Presentation to the SRS Citizens Advisory Board

Savannah River Ecology Laboratory - FY13 update

March 24, 2014

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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 FY14
- Emerging Missions For FY14

Consistent with the Facilities Disposition and Site Remediation Committee's 2013 Work Plan

SREL History

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

Dr. Eugene Odum

1951 to present – Funding from AEC, ERDA, and DOE

1954 – Established permanent lab on the SRS

1977 – Established current lab facilities

SREL's Mission:

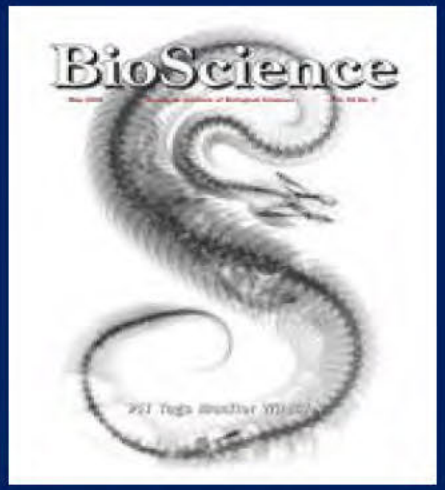
"To enhance our understanding of the environment by acquiring and communicating knowledge that contributes to sound environmental stewardship."

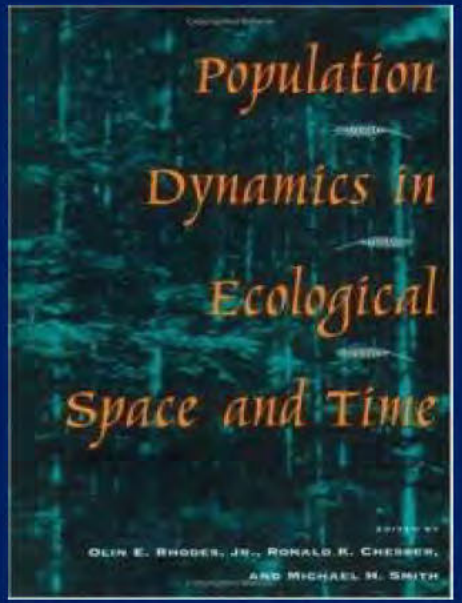
"To provide the public with an independent evaluation of the ecological effects of SRS operations on the environment"

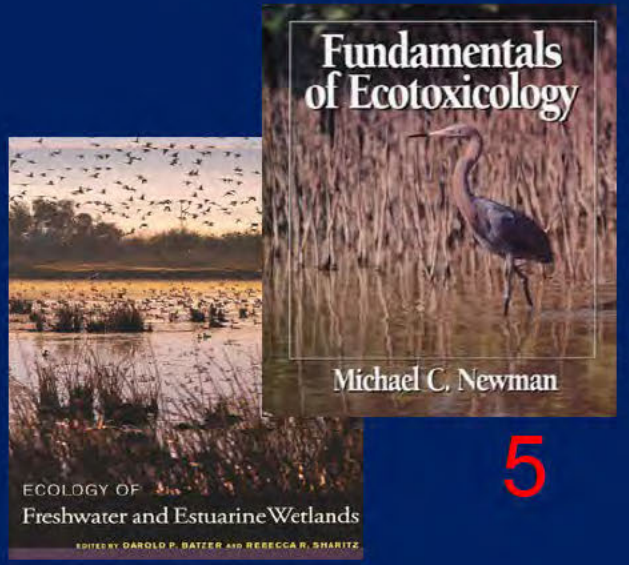
- An interdisciplinary program of field and laboratory **research** conducted largely on the SRS and published in the peer-reviewed scientific literature
- **Education** and research training for undergraduate and graduate students
- **Service** to the community through environmental outreach activities

SREL Research Program's

- >**3265** peer-reviewed scientific publications to date
- **62** books





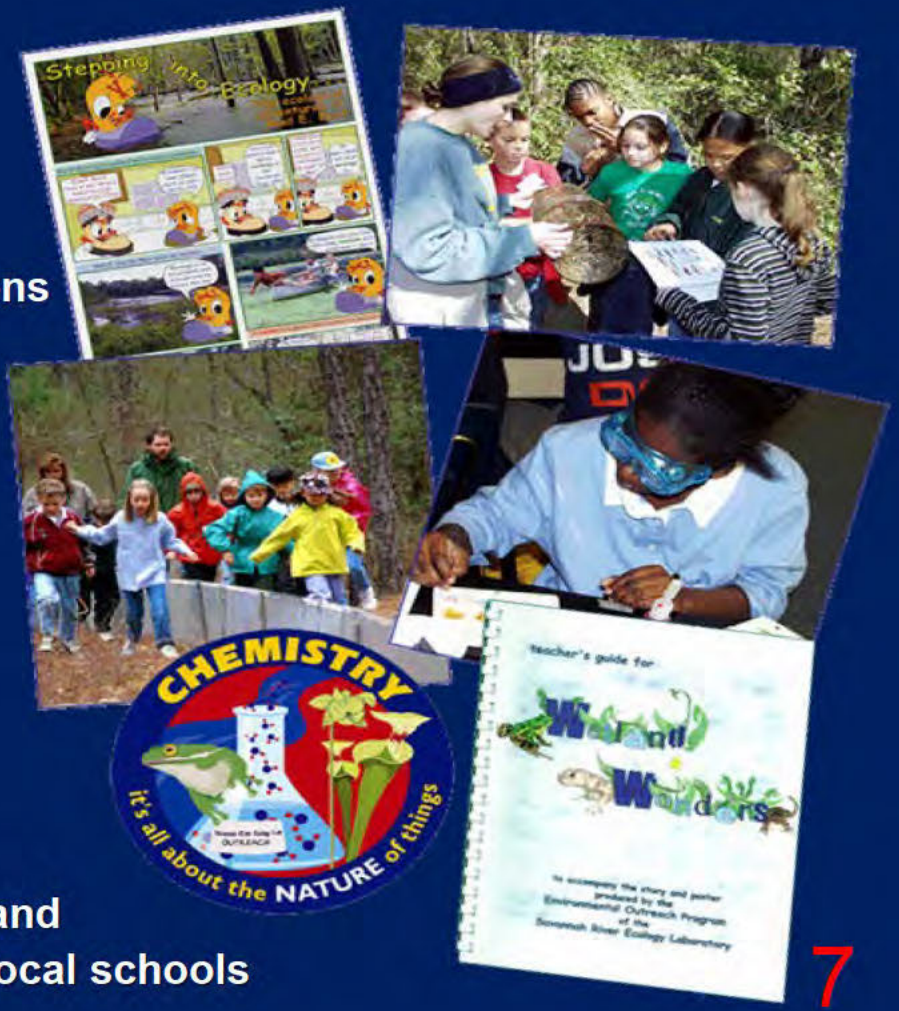


SREL Education Program

Education Programs

- >400 theses and dissertations
  - 198 M.S.
  - 223 Ph.D.
- SREL graduate students have received more than 125 awards
- Over 650 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 2012, SREL reached ~ 36,000 people by providing :

- 318 talks
- 53 public tours
- 20 exhibits at local or regional events, and
- 42 "Ecologist for a Day" programs for local schools

SREL in FY13

88 EMPLOYEES

- **UGA Employees**
  - Research Faculty - **8**
  - Emeritus Faculty - **5**
  - Post Docs - **3**
  - Outreach - **6**
  - Res. Professional - **12**
  - Research Support - **9**
  - Graduate Students - **20**
  - Undergraduates - **12**
  - Admin & Support - **13**

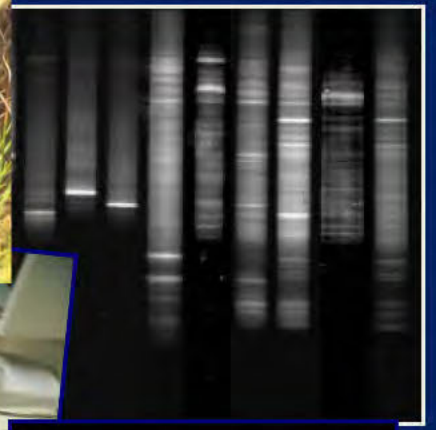
- **Facilities & Research Areas**
  - A-Area (laboratories, equipment, offices, animal care, storage)
  - Par Pond (low-dose facility)
  - 30 DOE Set-Asides
  - 75 field research sites

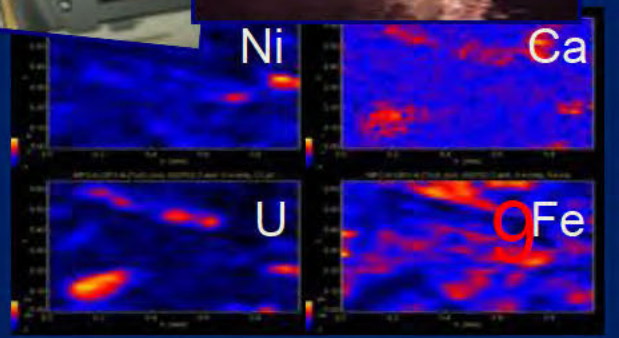
Disciplinary Expertise

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

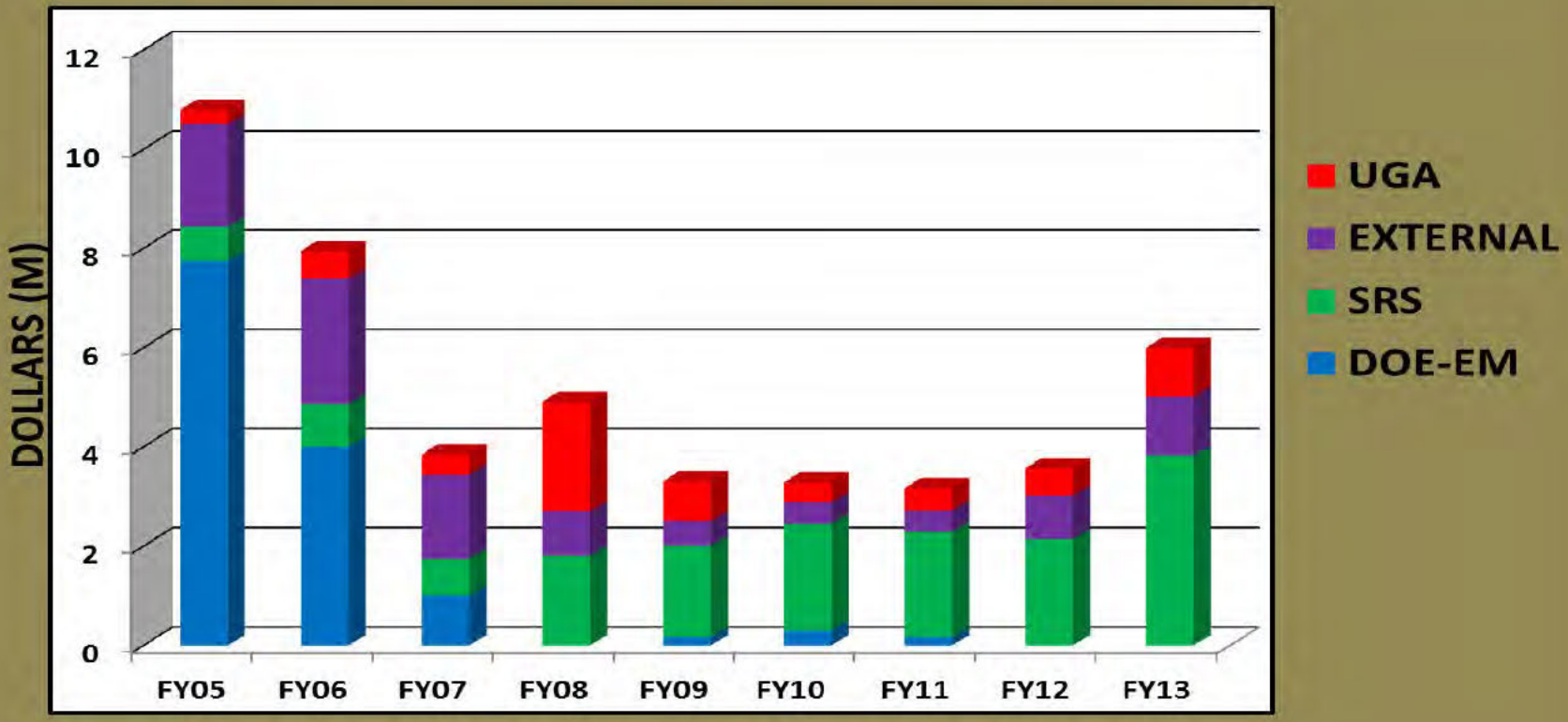
Current Research Areas

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





RECENT FUNDING HISTORY



Significant Events in FY13

- **UGA**
  - Allowed majority (66%) of the 30% Indirect Costs to be retained by SREL
  - Approved conversion of one SREL research scientist to tenure track faculty status
  - Approved hire of four new tenure track faculty positions (2 @ SREL) to be cost shared between SREL and main campus
  - Provided over 60K in funding for equipment
- **DOE / SRS / External**
  - Building, equipment, utilities, and site access
  - Funding provided by DOE-SR under 5-year Cooperative Agreement
  - Funding provided by DOE-NNSA for MOX and Tritium related research
  - Continued project funding from ACP and SRR
  - > 1 million in external funding from non-SRS sources leveraged

Advancements in FY13

1. **Work scope**:

Research Set-Asides, Site Use Permitting

Enacted significant land management activities for set asides

Graduate and Undergraduate Education Programs

Added >15 new graduate students and hosted over 12 undergrads

General Public Outreach and Education Programs

Conducted over 350 public outreach events reaching >36,000 people

Interdisciplinary Research

Initiated collaborative research programs with SRNL, USFS-SR, UGA, USDA, USACE & other university, federal, state, and private partners Involving research on radionuclide and metal remediation, feral swine control & biofuel production

Site-wide Source of Ecological Expertise

Provided ecological research support to Area Closures Project, Savannah River Remediation, Savannah River National Lab, etc.

Advancements in FY13

2. **Facilities:**

Main SREL facilities
Minor repairs, paint, carpet, and HVAC to portions of lab

Par Pond Radioecology Lab
Minor repairs and paint, restored aquatic research capabilities

Low Dose Irradiation Facility
Restored operational condition and have initiated research projects

SREL Rhizotron
Refurbished SREL Rhizotron facility for new contaminant research

3. **Scientific Equipment:**

Analytical equipment purchases to enhance research on contaminants of soil, water, and biological materials

Radionuclide monitoring equipment purchased to restore and upgrade radionuclide assay and monitoring capabilities at SREL

Opportunities for FY14

1. Strategic growth in faculty disciplinary expertise
2. Continued growth in graduate student enrollment
3. Continued growth in experiential learning for undergrads
4. Continued investments in research infrastructure
5. Continued improvements to facilities
6. Development of new missions and roles on the SRS:
   a) Radioecology and low dose radiation effects
   b) Biofuel production on marginal lands
   c) Feral swine control on SRS
   d) Environmental Justice

Emerging Missions for SREL in FY14

- **Enhancing Graduate Education**
  - Increase to 25-30 graduate students
  - Increase to 15-20 undergraduate interns

Enhance Graduate Training Using SRS as a Living Laboratory

Develop New Curricula for Radioecology in the United States

- Have Developed Regional Environmental Radiation Protection Curriculum @ SREL
  - Offers Coursework in:
    - Radiation Safety and Protection
    - Radioecology
    - Radiation Genotoxicology
    - Environmental Geochemistry of Radionuclides
    - Radioecology Career Development Seminar

Emerging Missions for SREL in FY14

- Enhancing Graduate Education
  - Increase to 25-30 graduate students
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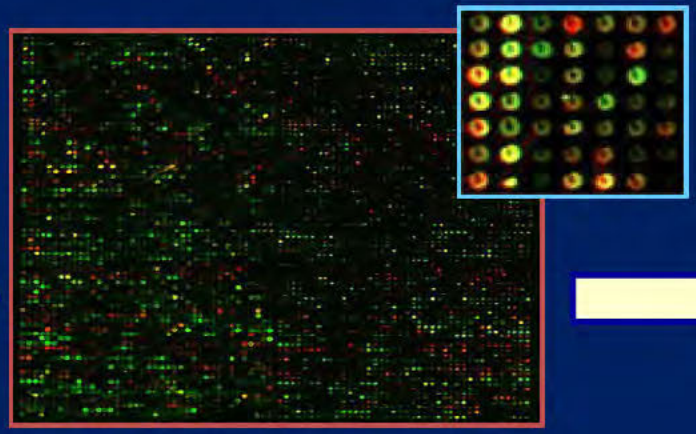
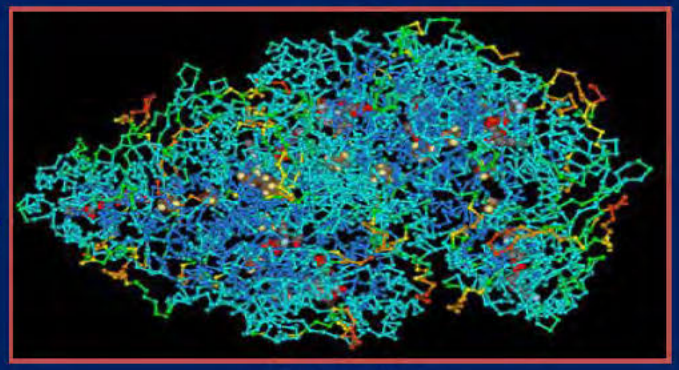
- Radioecology
  - Proteomics research at low dose facility
  - Trophic Transfer of contaminants
  - Use of legacy data and samples for assessing current ecological impacts on SRS

Long-term Surveillance and Monitoring R&D

DNA molecule



DNA micro array

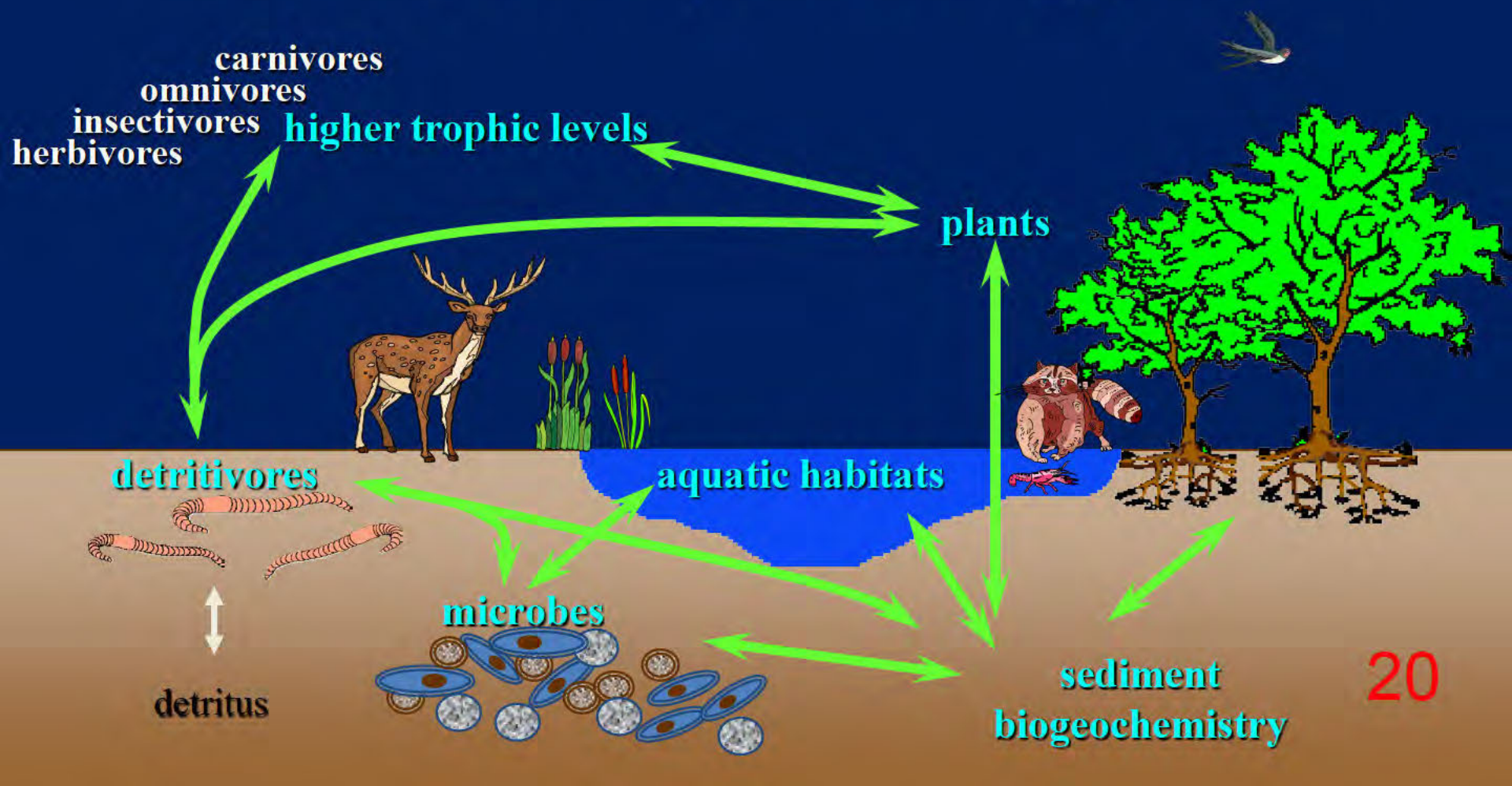


protein

organisms

ecosystem

Develop Ecosystems Approach



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- **Radioecology**
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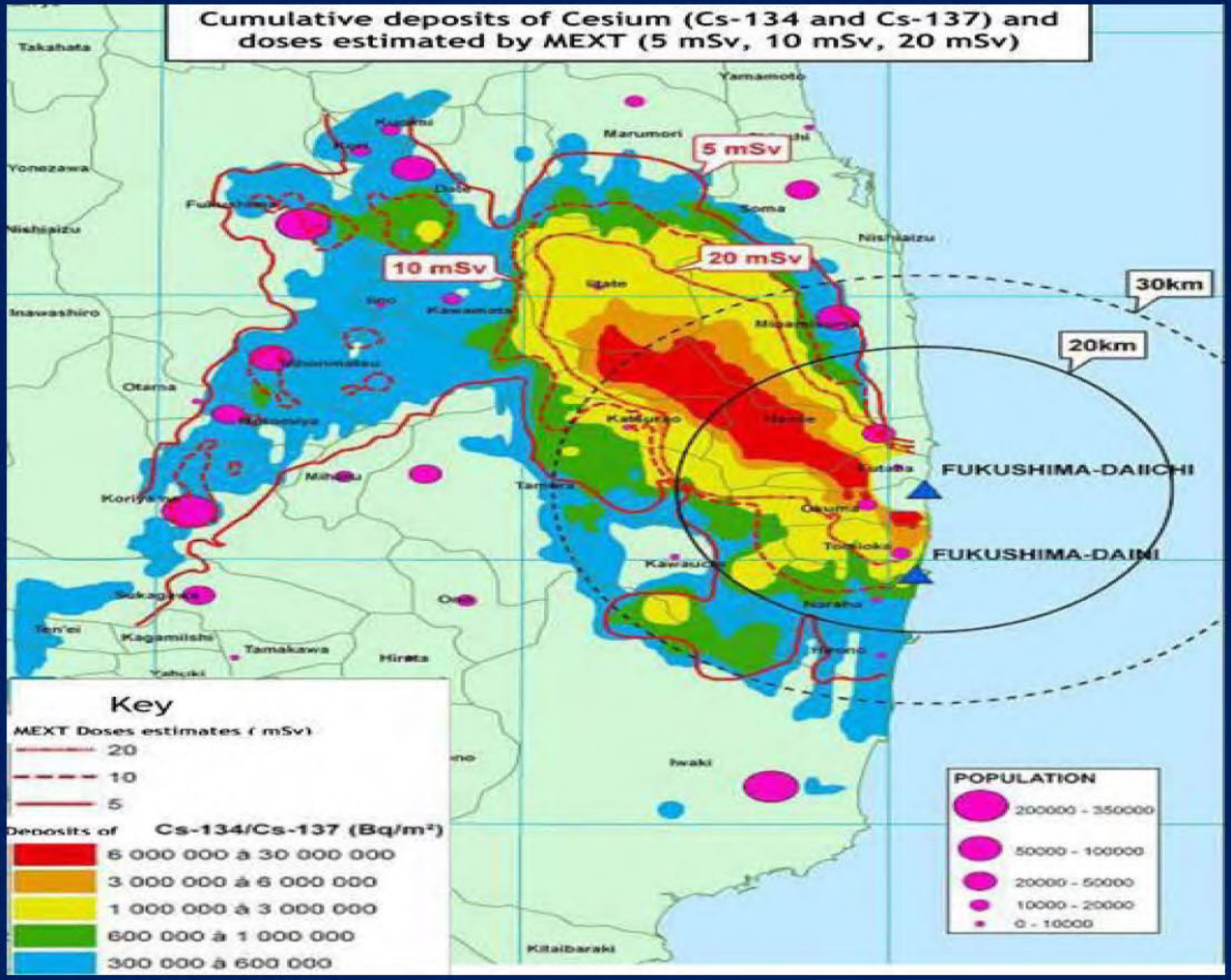
- **Remediation and Restoration**
  - Collaborative research with SRNL on potential technologies for Fukushima


Cumulative deposits of Cesium (Cs-134 and Cs-137) and doses estimated by MEXT (5 mSv, 10 mSv, 20 mSv)
5 mSv
10 mSv
20 mSv
30km
20km
FUKUSHIMA-DAIICHI
FUKUSHIMA-DAINI
Key
MEXT Doses estimates (mSv)
20
10
5
Deposits of Cs-134/Cs-137 (Bq/m²)
6 000 000 à 30 000 000
3 000 000 à 6 000 000
1 000 000 à 3 000 000
600 000 à 1 000 000
300 000 à 600 000
POPULATION
200000 - 350000
50000 - 100000
20000 - 50000
10000 - 20000
0 - 10000
Takahata
Yonezawa
Nishiaizu
Inawashiro
Otama
Koriyama
Sukagawa
Ten'ei
Kaganishi
Tamakawa
Hirata
Yabuki
Yamamoto
Marumori
Soma
Nishiaizu
Iwaki
Kitaibaraki

Emerging Missions for SREL in FY14

- **Environmental Justice**
  - Increased role in outreach and education to local communities
  - Increase capabilities for environmental monitoring of radionucleotides

Outreach and Monitoring for Local Communities

Emerging Missions for SREL in FY14

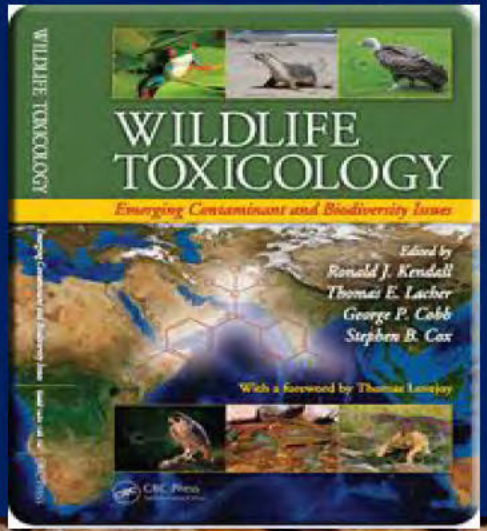
- **Environmental Justice**
  - Increased role in EJ outreach and education to local communities
  - Increase capabilities for environmental monitoring of radionucleotides
- **Energy Ecology**
  - Increased research on ecological consequences of green energy technologies (e.g., nuclear & biofuel)

Ecological Impacts of Green Energy

Emerging Missions for SREL in FY14

- **Environmental Justice**
  - Increased role in EJ outreach and education to local communities
  - Increase capabilities for environmental monitoring of radionucleotides
- **Energy Ecology**
  - Increased research on ecological consequences of green energy technologies (e.g., nuclear & biofuel)
- **Ecotoxicology**
  - Increased capabilities for assessing ecological and health effects of metals

Ecological Impacts of Contaminants



Summary

- SREL has a diversity of expertise available to address ecological issues on the SRS
- Additional funding is still needed to bring the laboratory to it's full potential
- UGA has reinforced it's commitment to keeping the laboratory open with the cost share of new faculty lines
- DOE-SR and NNSA are investing in SREL to utilize the laboratory to meet its work scope for the public good
- SREL will continue to support the development of radioecology on the SRS and in the US
- SREL will continue to make investments in graduate education
- SREL will continue to serve in its role as an independent source of expertise on the SRS

THANK YOU