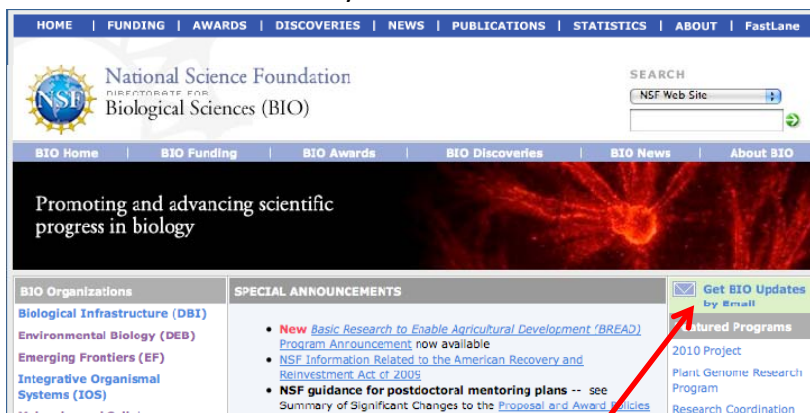


# Opportunities for early career scientists

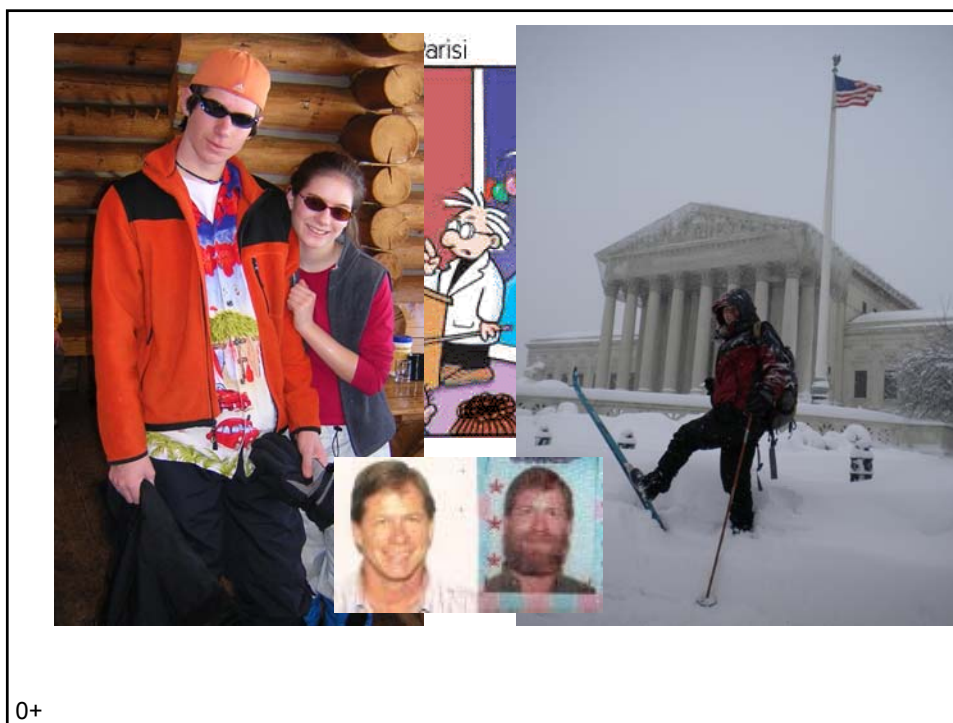
Buck Sanford – Directorate of Biological Sciences  
Division of Environmental Biology  
Ecosystem Science



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## Non-NSF/NASA opportunities



United States Department of Agriculture  
National Institute of Food and Agriculture

Environment & Natural Resources

### Programs

[Air Quality](#)

[Ecosystems](#)

[Environmental & Resource Economics](#)

[Forests](#)

[Global Change and Climate](#)

[Rangelands and Grasslands](#)

[Soils](#)

[Sustainable Development](#)

[Water](#)

[Wildlife & Fish](#)



**USAID** | **ASIA**  
FROM THE AMERICAN PEOPLE

Asia Regional Center of **Excellence on Climate Change and Development**

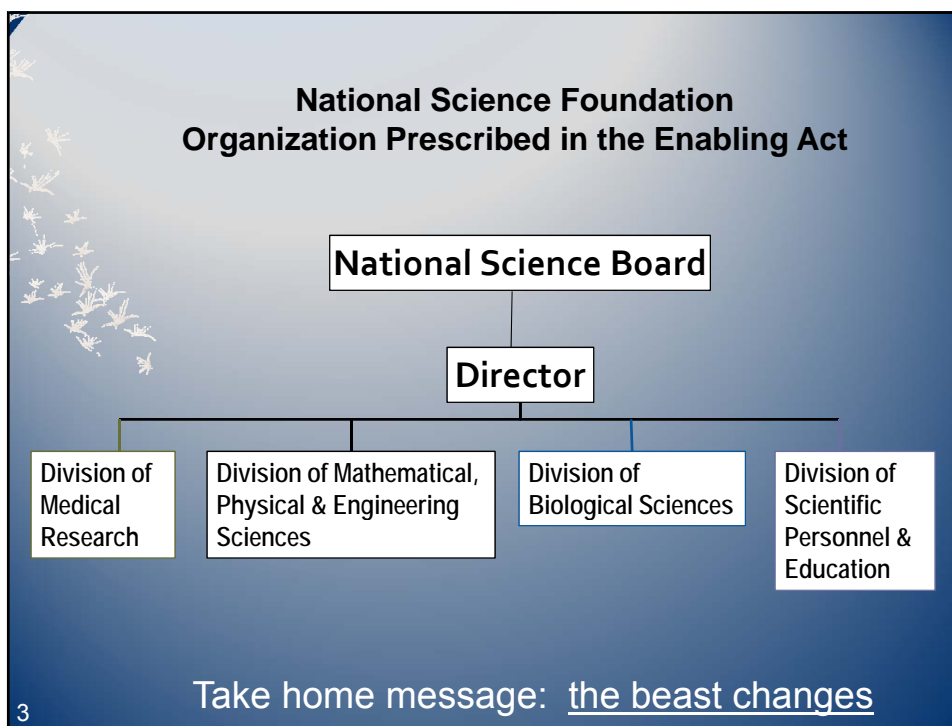

1

## A1: Know the beast

- The National Science Foundation was created by Congress in 1950  
*"To promote the progress of science; to advance the national health, prosperity, and welfare; to secure the national defense; and for other purposes."*
- Areas funded:
  - [Biological Sciences](#)
  - Computer & Information Science & Engineering
  - Cyberinfrastructure
  - Education and Human Resources
  - Engineering
  - Environmental Research & Education
  - Geosciences
  - International Science & Engineering
  - Mathematical & Physical Sciences
  - Polar Programs
  - Social, Behavioral & Economic Sciences



2





**BIO's first born...**

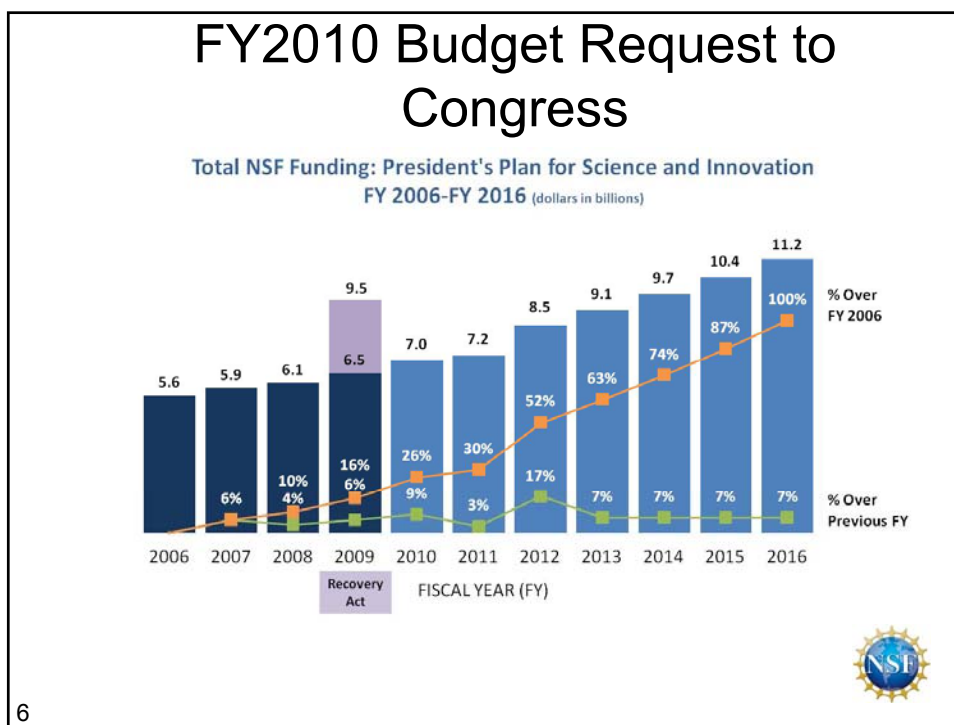
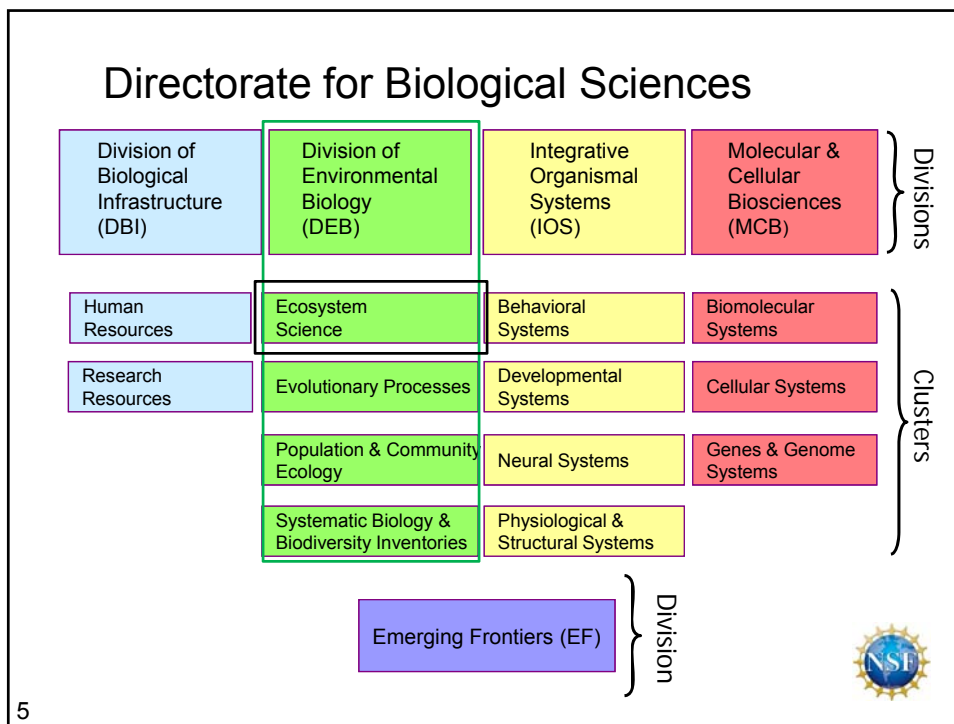
5200016 – **Control of metamorphosis in *Hyla brunnea***  
**Award Amount - \$1000**

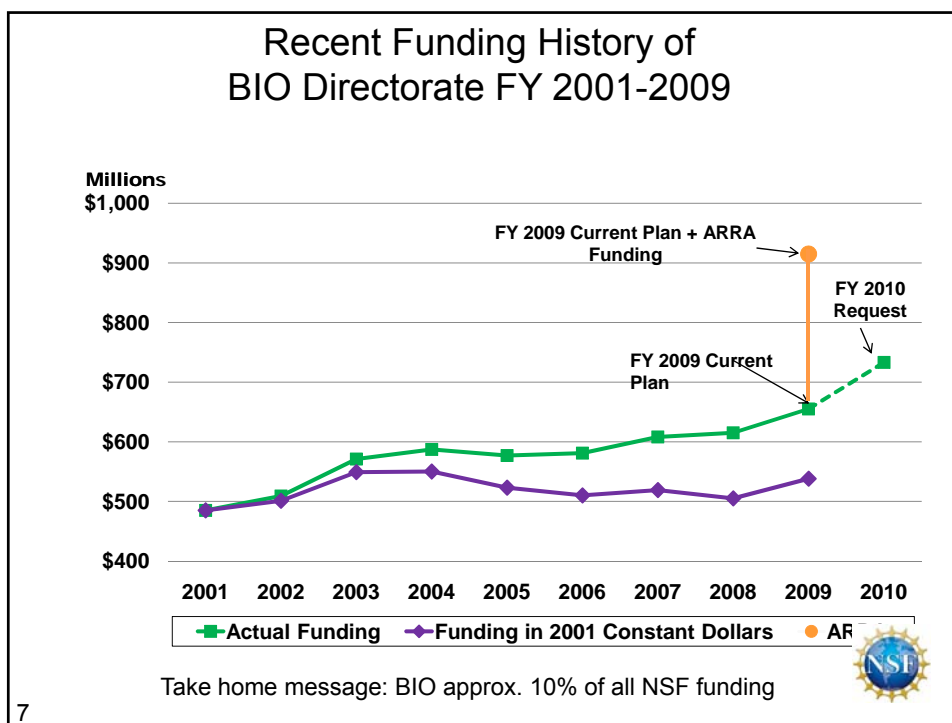
1952 BIO Award Data  
 # of Awards - 80  
 Average Award Size - \$10,897  
 (\$88,221 in 2009 Dollars)

2009 BIO Award Data  
 # of Awards - 1823  
 Average Award Size - \$199,695



4





7

### FY 2010 New Activities

- **Climate Research Investments**
  - Water Sustainability and Climate
  - Ocean Acidification
  - Earth System Modeling
  - Dimensions of Biodiversity
  - Climate Change Education
- **Research Resources**
  - Digitizing Collections – begun with ARRA fund
- **Transforming Undergraduate Biology Education**
  - Course, Curriculum, and Laboratory Improvement
  - BIO-EHR STEP Center
  - Research Coordination Networks – Undergraduate Biology Ed.
- **Experiments in Innovation**
  - Innovation in Biological Imaging and Visualization solicitation
  - Enabling Partnerships to Enable Science (Tools”) DCL
- **National Ecological Observatory Network (NEON)**
  - Macrosystems Biology

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## FY 2010 BIO Priorities

- Climate Research (\$46M)
- Innovation (+\$20M over FY2009)
- Disciplinary Research: Enhancing the Core (+\$38M)
- Research Resources (+\$20M)
- National Ecological Observatory Network (+\$200K)
- Education & Learning (+\$11.5M)



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## Climate Research (\$46M)

- Multiscale Modeling (MSM)
  - Enhance scalability from global ↔ regional ↔ local
  - Improve multiscale predictability to inform decision makers
- Fundamental research
  - Carbon cycling, biodiversity, & ecological systems: Emerging Topics in Biogeochemical Cycles (ETBC)
  - Expand the Nation's workforce to address complex environmental challenges
- Environmental observation
  - Improve, upgrade, & deploy critical observing platforms & systems such as LTER & NEON
  - USDA partnership to establish **Urban Long Term Research Areas** (ULTRA, ULTRA-Ex)



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## Innovation (+\$20M over FY09)

- Stimulating interdisciplinary research
  - Ecology of Infectious Disease (EID: BIO, GEO, SBE, NIH)
  - Science, Technology, and Society (STS: BIO, SBE)
  - Dynamics of Coupled Natural and Human Systems (CNH: BIO, GEO, SBE and USFS)
  - Interdisciplinary Training Undergraduates in Biological and Mathematical Sciences (UBM: BIO, EHR, MPS)
  - Basic Research Enabling Agricultural Development (BREAD: BIO + Bill & Melinda Gates Foundation)
- Exploring novel processes for problem solving
  - Joint NSF/EPSRC “Sandpit” on Synthetic Biology



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## Innovation (+\$20M over FY09)

- Establishing collaborations
  - Synthesis Centers: support for working groups, catalysis groups, informatics, education
    - National Center for Ecological Analysis and Synthesis (NCEAS)
    - National Evolutionary Synthesis Center (NESCent)
    - National Institute for Mathematical and Biological Synthesis (NIMBios)
  - Research Coordination Networks (RCN): Funding for groups of investigators to communicate and coordinate their research, training and educational activities across disciplinary, organizational, institutional, and geographical boundaries.
- Capitalizing on developing priorities
  - Early-concept Grants for Exploratory Research (EAGER):
    - Exploratory work in its early stages on untested, but potentially transformative, ideas or approaches
    - Budget consistent with project scope and existing programmatic activities (up to \$300K for 2 years, no external review)
  - Grants for Rapid Response Research (RAPID):
    - Rapid release of funds, expedited merit review



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## Disciplinary Research: Enhancing the Core (+\$38M over FY09)

- BIO investments support
  - integrative fundamental research
  - across the biological scales,
    - from intracellular macromolecules to the biosphere and
  - results in the discoveries and new knowledge needed to address issues of national importance.



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## Research Resources (+\$20M over FY09)

- Scientific collections
  - Continue efforts to digitize & network U.S. specimen-based research collections
- Enhanced support for research resources
  - Advances in Biological Informatics (ABI)
  - Instrument Development for Biological Research (IDBR)



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## Education & Learning (+\$11.5M over FY09)

- Climate science partnerships with EHR, GEO, & OPP
  - Innovative formal and informal education activities
- BIO/EHR partnership activities:
  - Vision & Change in Undergraduate Biology Education Conference (July 2009) with AAAS
  - Proposed incubation grants to build upon themes
  - Research Coordination Networks (RCN)
  - Join biology & education researchers & practitioners



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## Developing Expertise–Broadening Participation: *Postdoctoral Fellows*

- **Postdoctoral Research Fellowships in Biology (PRFB)**

Due date: Oct. 14, 2009

1. Broadening Participation in Biology
2. Biological Informatics



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## Developing Expertise—Broadening Participation: *Early Career Faculty*

### **Faculty Early Career Development Program (CAREER)**

Untenured assistant professors seeking to integrate research and teaching in innovative ways. Submit to core programs; \$600K+ for 5 years.

### **Research Initiation Grants to Broaden Participation in Biology (RIG BP)**

New investigator, underrepresented group, \$200K for 2 years.



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## Special grants you should know about...

- **Collaborative proposals:** individual funding for researchers at different institutions on same project. Part of regular BIO funding.
- **RUI proposals** (Research at Undergraduate Institutions): for PIs at schools with no NSF-fundable grad programs. 5 extra pages to explain how and why. Reviewed & funded with regular BIO grants.
- **REU supplements:** If you have a NSF award, you can get ~\$10,000 each summer to support an undergraduate researcher.
- **CAREER Program:** The most prestigious foundation-wide awards, in support of junior faculty who exemplify the role of teacher-scholars through outstanding research, excellent education and the integration of education and research within the context of the mission of their organizations. Own funding pool.



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## BREAD -Basic Research to Enable Agricultural Development

- (NSF) and the Bill & Melinda Gates Foundation (BMGF) have partnered
- support a new research program to be administered by NSF.
- The objective of the BREAD Program is to support innovative scientific research designed to address **key constraints to smallholder agriculture in the developing world.**
- significant distinction between BREAD and other NSF programs is that proposals to BREAD must make a clear and well-defined connection between the outcomes of the proposed research and its direct relevance and potential application to agriculture in the developing world. Up to \$6 million was available for first-year funding of this program. Full proposals were due September 9, 2009
- <http://sharepoint07.nsf.gov/bio/ios/pgpr/Shared%20Documents/BREAD%20nsf09566.pdf>

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## NCEAS- National Center for Ecological Analysis and Synthesis

- Scientists at NCEAS use existing information to address important questions in ecology and allied disciplines. Hundreds of scholars, including Postdoctoral Associates, Sabbatical Fellows, and visitors in Working Groups collaborate each year at the Center on scores of projects.
- <http://www.nceas.ucsb.edu/fmt/doc?/frames.html>

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## Long Term Ecological Research

- <http://www.lternet.edu/overview/>



- Twenty-six research sites constitute the **LTER Network**
- includes a wide range of ecosystem types spanning broad ranges of environmental conditions and human domination of the landscape.
- The geographic distribution of sites ranges from Alaska to Antarctica and from the Caribbean to French Polynesia and includes agricultural lands, alpine tundra, barrier islands, coastal lagoons, cold and hot deserts, coral reefs, estuaries, forests, freshwater wetlands, grasslands, kelp forests, lakes, open ocean, savannas, streams, and urban landscapes.
- Each site develops individual research programs in five core areas:

- Pattern and control of primary production;
- Spatial and temporal distribution of populations selected to represent trophic structure;
- Pattern and control of organic matter accumulation in surface layers and sediments;
- Patterns of inorganic inputs & movements of nutrients through soils, groundwater & surface waters;
- Patterns and frequency of site disturbances.

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## FY 2011 Priorities

- **Bio-economy**
- **Intersection of Biological and Physical Sciences**
- **Science, Engineering, and Education for Sustainability (SEES)**
- **U.S. Global Change Research Program**
- **Experiments in Innovation**
- **Transforming Undergraduate Biology Education**
- **Digitization of Collections**
- **National Ecological Observatory Network (NEON)**

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## National Ecological Observatory Network (NEON)

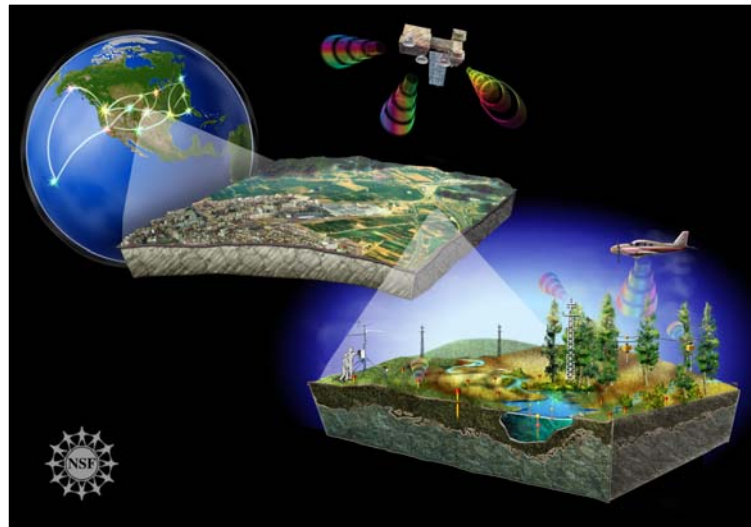
(+\$200K over FY09)

- Increased investment in project planning
- Sustain project design & development activities
  - Preliminary design review completed in June 2009
  - Final design review completed early FY2010
- • New horizons for large-scale biology
- • FY 2011 MREFC Budget Request
- – \$20 million to start construction
- – \$433.72 Total Project Cost over 6 years




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## NEON (National Ecological Observatory Network)



Biosphere, Geosphere, Atmosphere


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NEON Goal neon

The goal of NEON is to enable understanding and forecasting of the impacts of **climate change, land use change** and **invasive species** on **continental-scale ecology** by providing infrastructure to support research, education and environmental management in these areas.

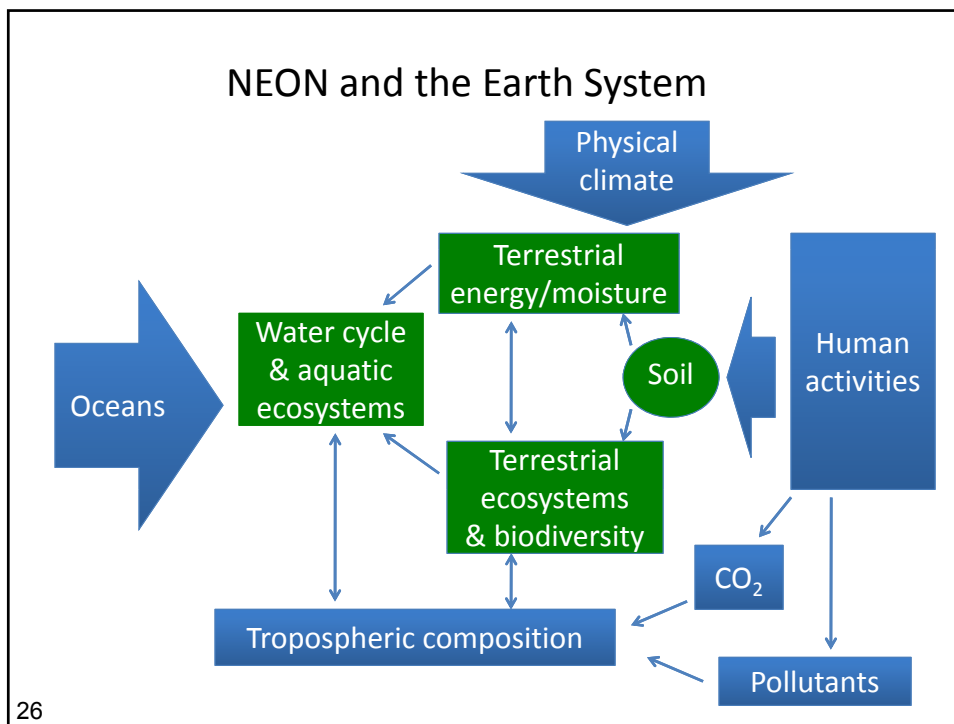
25





neon

- *Existing monitoring systems, while useful for many purposes, are not optimized for detecting the impacts of climate change on ecosystems.*
- *As a result, it is likely that only the largest and most visible consequences of climate change are being detected.*

26 (Synthesis and Assessment Product 4.3 USGCRP 2008)





NEON data support a forecasting approach  
to ecological science

Macrosystems biology solicitation in being developed... (NSF tweet)

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