

The National Ecological Observatory Network**\$0.0**

The FY 2009 Budget Request does not request construction funds for the National Ecological Observatory Network (NEON).

MREFC Funding for the National Ecological Observatory Network

Appropriations and Requests

(Dollars in Millions)

	FY 2007 Appropriation	FY 2008 Estimate	FY 2009 Request
NEON Appropriations and Request	\$4.00	\$3.00	-
Rescission	-\$4.00		
Total, NEON	-	\$3.00	-

\$4.0 million of the FY 2007 appropriated funds for NEON were rescinded per PL 110-161

Baseline History: NSF first requested funds for NEON in FY 2001. In 2004 an NRC report evaluated the original NEON proposal and made recommendations that significantly altered the design to make it better suited for regional to continental scale ecological research. Congress appropriated MREFC funding for NEON in FY 2007 and FY 2008. A formal baseline for NEON will be reviewed in FY 2009 as part of a Final Design Review (FDR). Assuming successful completion of the FDR, the project will be eligible for additional MREFC construction funding in a future budget request.

If constructed, the proposed NEON would consist of geographically distributed field and lab infrastructure networked via cyber technology into an integrated research platform for regional to continental scale ecological research. Cutting-edge sensor networks, instrumentation, experimental infrastructure, natural history archive facilities, and remote sensing would be linked via the internet to computational, analytical, and modeling capabilities to create NEON's integrated infrastructure.

Total Obligations for NEON

(Dollars in Millions)

	Prior FY 2007 Years	FY 2008 Actual	FY 2008 Estimate	FY 2009 Request	ESTIMATES				
					FY 2010	FY 2011	FY 2012	FY 2013	FY 2014
<i>R&RA Obligations:</i>									
Concept & Development ¹	17.75	11.94	20.00	26.04	28.00	32.00	30.70	28.70	28.70
Management and Operations	-	-	-	-	-	-	-	-	-
Subtotal, R&RA Obligations	\$17.75	\$11.94	\$20.00	\$26.04	\$28.00	\$32.00	\$30.70	\$28.70	\$28.70
<i>MREFC Obligations:</i>									
Construction	-	-	\$3.00	-	-	-	-	-	-
Subtotal, MREFC Obligations	-	-	\$3.00	-	-	-	-	-	-
Total: NEON Obligations	\$17.75	\$11.94	\$23.00	\$26.04	\$28.00	\$32.00	\$30.70	\$28.70	\$28.70

¹ Included are costs for final Concept and Development and NEON, Inc. Consortium activities. In addition, costs for the NEON Project Office are included until construction begins.

Since NSF supports 63 percent of the fundamental environmental biology research at U.S. academic institutions, advances in the field of ecology, and the infrastructure to enable those advances, depend largely on support from NSF. Current research infrastructure is inadequate to enable studies to address the complex phenomena driving ecological change in real time and at the scales appropriate for studying

many grand challenge questions in ecology. As a continent-wide research instrument, NEON will support a large and diverse group of organizations and individuals; foremost are the scientists, educators, and engineers who will use NEON infrastructure in their research and educational programs. NSF will support research performed using the NEON platform through a special competition and through ongoing research and education programs. Based on prior experience with other new activities, BIO expects that within 3-5 years proposal submission to regular programs to use NEON will have grown sufficiently to negate the need for a special competition, and resources dedicated to the competition will be transferred to core programs. A NEON cyberinfrastructure gateway will provide resources to support formal and informal public education and provide opportunities for citizens to participate in scientific investigations. Data from standard measurements made using NEON will be publicly available.

Coordination with other federal agencies occurs through the NEON Federal Agency Coordinating Committee. Discussions have resulted in a signed Memorandum of Understanding (MOU) between NSF and the U.S. Geological Survey (USGS) that will facilitate the sharing of satellite remotely sensed data, in-situ verification, and archival storage of NEON aerial remote sensed data by USGS. Discussions are underway with NASA to partner on satellite remote sensing and ecological forecasting. Since a number of the NEON infrastructure deployment sites are located on USDA Forest Service lands, a draft agreement is under development for NEON to partner with Forest Service research stations, enable data exchange, and facilitate permitting at a national level. Discussions between NSF and Department of Energy (DOE) have focused on collaboration between NEON and DOE's Ameriflux network of sites. National Oceanic and Atmospheric Administration (NOAA) and NSF are discussing a partnership to use NEON sites as primary CO₂ observation sites and to partner with NOAA's coastal observation initiative and the National Estuarine Research Reserve network. NOAA may also support NEON operations and measurements in sensitive coastal regions.



NEON will be a collaborative research platform of geographically distributed infrastructure connected via the latest information technology. By combining in-situ sensing with remote sensing observations, NEON will address pressing environmental questions on regional to continental scales. *Credit: NSF.*

Private foundations, e.g., the Heinz Center, Nature Serve, and U.S. Landtrust, are participating in the NEON design, research, and development activities. While the bulk of NEON's infrastructure and instrumentation will be "commercial off the shelf", NEON's scientific and networking design requires certain technological innovations. Consequently, NEON has partnered with industry on R&D activities in the areas of sensors and cyberinfrastructure.

Project Report:

Management and Oversight:

- **NSF Structure:** The FY 2009 budget requests a realignment that will move NEON management and oversight from the Division of Biological Infrastructure to the Office of Emerging Frontiers. The realignment will strengthen management oversight of the project and foster its interdisciplinary science connections.

The project is managed by a Program Officer in Emerging Frontiers. The project is monitored closely by the Office of the Assistant Director/BIO where the BIO AD provides overall policy guidance and oversight. A Business Oversight Team chaired by the NEON Program Officer advises and assists the OAD/BIO on the business framework of the project. A BIO-NEON committee, which includes the BFA Deputy Director for Large Facility Projects, and a cross-NSF Program Advisory Team (PAT) formulates program planning for NEON.

- External Structure: The NEON Project is funded through cooperative agreements with NEON, Inc. The NEON, Inc.'s CEO provides overall leadership and management. A Project Manager at NEON, Inc. oversees all aspects of the project design, review, construction, and deployment. The NEON, Inc.'s Chief Technology Officer is responsible for oversight of the cyberinfrastructure and embedded sensor development. The NEON, Inc. Board of Directors, a Science, Technology, and Education Advisory Committee (STEAC) and a Program Advisory Committee (PAC), composed of members of the NEON user community help ensure that NEON will enable frontier research and education.
- Reviews:
 - Technical reviews: The NEON Integrated Science and Education Plan and Networking and Informatics plans were merit reviewed in FY 2006.
 - Management, Cost, and Schedule reviews:
 - The Conceptual Design Review (CDR) was conducted in November 2006.
 - A Preliminary Design Review (PDR) was held in May 2007. The review identified several issues that are currently being addressed by the project.
 - Cost and Schedule reviews: Scheduled for FY 2008
 - Readiness Review for Final Design Review scheduled for FY 2008.
 - Final Design Review scheduled for FY 2009.

Current Project Status:

The NEON, Inc. Project Office is currently completing the final NEON Project Execution Plan (PEP), addressing site selection and deployment issues, and beginning work on Environmental Compliance. They are finalizing the network design and addressing issues raised at the PDR in May 2007. A follow-up review of outstanding issues identified during the PDR will be held in FY 2008. In FY 2009 the final design and baseline, scope, schedule, and the risk-adjusted cost will be reviewed. Sufficient contingency will be built into the project design and budget to cover known risks.

Cost and Schedule:

FY 2008 MREFC funds will be carried over to FY 2009. In FY 2009, based on the outcome of the FDR, these MREFC funds will be used to begin construction of the first NEON Domain Core Site Fundamental Instrumentation Unit and embedded cyberinfrastructure. Prior to certification of construction-readiness following a final baseline review, support is requested through the R&RA account for the NEON Project Office, NEON, Inc, Consortium for oversight of the project, and ongoing R&D projects. The project will be eligible to receive additional MREFC funding for construction following successful completion of the Final Design Review.

Risks:

- Technical: Dependence on commercial off-the-shelf technology will be mitigated by long-lead purchase orders and alternative vendors. Production quality, embedded and system-level

cyberinfrastructure (CI) will be addressed by a combination of “In-house” design, commercial, contracts, and targeted research (e.g., cyber-dashboard).

- **Deployment:** Environmental Assessment and permitting may impact schedule and costs. These risks are being addressed through the contracting of two national legal firms by NEON, Inc., having alternative sites if the primary sites have significant risk, US Forest Service allocating an FTE to assist with Environmental compliance issues on Forest Service lands, and the direct involvement of local staff scientists in site analysis and preparation.
- **Remote Sensing:** A potential risk is the long-term availability of satellite (e.g., LANDSAT and MODIS) borne sensors. This risk is mitigated through a partnership with the USGS EROS Data Center that has the federal responsibility for curation and management of LANDSAT and MODIS images and having alternative satellite sensor sources to purchase images (e.g., SPOT - France, AWIFS – India, Terra and Aqua - US). The proposed NEON Airborne Sensor System design and aircraft availability provide technical and implementation risk. To minimize this risk the Airborne Sensor System is being prototyped by NASA and Carnegie Mellon University and designed to fit multiple aircraft, including commercial aircraft. Design engineers from Carnegie Mellon University are contracted by NEON, Inc. and experienced research aircraft pilots serve on the design team.

Future Operations Costs

Management and Operations Costs are being refined in response to issues raised in the Preliminary Design Review and will be reviewed at both the Readiness and Final Design Reviews.