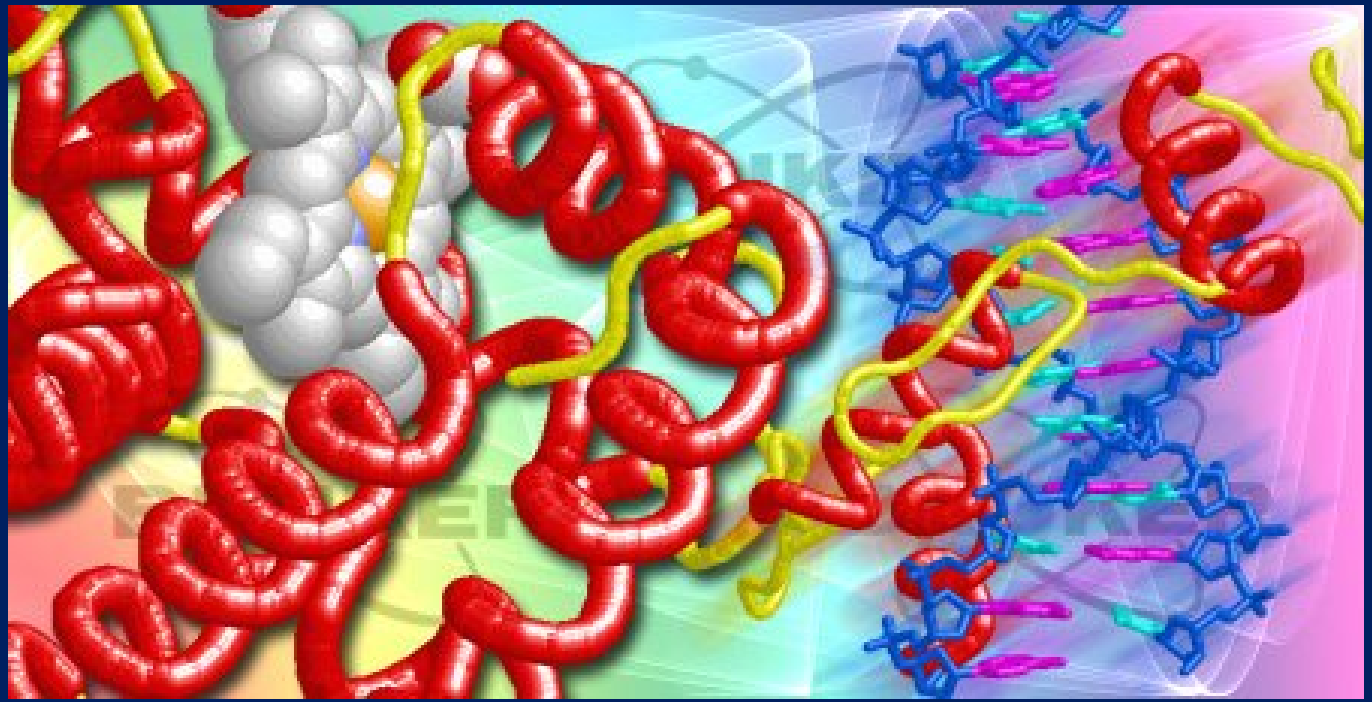
organisms

ecosystem

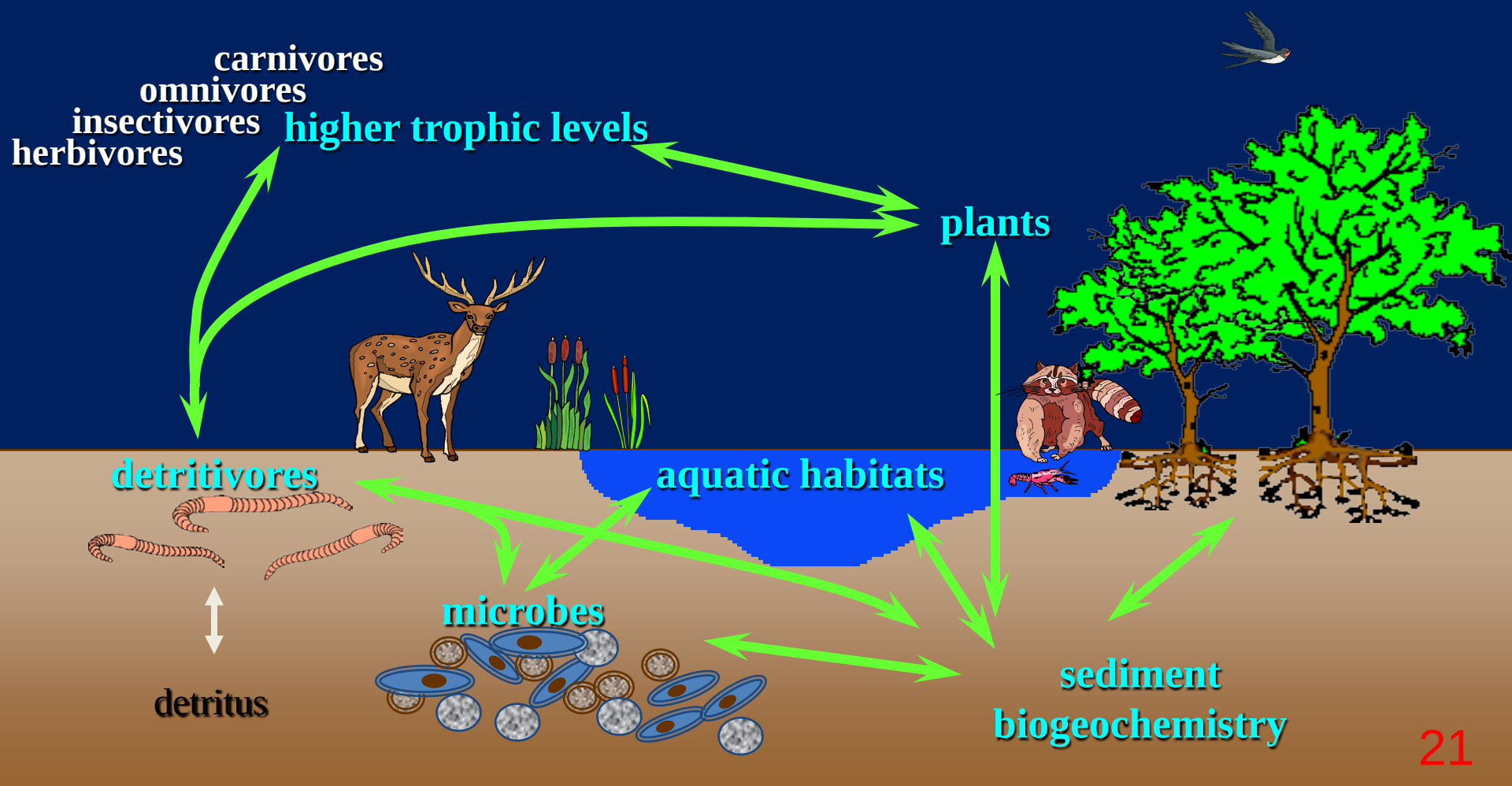


SAVANNAH RIVER ECOLOGY LABORATORY

Next Generation Radioecology



Ecosystems Approach to Radioecology



Research on Wild Pig Movement, Behavior and Contaminants

Outreach and Monitoring for Local Communities

SREL Radionuclide Education, Monitoring and Outreach Program (REMOP)

WHERE:

Shell Bluff Georgia

WHO:

DOE (Funder)

SREL (Outreach and Monitoring)

GA WAND (Facilitate Communication to Local Residents)

WHEN:

January 2017- December 2019

SREL Radionuclide Education, Monitoring and Outreach Program (REMOP)

Goal:

To utilize radionuclide and metals data collected within the local community of Shell Bluff to inform outreach and education efforts on radionuclide monitoring programs and risks designed for delivery to local residents.

***** NOT A NEW MONITORING PROGRAM*****

SREL Radionuclide Education, Monitoring and Outreach Program (REMOP)

Summary Details:

1. Three year project
2. Pre-Post surveys of residents
3. Community participation in selection of sites and media
4. Review of existing monitoring program data from DOE, SCDHEC, and Vogtle for comparative purposes
5. Development of outreach programing to help residents interpret data and gain perspective on risk

SREL Radionuclide Education, Monitoring and Outreach Program (REMOP)

Current Activities:

1. Postdoc Hired and on Site
2. Outreach Coordinator Hired and on Site
3. Coordinating with EPA Needs Assessment for Community
4. Targeting Initial Community Engagement February 2017
5. Targeting Initial Sample Collection Beginning June 2017

RADIONUCLIDES

Sample Type	Radionuclides	Annual Frequency	Total
Environmental		**(Locations:Sites:Samples)**	
Air (filter)	ϑ spectrometry, gross alpha/beta	**Biweekly (1:1:24)**	24
Air (filter)	Sr-89/90, actinides, Tc-99	**Quarterly (1:1:4)**	4
Air (charcoal)	ϑ spectrometry, ^{131}I	**Quarterly (1:1:4)**	4
Air (silica gel)	H-3	**Monthly (1:1:12)**	12
Rainwater	H-3	**Monthly (1:1:12)**	12
Rain **Ion Column**	ϑ spectrometry, gross alpha/beta, Sr-89/90, actinides, Tc-99, I^{129}	**Monthly (1:1:12)**	12
Groundwater	H-3	**Quarterly (1:5:4)**	20
Fresh Foods			
Fruits	H-3, ϑ spectrometry, Am-241, Cu-244, Np-237, Tc-99, Pu-238/239, Sr-89/90, U-234/235/238	**Annual (1:5:2)**	10
Vegetables	H-3, ϑ spectrometry, Am-241, Cu-244, Np-237, Tc-99, Pu-238/239, Sr-89/90, U-234/235/238	**Annual (1:5:2)**	10
Meat	H-3, ϑ spectrometry, Am-241, Cu-244, Np-237, Tc-99, Pu-238/239, Sr-89/90, U-234/235/238	**Annual (1:5:2)**	10
Milk -Cow	H-3, ϑ spectrometry, Am-241, Cu-244, Np-237, Tc-99, Pu-238/239, Sr-89/90, U-234/235/238, ^{131}I	**Annual (1:5:2)**	10
	H-3, ϑ spectrometry, Am-241, Cu-244, Np-237,		

Heavy Metals

Sample Type	METALS	Annual Frequency	Total
Environmental		(Location:Sites:Samples)	
Soil	Total Mercury, Methyl Mercury, ~20 metals	Annual (1:12:2)	24
Surface Water	Total Mercury, Methyl Mercury, ~20 metals	Annual (1:12:2)	24
Groundwater	Total Mercury, Methyl Mercury, ~20 metals	Annual (1:12:2)	24
Fresh Foods			
Fruits	Total Mercury, Methyl Mercury, ~20 metals	Annual (1:12:2)	24
Vegetables	Total Mercury, Methyl Mercury, ~20 metals	Annual (1:12:2)	24
Meat	Total Mercury, Methyl Mercury, ~20 metals	Annual (1:12:2)	24
Milk -Cow	Total Mercury, Methyl Mercury, ~20 metals	Annual (1:12:2)	24
Milk -Goat	Total Mercury, Methyl Mercury, ~20 metals	Annual (1:12:2)	24

THANK YOU