Advisory Committee for Environmental Research and Education (AC ERE)

Update for NSF MPS Advisory Committee

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Advisory Committee for Environmental Research and Education (AC ERE)

Purpose:

- To provide advice and recommendations concerning support of the NSF's environmental research and education portfolio

- To foster a greater emphasis on interdisciplinary research and education through communication and collaboration among the various disciplines

AC ERE Duties

Advise NSF on:

- Impact of NSF research support and NSF policies on the scientific community

- Program management, overall program balance, and performance for environmental research and education

- Serve as a forum for long-range planning for ERE

- Provide an important base of contact with the scientific community encompassed by ERE

Background

- "Complex Environmental Systems: Synthesis for Earth, Life, and Society in the 21st Century" (2003)

- "Complex Environmental Systems: Pathways to the Future" (2005)

- "Transitions and Tipping Points in Complex Environmental Systems" (2009)
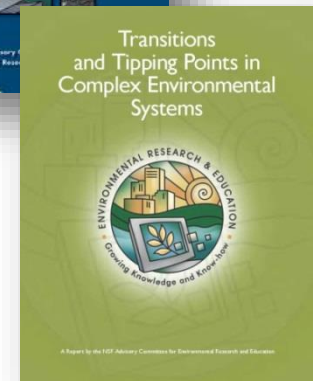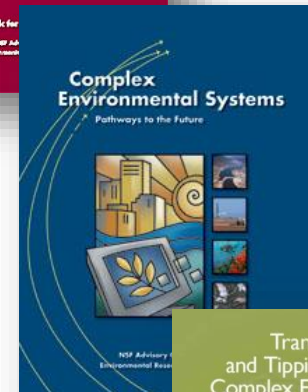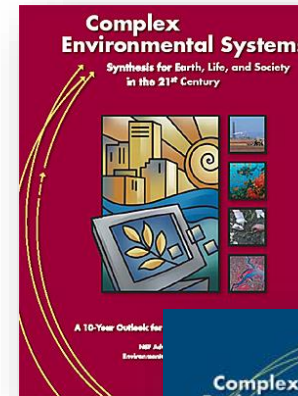
Rationale For New Report

- Past NSF successes and new developments in environmental research and education programming called for a new *Outlook*

  - Provide enhanced and revitalized dialog between the Foundation and the Advisory Committee

  - Serve to advocate strong and sustained support for interdisciplinary programs

  - Identify new challenges and advocate new opportunities

Purpose

- To provide advice and recommendations concerning support of the NSF's environmental research and education portfolio

  - Internal audience: NSF-wide, Director, and Assistant Directors

  - External audience: ERE funding stakeholders and the ERE science community

Context of Report

- The nation is at an environmental crossroads where the confluence of unprecedented global environmental change and transformative new capabilities create both an imperative and an opportunity.

- Human society and technology are increasing the pace and rate of environmental change in ways for which no precedent exists.

- Human systems are becoming dominant forces in ecosystems and the environment resulting in novel landscapes, natural and managed ecosystems.

- Society looks to science for answers to help solve current and future challenges.

- Scientists are increasingly recognizing the need to work together with decision-makers, educators, community leaders, and other stakeholders to enable research and education that fosters well-being on our dynamic and rapidly changing planet.

Need for ERE investments

- Unprecedented Environmental Challenges can be met head-on with science, engineering and an educated workforce

- Worsening trends and accelerating damage can be reversed

- Science and evidence-based decision making can provide societal benefits, increased environmental resilience and contributions to economic growth

- Problems that are not solvable by disciplinary science can be addressed

- Help society to shape a better future

1. Understanding the Challenges

- Continuing NSF's emphasis on understanding complex environmental systems but expanding to socio-environmental systems

- Investments in systems science, coupled natural-human systems, improved abilities to forecast environmental change

- Improved capacity to forecast complex environmental trajectories

2. Designing the future, and Changing the Forecast

- A new area of emphasis in supporting science to inform and improve "resilient designs" in environment systems

- Humans are dominant shapers of the environment; we can use science to inform active designs of environments that are sustainable, resilient, and contribute to improved welfare of our citizens

- Resilient environmental systems – landscapes, managed ecosystems, urban areas – that support human needs and economic well-being
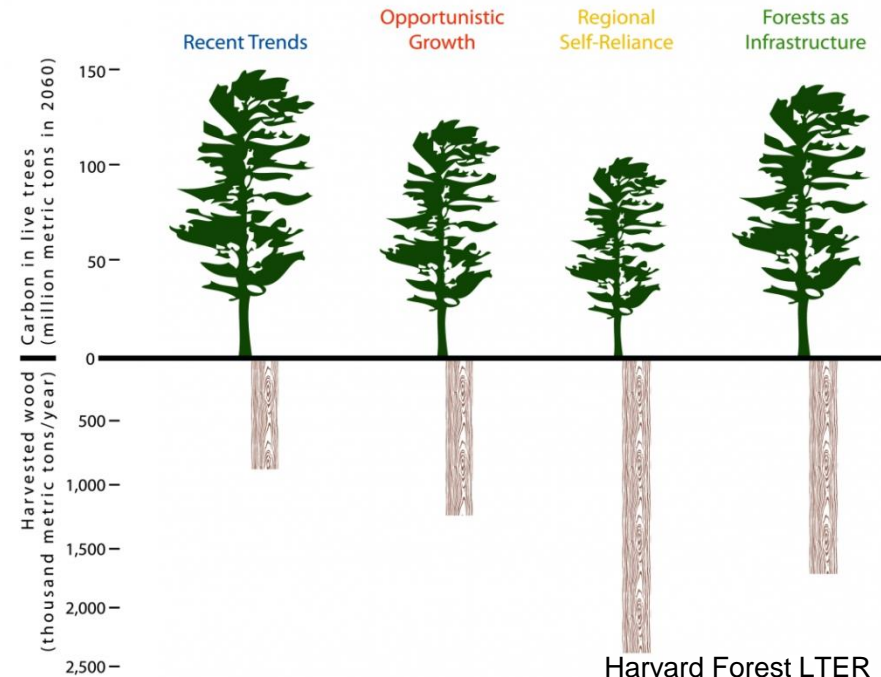
Current efforts

- Water sustainability
- Urban infrastructure
- Food, Energy, Water
- Long term modeling for design

Harvard Forest LTER

2. Designing the future, and Changing the Forecast

- Recognize the role that humans are already shaping and changing the environment and begin to focus on science to lead to improved outcomes

- Build a science of integration that starts to effectively build partnerships to increase resiliency

- Continue to foster effective collaboration across social, natural, physical sciences and engineering

- Leverage the increasing power of sensors, observatories, and big data

3. Enabling and Securing the Future

- Capacity-building of equal weight to discovery
- Stable investments and programs in infrastructure, research partnerships, collaborations, and translational activities
- Funding and Institutional Support
- Collaboration and Partnerships
- Diversity – watershed approach (NSF INCLUDES)
- Synthesis
- Environmental Literacy and Translation

Broader Impact Networks and Nodes (BINNS)

- Multi-institutional Collaborations

- Connect Education and Community Engagement Professionals with Researchers

- Help achieve Broader Impact goals

Report Designed to Serve as Basis for NSF Initiatives that:

- Endure – an overarching portfolio
- Design – a science of integration
- Leverage – capitalize on new investments
- Diversify – through multiple pathways
- Engage – exciting, involving, and educating diverse individuals from multiple generations and fields
- Enlist – by connecting scientists and stakeholders
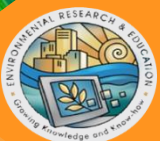
The Challenge

Investment in environmental science, engineering, and education are essential to enable and secure a thriving century by changing the trajectory of current trends – away from warming, stress, conflict and vulnerability, and toward resilience, well-being, and prosperity. This is the challenge, opportunity, and imperative of our time.

https://www.nsf.gov/geo/ere/ereweb/ac-ere/ac-ere_thriving_century.pdf