SECOND PRIORITY: NEW STARTS IN FY 2005 AND FY 2006

National Ecological Observatory Network (NEON)

Project Description: NEON will be a continental scale research instrument consisting of geographically distributed infrastructure, networked via state-of-the-art communications technology. Cutting-edge lab and field instrumentation, site-based experimental infrastructure, natural history archive facilities and/or computational, analytical and modeling capabilities, linked via a network will comprise NEON.

NEON will transform ecological research by enabling studies on major environmental challenges at regional to continental scales. Scientists and engineers will use NEON to conduct real-time ecological studies spanning all levels of biological organization and temporal and geographical scales. NSF disciplinary and multi-disciplinary programs will support NEON research projects and educational activities. Data from standard measurements made using NEON will be publicly available.

Principal Scientific Goals: Collectively, the network of observatories will allow comprehensive, continental-scale experiments on ecological systems and will represent a virtual laboratory for research to obtain a predictive understanding of the environment. Important ecological questions confronting the U.S. will be addressed using NEON.

The National Ecological Observatory Network (NEON), a collaborative research platform of geographically distributed infrastructure, will be connected via the latest information technology. NEON will address pressing environmental questions on regional to continental scales. *Credit: The Directorate for Biological Sciences, NSF.*

Principal Education Goals: The NEON's knowledge base, real time and continuous network data, simulation and observation capabilities, and networked communication will be an asset for formal and informal education and training. NEON will serve as a model to foster the NSF goal of integration of research and education by creating a research-intensive and collaborative learning environment. NEON will provide a creative and innovative educational platform to address the NSF Directorate for Biological Sciences education goals (experiential learning, biosphere literacy, and broadening career horizons).

Partnerships and Connections to Industry: Potential federal partners have expressed interest in NEON, including National Park Service, National Forest Service, NASA, USGS, EPA, National Marine Sanctuaries and USDA Agricultural Research Sites. Private foundations, such as the Santa Fe Institute, the Turner Foundation, Nature Serve, and The Nature Conservancy have also expressed interest. NEON-generated information will be useful to natural resource industries, such as forestry and fisheries. NEON's technological and networking infrastructure will be forging new technological frontiers and thus, will require partnerships with industry for development, deployment, and operation.

Management and Oversight: The Division of Biological Infrastructure within the BIO Directorate manages NEON. The NEON Program Officer in consultation with a BIO-NEON committee, which includes the Deputy Director for Large Facility Projects, formulates the programmatic development of NEON, i.e. drafting, release and review of program announcements, etc. A NEON Project Advisory Team, which includes individuals from all NSF directorates and includes the Office of Budget, Finance and Award Management, the Office of General Counsel, the Office of Legislative and Public Affairs, and the Office of Polar Programs, provides internal oversight. The NSF Deputy Director for Large Facility

Projects is a member of the PAT and will provide advice and assistance. In addition, a sub-committee of the BIO Advisory Committee will provide external advice to the NEON Program Officer about specific programmatic elements.

The NEON Program Officer ensures NEON coordination with other NSF observatories and networks. Coordination with other Federal Agencies occurs through the NEON Federal Agency Coordinating Committee. In addition, NEON is represented on the Architecture subcommittee of the Interagency Working Group for Global Earth Observation System, an activity of the CENR.

Current Project Status:

Planning Activities over the past year: There were three activities to further refine NEON science and infrastructure requirements and NEON governance and management. Two NEON Coordination and Implementation Conferences provided open fora for the scientific community to define how to form, manage, and govern NEON. A "scoping" workshop explored how the scientific community would use a network of ecological observation sites to deepen its understanding of the carbon cycle at sub-regional to continental scales. Two publications, the National Research Council (NRC) report and an American Institute of Biological Sciences (AIBS) white paper, were published. The white paper summarized the previous ten NEON workshop reports, synthesized the prior planning efforts, and provided the rationale for a national research platform.

NRC Report: In November 2003, the National Research Council (NRC) released a report entitled "NEON: Addressing the Nation's Environmental Challenges" that strongly endorsed NEON and provided recommendations for its overall implementation. The report identified several major environmental challenges that occur at regional to continental scales, which require nationally distributed infrastructure.

NEON will apply emerging technologies (sensor, analytical, communication and information) to investigate the structure and dynamics of U.S. ecosystems and to forecast biological change. *Credit: The Bigfoot Project* (*www.fsl.orst.edu/larse/bigfoot*)

Program Announcement for NEON Coordinating Consortium (NCC) and Project Office: The FY 2004 Estimate level does not fund NEON in the MREFC Account, but encourages NSF to continue planning and development activities. A program announcement will be released in FY 2004 to solicit proposals to refine NEON, which includes: developing the Project Execution Plan, establishing a coordination and governance structure, and setting up the NEON Project Office for administration and management. The NCC will establish a governance board, science and technical advisory committees, membership organization, and the NEON Project Office, and provide the scientific leadership, organizational structure, and overall governance of NEON.

Major milestones for NEON are listed below.

FY 2004 Milestones:

NEON Coordinating Consortium and Project Office awarded (4th quarter)
Refine NEON Project scope, budget, and schedule for research
Preliminary baseline design for NEON networking, informatics, education, training, and outreach

FY 2005 Milestones:

Final baseline design for NEON networking infrastructure, informatics, and education, training, and outreach
Preliminary Project Execution Plan for NEON research infrastructure

FY 2006 Milestones:
Final Project Execution Plan for NEON research infrastructure
Initiate construction of NEON networking infrastructure, informatics, and education, training and outreach
Evaluation of the NCC and Project Office

FY 2007 Milestones:
Installation and construction NEON research infrastructure
Continued construction of NEON networking infrastructure, informatics, and education, training and outreach

FY 2008 – FY 2010 Milestones:
Continued construction NEON research infrastructure
Continued construction of NEON networking infrastructure, informatics, and education, training and outreach

Funding Profile: In FY 2004, NSF requested $12.0 million in the MREFC Account to initiate construction of the first two NEON observatories. While the FY 2004 Estimate level does not provide funding, NSF will consider the recommendations in the NRC report, and continue to refine NEON planning with funds within the Research and Related Activities Account.

In FY 2004 the NEON Coordinating Consortium and Project Office will be established to refine NEON Project scope, budget, and schedule for research infrastructure. The NCC and Project Office will establish the governance and management structure for NEON, mechanisms for obtaining a community-driven definition of the location and types of infrastructure needed to address and prioritize the environmental grand challenges, and develop the preliminary baseline definition for the networking; informatics; and education, training, and outreach infrastructure in NEON.

In FY 2005, the NCC and Project Office will complete the preliminary Project Execution Plan for NEON research infrastructure. The Project Office will prepare the Final baseline design for NEON networking infrastructure, informatics, and education, training, and outreach.

Requested MREFC Funds for NEON
(Dollars in Millions)

FY 2005 Request	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	Total
$12.00	$16.00	$20.00	$20.00	$20.00	$12.00	$100.00

NEON Funding Profile
(Dollars in Millions)

	Concept/ Development		Implementation[1]		Operations & Maintenance		Totals		Grand
	R&RA	MREFC	R&RA	MREFC	R&RA	MREFC	R&RA	MREFC	**Total**
FY 1998	0.01						$0.01		**$0.01**
FY 1999	0.03						$0.03		**$0.03**
FY 2000	0.17						$0.17		**$0.17**
FY 2001	0.10						$0.10		**$0.10**
FY 2002	1.00						$1.00		**$1.00**
FY 2003	0.92						$0.92		**$0.92**
FY 2004 Estimate	4.00						$4.00		**$4.00**
FY 2005 Request	4.00			12.00			$4.00	$12.00	**$16.00**
FY 2006 Estimate	1.00			16.00	0.25		$1.25	$16.00	**$17.25**
FY 2007 Estimate	1.00			20.00	0.25		$1.25	$20.00	**$21.25**
FY 2008 Estimate	1.00			20.00	3.00		$4.00	$20.00	**$24.00**
FY 2009 Estimate	1.00			20.00	6.00		$7.00	$20.00	**$27.00**
FY 2010 Estimate	1.00			12.00	9.00		$10.00	$12.00	**$22.00**
Subtotal, R&RA	$15.23				$18.50		$33.73		
Subtotal, MREFC				$100.00				$100.00	
Total, each phase	**$15.23**			**$100.00**	**$18.50**				**$133.73**

NOTE: The expected operational lifespan of this project is 30 years after construction is complete in FY 2010. A steady state of $9.0 million in operations support is anticipated by FY 2010. Operations estimates for FY 2006 and beyond are developed strictly for planning purposes and are based on current cost profiles. They will be updated as new information becomes available.

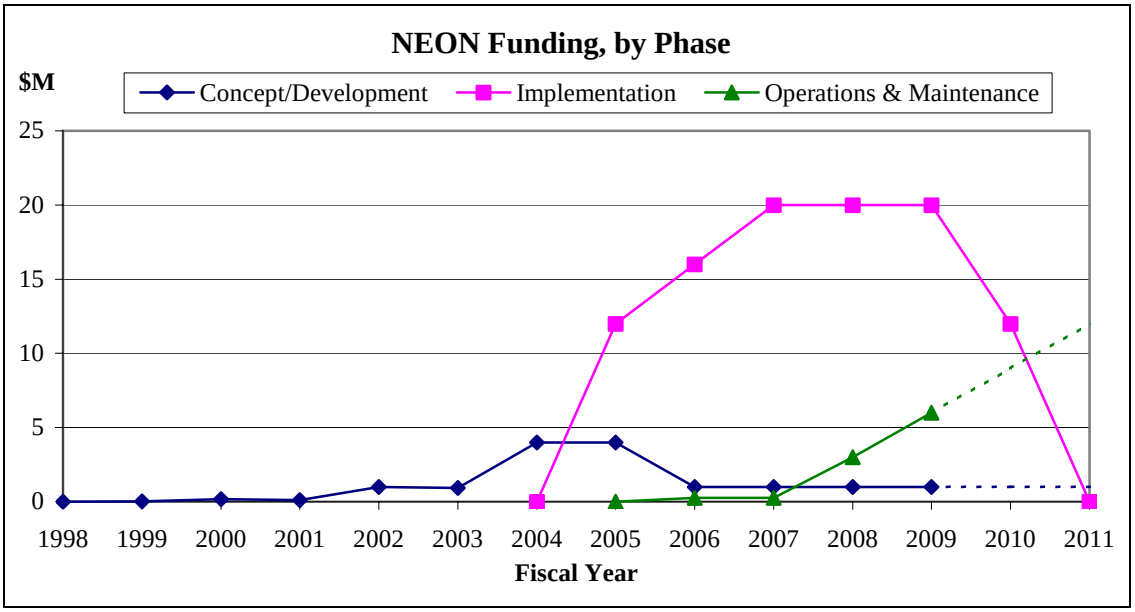
[1]FY 2006-10 implementation funding will be contingent upon the Project Execution Plans for research infrastructure, networking and informatics, and education, outreach, and training.

Information pertaining to the data in the table is provided below.

- Concept/Development: In FY 2002-2003 workshops were funded to specifically address the information technology needs, instrument array design and development, and data, information management architectures and synthesis of a regional-based implementation of NEON. In FY 2003, the National Research Council's study endorsed the concept for a continent-wide implementation of NEON along with a central governance management structure. In FY 2004, a solicitation will be released for a NEON Consortium and Project Office to provide the central management and governance of NEON and to develop the project execution plans for a continental implementation strategy based on nationally significant ecological research challenges. In FY 2005, funding for NEON enabling technologies will be supported.

- Implementation: Total construction costs for NEON will be determined from the project execution plan developed for research, networking, and education infrastructure. In FY 2005-06 MREFC funds will be used to baseline and develop the final design for NEON infrastructure. Initial construction of NEON networking and informatics infrastructure will begin in FY 2006.

- Operations and Maintenance: Initial operations support will commence in FY 2006 as construction is completed on NEON networking, and informatics infrastructure. Operations and maintenance support will increase as the research platform is established.



Future Science Support: Along with direct operations and maintenance support for NEON, NSF will support research performed using the NEON platform through ongoing research and education programs. The annual support for such activities once the research platform reaches full operations is estimated to be at least $12.0 million.

It is estimated that 1,400 field biologists will use NEON annually. A larger number of scientists, students, resource managers and decision makers will make use of NEON data, both directly and indirectly, through the network capabilities and data distribution and sharing technologies via the network and the internet.