BIOLOGICAL INFRASTRUCTURE $85,470,000

The FY 2005 Budget Request for the Biological Infrastructure (DBI) Subactivity is $85.47 million, an increase of $5.25 million, or 6.5 percent, above the FY 2004 Estimate of $80.22 million.

Biological Infrastructure Funding
(Dollars in Millions)

	FY 2003 Actual	FY 2004 Estimate	FY 2005 Request	Change over FY 2004 Amount	Change over FY 2004 Percent
Research Resources	42.41	48.63	51.38	2.75	5.6%
Human Resources	32.62	31.59	34.09	2.50	7.9%
Total, Biological Infrastructure	$75.03	$80.22	$85.47	$5.25	6.5%

Totals may not add due to rounding.

The goal of the Biological Infrastructure Subactivity is to ensure that essential infrastructure for contemporary research is available to scientists in all areas of biological science for both disciplinary and interdisciplinary efforts. Innovations in infrastructure support, including cyberinfrastructure, are vital to the advancement of 21st Century Biology across the BIO Activity. Resources supported range from physical infrastructure, such as multi-user instrumentation, to research training for students at all levels. In addition, teams of scientists including biologists, mathematicians, physicists, chemists, computer scientists, and engineers are supported to develop new research tools such as software, new algorithms, and novel instrumentation.

Research Resources supports a range of activities including support for the proposed National Ecological Observatory Network (NEON); multi-user instrumentation; the development of instruments with new capabilities, improved resolution or sensitivity; upgrades to biological field stations and marine laboratories; support of living stock collections ranging from microbes to plants and animals; development of biological databases and informatics tools; and research collections in biological sciences. These various research resources provide the essential platforms and tools for effective research in modern biology.

Research Resources will provide infrastructure support of $51.38 million, an increase of $2.75 million above FY 2004, for:

- Support for research resources, totals $51.38 million, an increase of $2.75 million over FY 2004. BIO will expand support for research tools development for the 21st Century Biology, expanding the instrument development activities to include research technique/method development that has the potential to revolutionize biological research.

- Support for NEON totals $4.0 million, equal to the FY 2004 Estimate. Funding will be used for the NEON Coordinating Consortium and Project Office (proposed to begin in FY 2004), NEON project execution planning, and enabling technologies. Construction and instrumentation costs for NEON are discussed in the Major Research Equipment and Facilities Construction chapter.

Human Resources supports a range of activities centered on ensuring adequately and appropriately trained scientists for the future, broadening participation, and fostering the integration of research and education. A total of $34.09 will be provided in FY 2005, an increase of $2.50 million above the FY 2004 Estimate.

- An increase of $2.50 million will be provided for the Integrative Graduate Education and Research Training (IGERT) program, Graduate Teaching Fellows in K-12 Education (GK-12), and Research Experience for Teachers (RET).

- Support will continue for NSF-wide activities such as Research Experiences for Undergraduates (REU) Sites projects and ADVANCE, and for the Undergraduate Mentorship in Environmental Biology (UMEB), and the Cross-disciplinary Research at Undergraduate Institutions (C-RUI) programs, designed to encourage interdisciplinary research experiences for faculty and students at predominantly undergraduate institutions.

Highlights of areas supported:

Federated Distributed Databases. Several crucial database infrastructure communities are being developed within the biological sciences. One is the DiGIR distributed database community. The DiGIR software and community is now the engine behind such broad reaching federated database resources as HerpNet and Manis. The program has also funded similar systems for the genomics/proteomics community such as MOBY. Taken together these projects have been the major force in biology both in making enormous amounts of essential data available to researchers and in supplying an alternative to large, expensive centralized databases by providing broad access through federation and interoperability.

Unique Site for Field Research and Education. The Archbold Biological Station in Central Florida, according to Archbold's director, is "Florida's attic, where we have this assemblage of species and communities found really nowhere else on Earth." In this scrub of nearly 9,000 acres are more than 40 rare species of plants and animals. Biologists now manage the environment these plants and animals inhabit. Understanding of the habitats and the organisms ranges from extracting DNA to identify the plants and animals, tracking diseases such as West Nile Virus, and investigating the processes that created the habitats. Facilities such as this field station allow biologists to offer programs for public education.

Research Experiences Expose Diverse Students to Science. An example of investment in students under the REU program is a project that targets children of migrant farm workers to encourage them to consider a career in scientific research. During the past summer, ten 1st generation college students who are children of migrant farm worker families successfully completed an intensive summer research in plant science. Students who have never been exposed to research have benefited from the program and view plants from a different perspective.

Students Discover Fish Habits While Learning Scientific Process. The Cross-disciplinary Research at Undergraduate Institutions (C-RUI) program supports a project designed to demonstrate the applicability of using fish otoliths ("ear stones") to determine the environments in which freshwater brown trout have lived. Otoliths "record" the life histories in fish through deposition of minerals, just as tree rings provide information on the life history of trees. The study can have major implications both as a useful scientific tool and in the management of freshwater fish. In the process, students are exposed to principles of biology, hydrology, and chemistry.