

NCoRE Research Priorities – Results from the NCoRE Workshop

Dr. Wendy Kuhne
NCoRE Director
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NCoRE Workshop Summary Briefing

Workshop Preparations

- **Workshop planning began in April 2012**
- **Invitations to attend the workshop were distributed to members of**
 - Academia
 - Government (EPA, NRC, USGS, and other DOE Labs)
 - Consulting Firms (i.e. Risk Assessment Corporation)
 - Non-profit (i.e. Electric Power Research Institute, Nuclear Energy Institute)



NCoRE Workshop, August 15 and 16, 2012

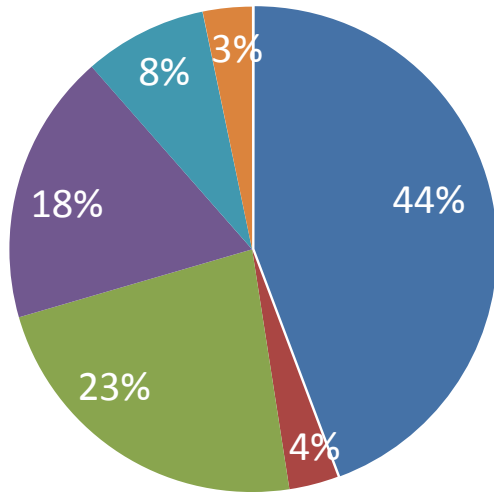
“Radioecology in the 21st Century – The science, tools and research goals needed to advance the field.”

- **A two day event to address the following objectives:**
 - Current status of radioecology research programs in the United States;
 - Immediate need for science driven discoveries, tool development and the generation of scientific data to support legislative decision making process for remediation strategies, long-term monitoring of DOE sites and protection of human health and the environment;
 - Discuss list of research priority areas identified by NCoRE partners;
 - Discuss the need for radioecology graduate education programs in the United States;
 - Discuss the Savannah River Site as a test bed for radioecology research.



Workshop Participants

- 61 registered participants



- Savannah River National Laboratory
- Other Federal Agencies
- Universities
- DOE (Headquarters, other labs)
- Savannah River Site
- Other (i.e. Non-Profits, Consulting Firms)



Radioecology Areas and Needs for Advancement

- **Radiological Risk Assessment** (Dr. John Till)
- **International Commission on Radiological Protection (ICRP)- Environmental Protection of the Environment** (Dr. Kathy Higley)
 - **ICRP Committee 5**
 - Framework development (modeled after human risk framework)
 - Selection of reference flora and fauna
- **Needs of the Department of Energy** (Dr. Wendy Kuhne)

Discussion Breakout Sessions

- Participants were asked to consider and expand upon the following topic areas to prioritize research needs and identify potential funding sources for external grant development.



Dr. Brian Looney (SRNL) Session Leader – Tool Development



Science Drive Research	Tool Development
Translocation and uptake kinetic studies of “lesser studied” radionuclides.	Development of tools for assessment of site specific spatial transport and temporal geochemical cycling
Multi-contaminant effects	Development of rapidly deployable techniques and tools to mitigate widespread contamination of the environment.
Radiation impacts on ecosystems	Development of reliable computational tools for estimation of radiological risk assessment–
Chronic low level radiation impacts on ecosystems	Utilization of chemometric approaches to predict environmental behaviors of exotic radionuclides
Genomics based changes within radiation exposed and radionuclide-contaminated biota using state of the art analytical methods, such as transcriptome, proteome and metabolomics measurements,	Expansion of radioecological models to include kinetic predictions of movement (the goal is to reduce conservatism in assessment models and to take into account the effect non equilibrium conditions have on radionuclide uptake and transfer rates).
Radiation-induced epigenetic effects with a particular emphasis on the occurrence and magnitude of transgenerational effects	Incorporation of scaling and extrapolation methods (the goal is to maximize the availability of defensible data without having to conduct expensive research).
Enhanced dosimetry in experimental designs to accurately assess effects that may be slightly above or below background levels.	

Results from Science Driven Research Discussions

- Filling in data gaps on “lesser known” radionuclides (Tc-99, I-129, Pu-239 and H-3)
- Improving environmental dosimetry for non-human biota (i.e. external and internal exposures)
- Trans-generational effects
 - Better understanding of individual effects
 - Linking to population effects
- Comparative approach across more species
- Functional genomics – using biomarkers such as micronuclei test, chromosome aberrations, transcriptomics, proteomics and metabolomics to assess changes in phenotype or to assess injury that affects growth, survival, and/or reproduction
- Mixed contaminant exposures (radionuclides and metals and chemicals)
- Understanding enhanced microbial effects (positive radiotaxis)
- Savannah River Site Species of Interest (development of Reference Animals and Plants list for future research)



Results from Tool Development/Ecological Relevancy Session

- **Optimized scenario based ecosystem modeling: Coupled biogeochemical transport, exposure and impacts modeling.**
- **Development of comprehensive-authoritative data source to support radioecology.**
 - European Union currently has the ERICA database
- **Radioecology case study site (Selection of test bed sites on the Savannah River Site).**
 - Tim's Branch and Steed's Pond (Uranium and Nickel)
 - Pond B (Cesium-137)
- **Consequence management tools for response, remediation and restoration.**



Tim's Branch Study Site

Results of Discussion Sessions

- **The participants felt that there is a significant opportunity to apply some of the latest scientific advances and tools to advance the field and provide valuable information to support safe operation and development of nuclear facilities.**
 - Examples of new technologies include – genomics, proteomics, voxel phantom development, and remediation technologies
- **Participants strongly supported the use of sites with existing contamination and baseline data as case study sties. This would provide the most defensible information on radioecological impacts in real environments and ecosystems.**
 - Proposed sites included Savannah River Site and Oak Ridge National Lab (baseline information in the mid-20th century).

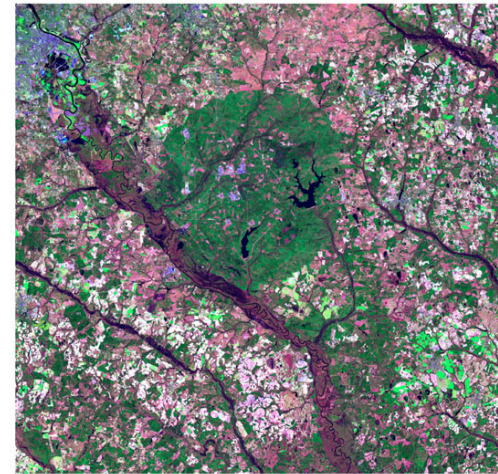
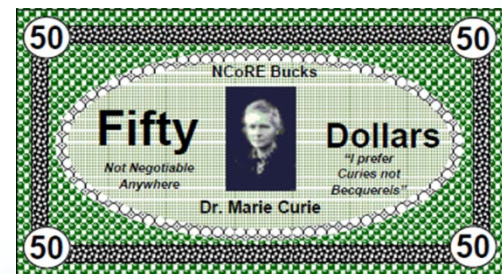
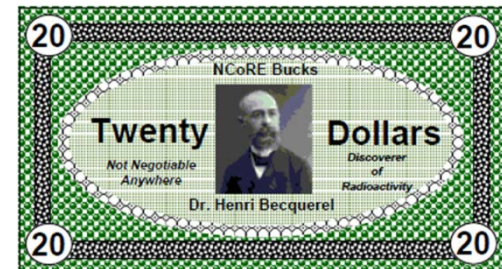
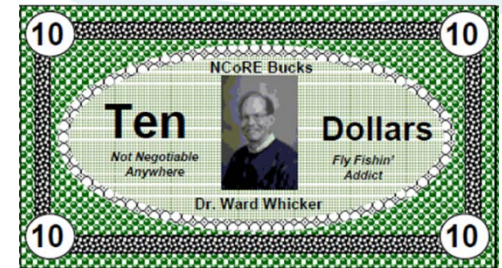
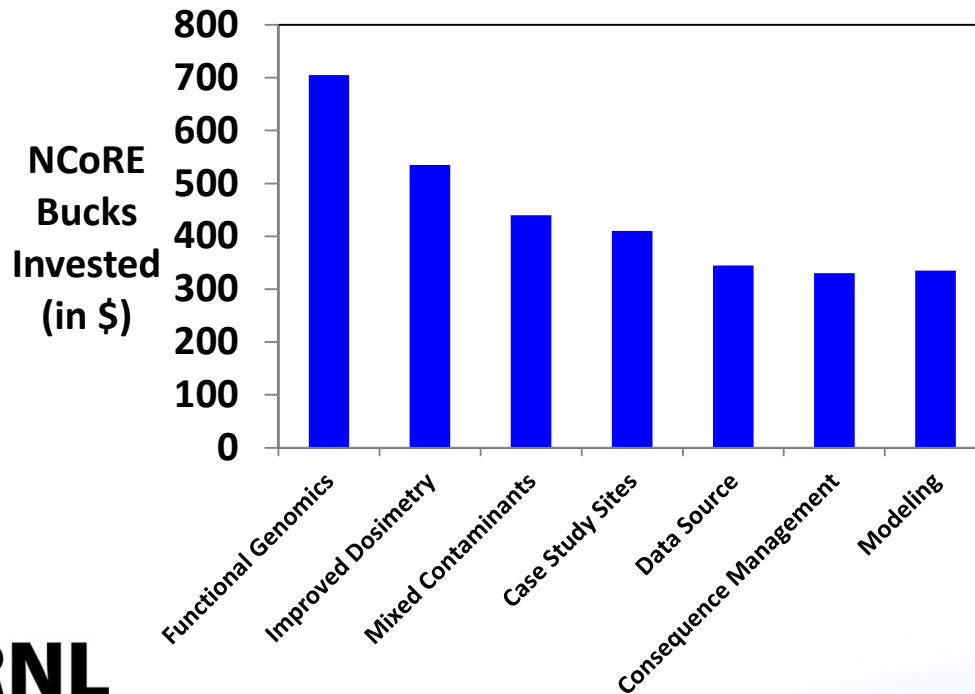


Photo Credit: SREL GIS LAB

NCoRE Bucks Investment Exercise

- In an effort to prioritize the lists from the two discussion sessions participants were given \$100 of NCoRE bucks and asked to spend it on research priority areas.
- The NCoRE bucks were assigned numbers to track the demographic spending on the research priority areas.



Products from workshop

- Workshop Summary Report
- DVD of presentations and discussion session.
 - Link on NCoRE website (<http://srnl.doe.gov/NCORE/>)



Workshop on Radioecology in the 21st Century
August 15 - 16, 2012

