

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.

Principal Education Goals: 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).



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.*

Partnerships and Connections to Industry: Several federal agencies have expressed interest in partnering with NEON, including the National Park Service, the National Forest Service, NASA, NOAA, USGS, EPA, National Marine Sanctuaries and the 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 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 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 for Large Facility Projects is a member of the PAT and provides 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 by serving on the NSF Networks and Observing Systems for the Environment (NOSE) working group and

on the PATs for other large facility projects, such as the Network for Earthquake Engineering Simulation (NEES) and Ocean Observatories Initiative (OOI). 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 National Science and Technology Council, Committee on Environment and Natural Resources.

Current Project Status:

Planning activities over the past year: The American Institute of Biological Sciences (AIBS) organized six community workshops between August and September 2004 to identify NEON-specific science questions and requirements based on the environmental grand challenges identified in the NRC NEON report “NEON: Addressing the Nation's Environmental Challenges”, the NSB Environment report and the NRC report “Grand Challenges in Environmental Sciences”<sup>3</sup>.

Award for NEON Design Consortium and Project Office: In FY 2004 and FY 2005, Congress instructed NSF to continue planning and development activities for NEON through the Research and Related Activities (R&RA) Account. On September 15, 2004, BIO made a 2-year, \$6.0 million award to the AIBS to establish a NEON Design Consortium and Project Office, funding the award through R&RA. The NEON Design Consortium is refining the science and education requirements, developing the reference design, designing the baseline for the networking and cyberinfrastructure, drafting the Project Execution Plan and defining the governance and management structures for NEON.

Fostering Technology and Cyberinfrastructure Development: Two workshops were conducted in coordination with the Ocean Observatories Initiative, and the Long Term Ecological Research program to define the cross cutting needs, challenges, and opportunities in sensors and cyber infrastructure. The workshops addressed emerging issues of interoperability among evolving observing systems, leveraging emerging technologies and research frontiers, fostering collaboration, and stimulating robust technology development.

Major milestones for NEON are listed below.

FY 2004 Milestones:

- Held a prospective PI meeting for the NEON Design Consortium and Project Office competition
- Awarded NEON Design Consortium and Project Office (Completed)
- Held six workshops to formulate science questions from the NRC Grand Challenges
- Held two workshops to identify and evaluate options for NEON governance and management

FY 2005 Milestones:

- Establish NEON Design Consortium and Project Office (completed)
- Appoint NEON Advisory Board and Design Consortium subcommittees (completed)
- Refine the NEON requirements, facilities and infrastructure reference design, and develop the governance and management structures for NEON. (Ongoing)
- Research and development on environmental sensors, networks, and cyber tools that will advance the development of NEON as a network of nationally deployed infrastructure (Ongoing)

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<sup>3</sup> These reports can be found on the National Academies Press website:

NEON: Addressing the Nation's Environmental Challenges (<http://www.nap.edu/books/0309090784/html/>)  
Grand Challenges in Environmental Challenges (<http://www.nap.edu/books/0309072549/html/>)

FY 2006 Milestones:

- Final NEON Science Plan and Requirements
- Baseline Networking and Informatics Plan and Review
- Preliminary Project Execution Plan for NEON research infrastructure
- Evaluation of the NEON Design Consortium and Project Office
- Research and development on environmental sensors, networks, and cyber tools that will advance the development of NEON as a network of nationally deployed infrastructure

FY 2007 Milestones:

- Final Project Execution Plan for NEON
- Baseline NEON Infrastructure and Review
- Initiate construction of NEON networking, informatics, and education, training and outreach infrastructure
- Initiate construction of NEON research infrastructure
- Research and development on environmental sensors, networks, and cyber tools for NEON

FY 2008 – FY 2011 Milestones:

- Continued construction of NEON research, networking, informatics, and education, training and outreach infrastructure
- Research and development on environmental sensors, networks, and cyber tools for NEON

Funding Profile: In FY 2005, NSF requested \$12.0 million in the MREFC Account and \$4.0 million in R&RA to baseline and develop the final design for NEON infrastructure and initiate construction of NEON networking and informatics infrastructure. While the FY 2005 omnibus appropriation did not provide MREFC funding, Congress instructed NSF to continue NEON planning through the R&RA Account. In FY 2005 the NEON Design Consortium and Project Office was established to refine the NEON requirements, develop the facilities and infrastructure reference design, the preliminary baseline definition for networking and informatics, the infrastructure requirements for education, training, and outreach and design the governance and management structures for NEON.

In FY 2006, the NEON Design Consortium and Project Office will complete the final NEON Science Plan and Requirements, baseline the Networking and Informatics Plan, and review, and complete the preliminary Project Execution Plan for NEON.

**Requested MREFC Funds for NEON**

(Dollars in Millions)

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Request	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	Total	
FY 2006	\$0.00	\$12.00	\$12.00	\$20.00	\$30.00	\$26.00	\$100.00

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### NEON Funding Profile

(Dollars in Millions)

	Concept/ Development		Implementation <sup>1</sup>		Operations & Maintenance		Totals		Grand Total
	R&RA	MREFC	R&RA	MREFC	R&RA	MREFC	R&RA	MREFC	
FY 1998	0.01						\$0.01	\$0.00	<b>0.01</b>
FY 1999	0.03								
FY 2000	0.17								
FY 2001	0.10						\$0.10	\$0.00	<b>0.10</b>
FY 2002	1.00						\$1.00	\$0.00	<b>1.00</b>
FY 2003	0.92						\$0.92	\$0.00	<b>0.92</b>
FY 2004	3.60						\$3.60	\$0.00	<b>3.60</b>
FY 2005 Current Plan	5.95						\$5.95	\$0.00	<b>5.95</b>
FY 2006 Request	6.00						\$6.00	\$0.00	<b>6.00</b>
FY 2007 Estimate	6.00			12.00			\$6.00	\$12.00	<b>18.00</b>
FY 2008 Estimate	4.00			12.00	4.00		\$8.00	\$12.00	<b>20.00</b>
FY 2009 Estimate	4.00			20.00	8.00		\$12.00	\$20.00	<b>32.00</b>
FY 2010 Estimate	3.00			30.00	16.00		\$19.00	\$30.00	<b>49.00</b>
FY 2011 Estimate	2.00			26.00	20.00		\$22.00	\$26.00	<b>48.00</b>
Subtotal, R&RA	\$36.78		\$0.00		\$48.00		\$84.58		
Subtotal, MREFC		\$0.00		\$100.00		\$0.00		\$100.00	
<b>Total, Each Stage</b>	<b>\$36.78</b>		<b>\$100.00</b>		<b>\$48.00</b>				<b>\$184.58</b>

NOTE: The expected operational lifespan of this project is 30 years after construction is complete in FY 2011. A steady state of \$20.0 million in operations support is anticipated by FY 2011. Annual operations and maintenance estimates for FY 2008 and beyond are developed strictly for planning purposes and are calculated as 20% of the estimated MREFC costs summed to that year. They will be updated as new information becomes available.

<sup>1</sup>FY 2007-11 implementation funding level 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 2001-2003 workshops were funded to address the information technology needs, instrument array design and development, and data, information management architectures and synthesis of a region-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 was released and an award made for the NEON Design Consortium and Project Office to provide the central management for NEON planning and to develop the preliminary project execution plan for a continental implementation strategy based on nationally significant ecological research challenges. In FY 2005, support continues for the NEON Design Consortium and Project Office to continue the preliminary project execution plan development and

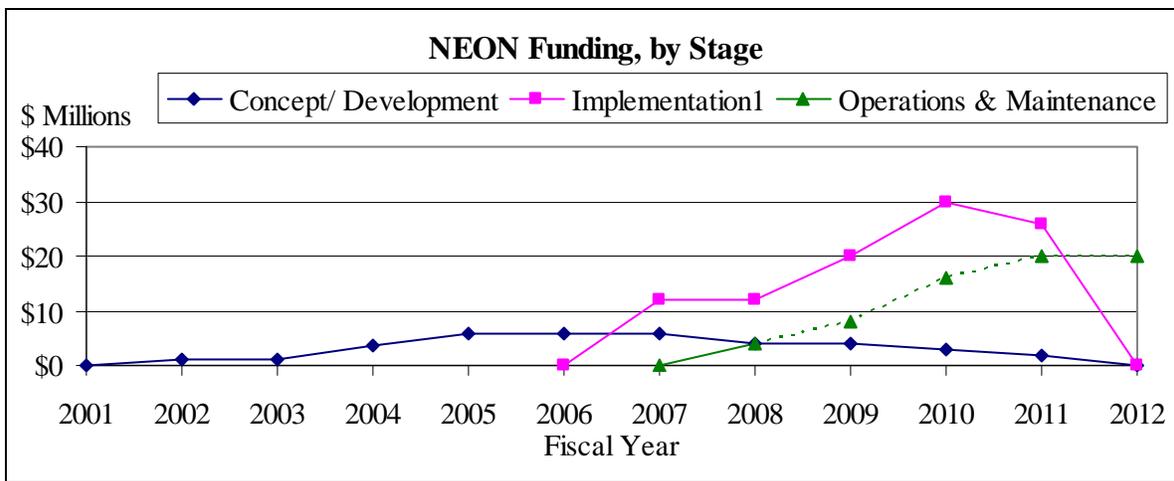


NEON will apply emerging technologies (sensor, analytical, communication and information) to investigate the structure and dynamics of U.S. ecosystems and to forecast biological change.

Credit: The Bigfoot Project  
[www.fsl.orst.edu/larse/bigfoot](http://www.fsl.orst.edu/larse/bigfoot)

funding for NEON research and development on enabling technologies. In FY 2006, support will be provided to complete the final NEON Science Plan and Requirements, baseline the Networking and Informatics Plan and review, and complete the preliminary Project Execution Plan. Support will be continued for research and development of NEON enabling technologies from FY 2006 through the construction phase.

- **Implementation:** Total construction costs for NEON will be determined from the project execution plan developed for research, networking, and education infrastructure. In FY 2007, 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 2007.
- **Operations and Maintenance:** Initial operations support will commence in FY 2008 as construction is completed on NEON networking, and informatics infrastructure. Operations and maintenance support will increase as NEON is brought online.



**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 annually.

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.

### **George E. Brown Jr. Network for Earthquake Engineering Simulation (NEES)**

Final MREFC funding for NEES was appropriated in FY 2004. For information on this project, please see the Facilities chapter of this document.