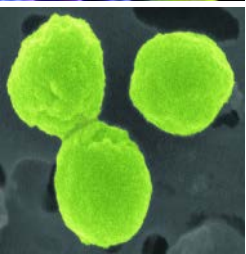
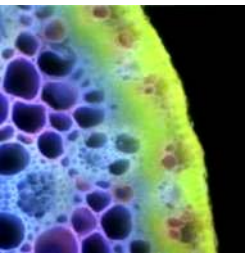


DOE Climate Modeling Science Team Meeting



Sharlene Weatherwax, Ph.D.
Associate Director of Science
Biological and Environmental Research

September 19, 2011

Hyatt Grand Washington, DC

Office of Science

Science to Meet the Nation's Challenges Today and into the 21st Century

The Frontiers of Science

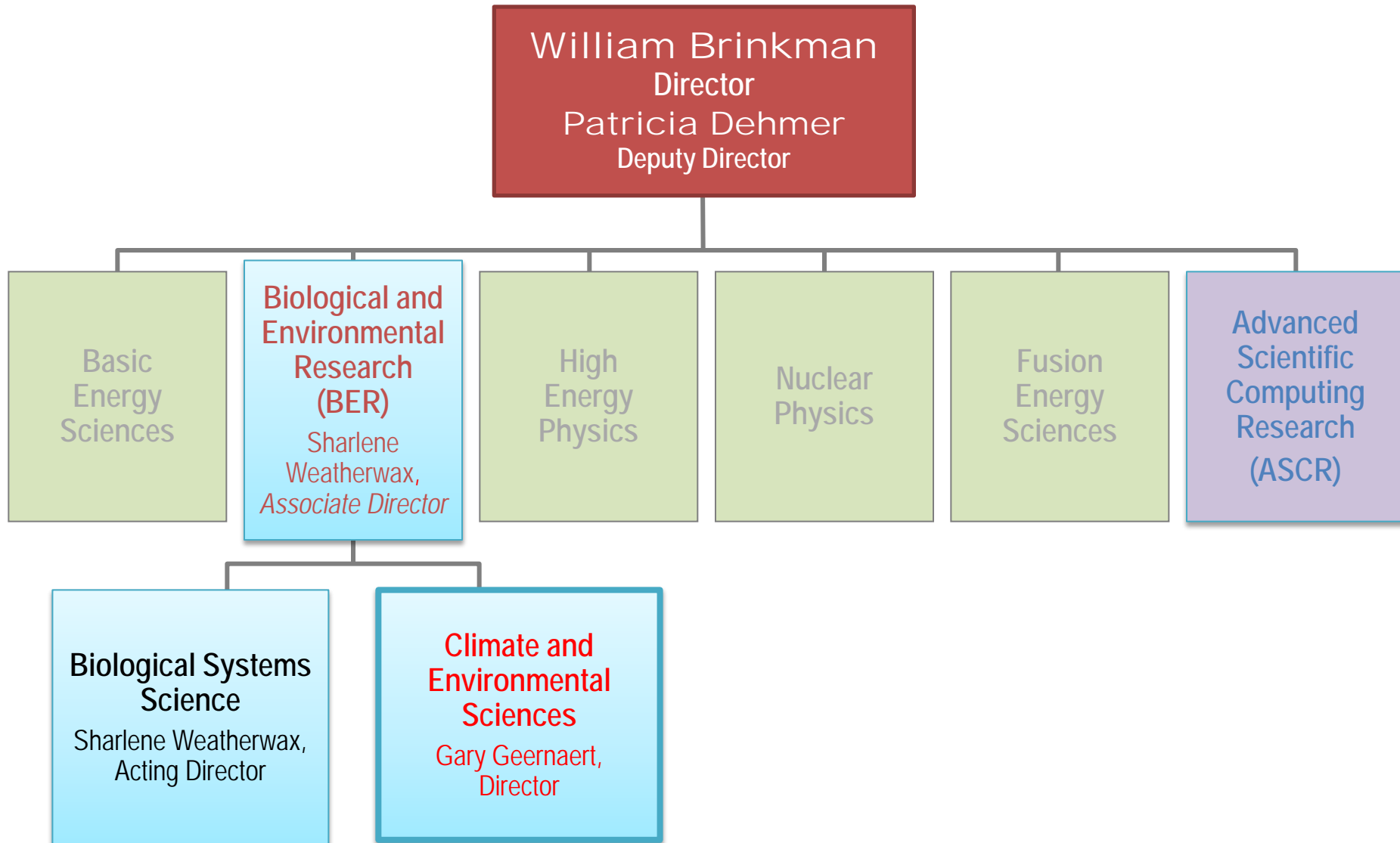
- Supporting research that led to over 100 Nobel Prizes during the past 6 decades—22 in the past decade alone
- Providing 45% of Federal support of basic research in the physical sciences and key components of the Nation's basic research in biology and computing
- Supporting over 27,000 Ph.D.s, graduate students, undergraduates, engineers, and support staff at more than 300 institutions

21st Century Tools of Science

- Providing the world's largest collection of scientific user facilities to over 26,000 users each year

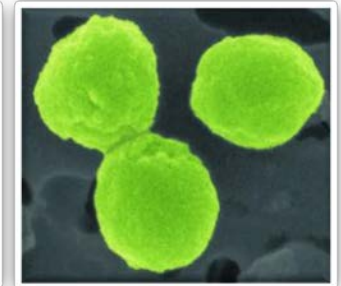
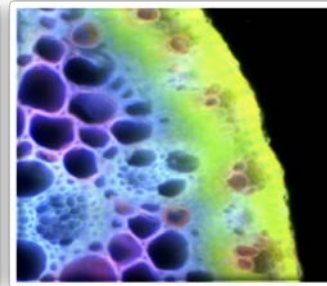
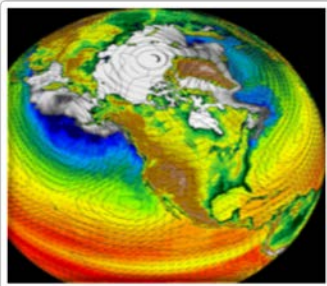


Department of Energy Office of Science



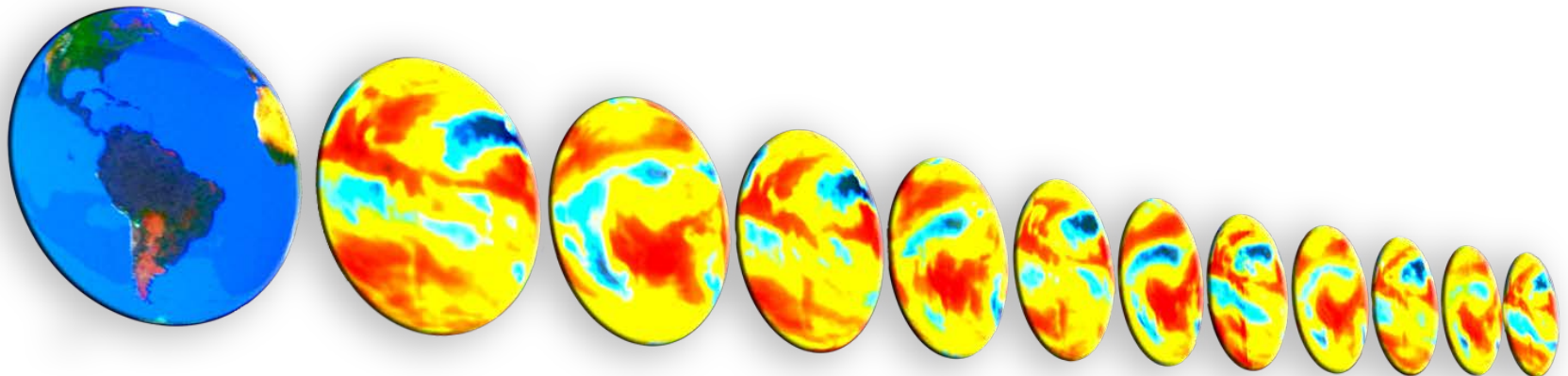
Biological and Environmental Research Mission

- To understand complex biological, climatic, and environmental systems across spatial and temporal scales.
- BER provides the foundational science to:
 - Support the development of biofuels as major, secure, and sustainable national energy resources
 - Understand the potential effects of greenhouse gas emissions on Earth's climate and biosphere and the implications of these emissions for our energy future
 - Predict the fate and transport of contaminants in the subsurface environment at DOE sites
 - Develop new tools to explore the interface of biological and physical sciences



Biological and Environmental Research Approach

- Understanding complex biological and environmental systems across many spatial and temporal scales:
 - From the sub-micron to the global
 - From individual molecules to ecosystems
 - From nanoseconds to millennia
- Integrating science by tightly coupling theory, observations, experiments, models, and simulations
- Supporting interdisciplinary research to address critical national needs
- Engaging national laboratories, universities, and the private sector to generate the best possible science



Biological and Environmental Research

Appropriations		FY 11	FY 12 Pres. Request	FY 12 House Mark
Research	Biological Systems Science	\$223M	\$276M	\$204M
	Climate Science	\$106M	\$104M	\$75M
	Environmental Systems Science	\$80M	\$101M	\$69M
	Total	\$409M	\$481M	\$346M
Facilities: Scientific User Facility Operations	Biological Systems Facilities and Infrastructure	\$85M	\$90M	\$85M
	ARM Climate Research Facility	\$46M	\$68M	\$48M
	Environmental Molecular Sciences Laboratory (EMSL)	\$51M	\$56M	\$50M
	Total	\$182M	\$214M	\$185M
Other	Small Business Innovation Research, etc	\$21M	\$23M	\$15M
	Total BER	\$612M	\$718M	\$547M

Why DOE?

The Energy-Climate Nexus

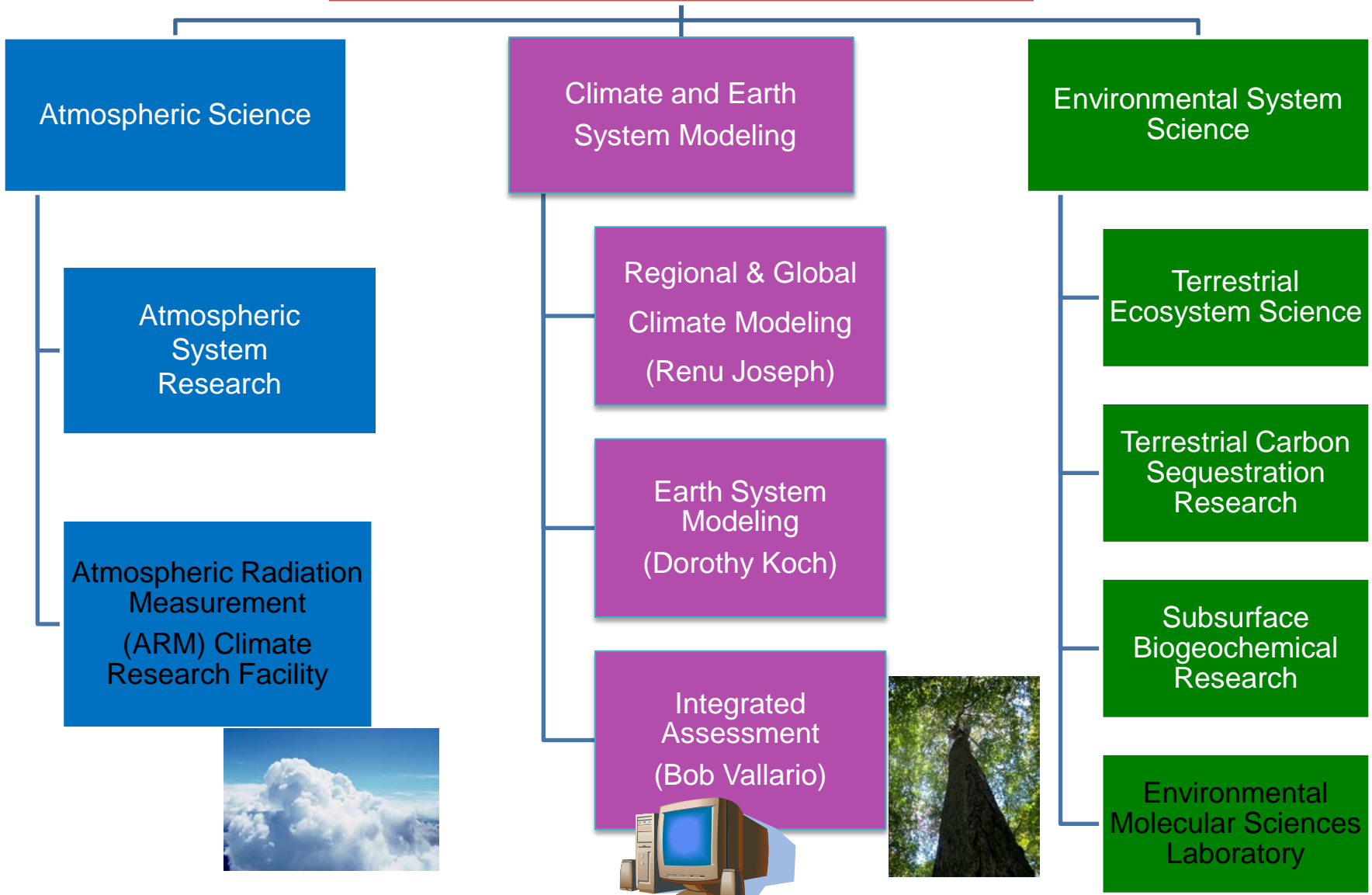
Greenhouse gases are emitted during energy production...
and climate change will impact energy production

DOE seeks to:

- Understand the effects of GHG emissions on Earth's climate and the biosphere
- Provide world-leading capabilities in climate modeling and process research on clouds and aerosols, and the carbon cycle
- Provide unique, world-leading capabilities in cloud and aerosol observations and large scale ecological experiments
- Build foundational science to support effective energy and environmental decision making

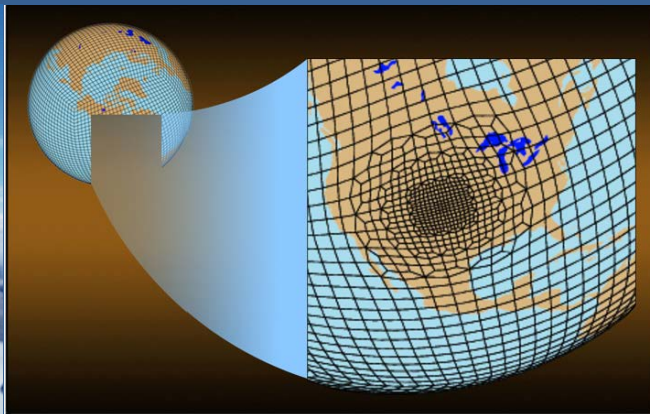


Climate and Environmental Sciences



Climate Modeling as CESD integrator: Links between Atmospheric Sciences Research/Atmospheric Radiation Measurement (ASR/ARM) and Climate Modeling

- Develop Community Atmosphere Model (CAM) clouds, aerosols and dynamics
- Apply ARM and other cloud/atmosphere/aerosol datasets to improve and test model
- Use model to discern most sensitive and uncertain elements of CAM to inform ASR research and ARM deployments



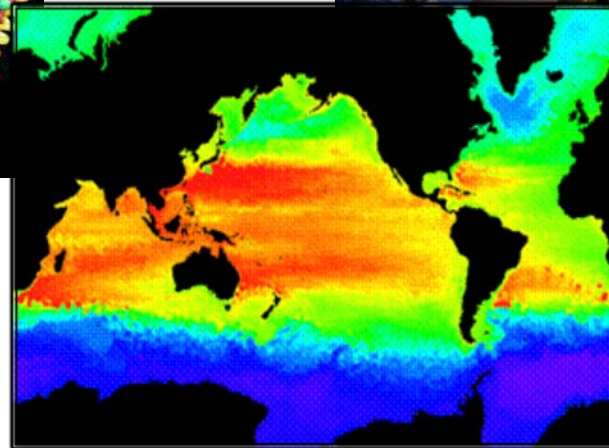
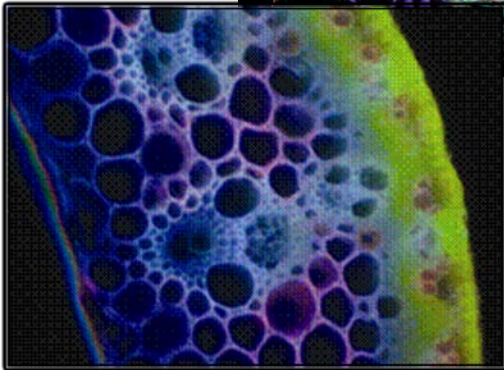
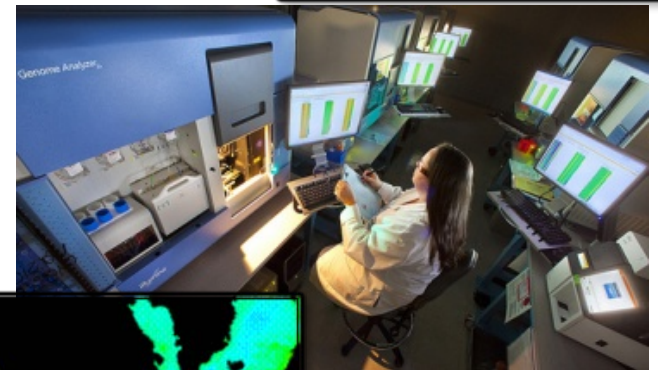
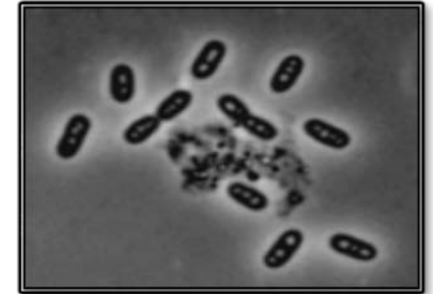
Climate Modeling as CESD integrator: Links between Terrestrial Ecosystem Sciences (TES) and Climate Modeling

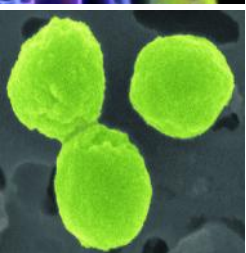
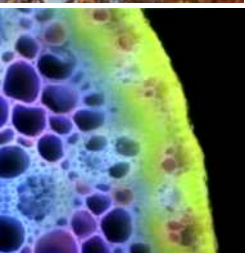
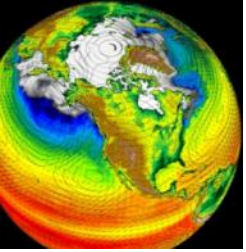
- Develop Carbon cycle in Community Land Model (CLM)
- Apply Ameriflux and other TES datasets to improve and test CLM
- Use model to discern most sensitive or uncertain elements of CLM to inform TES research



Biological and Environmental Research

Systems science to meet DOE mission needs in bioenergy, climate and the environment.





Thank you!

Sharlene Weatherwax

Sharlene.Weatherwax@science.doe.gov

<http://science.energy.gov/ber>



U.S. DEPARTMENT OF
ENERGY

Office
of Science

Office of Biological
and Environmental Research