

## SMITHSONIAN TROPICAL RESEARCH INSTITUTE

	APPLICATION OF OPERATING RESOURCES							
	FEDERAL APPROPRIATIONS		GENERAL TRUST		DONOR/SPONSOR DESIGNATED		GOV'T GRANTS & CONTRACTS	
	FTE	\$000	FTE	\$000	FTE	\$000	FTE	\$000
FY 2006 ACTUAL	247	11,969	13	1,215	40	4,551	18	1,172
FY 2007 ESTIMATE	248	12,116	13	1,108	38	4,116	19	1,290
FY 2008 ESTIMATE	248	12,438	13	1,088	38	3,849	19	1,290

### STRATEGIC GOALS: INCREASED PUBLIC ENGAGEMENT; STRENGTHENED RESEARCH; AND ENHANCED MANAGEMENT EXCELLENCE

#### Federal Resource Summary by Performance Objective and Program Category

Performance Objective/ Program Category	FY 2007		FY 2008		Change	
	FTE	\$000	FTE	\$000	FTE	\$000
<b>Increased Public Engagement</b>						
<i><b>Public Programs</b></i>						
Engage and inspire diverse audiences	5	269	5	276	0	7
Provide reference services and information	4	182	4	187	0	5
<b>Strengthened Research</b>						
<i><b>Research</b></i>						
Engage in research and discovery	119	6,625	119	6,801	0	176
<b>Enhanced Management Excellence</b>						
<i><b>Facilities</b></i>						
Execute an aggressive, long-range revitalization program and limited construction of new facilities	7	426	7	437	0	11
Implement an aggressive and professional maintenance program	25	968	25	994	0	26
Improve the overall cleanliness and efficient operation of Smithsonian facilities	15	417	15	428	0	11
<i><b>Security and Safety</b></i>						
Provide world-class protection for Smithsonian facilities, collections, staff, visitors, and volunteers	23	691	23	709	0	18
Provide a safe and healthy environment	6	232	6	238	0	6
<i><b>Information Technology</b></i>						
Modernize the Institution's information technology systems and infrastructure	4	293	4	301	0	8

Performance Objective/ Program Category	FY 2007		FY 2008		Change	
	FTE	\$000	FTE	\$000	FTE	\$000
<b><i>Management Operations</i></b>						
Strengthen an institutional culture that is customer centered and results oriented	12	430	12	441	0	11
Ensure that the Smithsonian workforce is efficient, collaborative, committed, innovative, and diverse	8	753	8	773	0	20
Modernize the Institution's financial management and accounting operations	7	374	7	384	0	10
Enhance the reputation of the Smithsonian by maintaining good relations with the news media and with federal, state, and local governments	3	216	3	222	0	6
Modernize and streamline the Institution's acquisitions management operations	10	240	10	247	0	7
<b>Total</b>	<b>248</b>	<b>12,116</b>	<b>248</b>	<b>12,438</b>	<b>0</b>	<b>322</b>

## **BACKGROUND AND CONTEXT**

The Smithsonian Tropical Research Institute (STRI) is the principal U.S. organization dedicated to advancing fundamental scientific discovery and understanding of biological diversity in the tropics and its contribution to human welfare. STRI plays a critical role for the U.S. Government and the Smithsonian by maintaining world-class research facilities in Panama, where each year more than 900 resident and visiting scientists access diverse tropical environments, including rain forest and coral reef ecosystems. Under the terms of the Convention on Nature Protection and Wildlife Preservation in the Western Hemisphere, STRI serves as official custodian of the Barro Colorado Nature Monument, which is the only mainland tropical reserve under U.S. stewardship. Marine laboratories on the Atlantic and Pacific coasts of Panama facilitate comparative oceanographic and coastal zone studies of both oceans.

The long-term research conducted by STRI scientists and collaborators is a critical contribution to the Smithsonian Science Strategic Plan, "Science Matters," set forth in FY 2005. The relevance, quality, and performance of STRI scientists are top tier, as evaluated biannually by a visiting committee of outside experts. In FY 2006, the STRI visiting committee used National Research Council criteria to measure the productivity and impact of STRI science in comparison to 142 of the best university research departments in the United States. STRI scientists ranked first in the three measures of scientific relevance (publication citations), first in the measure of quality (scientific honors), and first in two measures of scientific productivity (publication numbers). In addition, the number of young scientists who choose

STRI as the base for their graduate and postgraduate research training provides an annual measure of the relevance and quality of STRI science. In FY 2005, STRI hosted 481 scientists representing 40 U.S. states, and an equal number of international scientists representing 40 nations. FY 2005 marked the third year in a row that the number of visiting scientists choosing to base their research at STRI increased by more than 20 percent.

During the last 25 years, the Smithsonian Institution, through STRI, has established a global network of forest plots to help develop a predictive science of biodiversity which permits scientists and policy makers to model and understand global environmental change and its impact on the number, kinds, distribution, and function of the Earth's species. For the past 10 years, STRI has directed 6 FTEs and approximately \$500,000 in federal funds, established a \$4.5 million endowment, and developed a network of international partnerships to build and maintain the global system of large-scale forest plots. In addition, STRI will join forces with other Smithsonian science units to begin to transform these forest plots into a worldwide network, the Smithsonian Institution Global Earth Observatories (SIGEO), making a significant contribution to the goal of Strengthened Research at the Institution.

To achieve the goal of Increased Public Engagement, STRI will continue to augment its efforts to put its data and databases on the Web, thereby making results of its research available to broader audiences. The goal of Enhanced Management Excellence will be addressed by continuing to provide superbly maintained facilities and instrumentation to support researchers seeking increased understanding of the tropics.

For FY 2008, the budget estimate includes an increase of \$322,000 for necessary pay for existing staff funded under this line item.

## **MEANS AND STRATEGY**

For the past 25 years, the Smithsonian has created the first actuarial table for trees around the globe, thus providing a basis for determining quantitatively how trees and forest ecosystems are responding to Earth's changing climate. This international collaboration is now monitoring the growth and survival of 3.5 million trees at 17 sites in 15 countries — or approximately 10 percent of all known tropical tree species. This system is managed by STRI's Center for Tropical Forest Science (CTFS) and it has now matured to the point where there is a tremendous and uniquely Smithsonian opportunity to expand the mandate of the CTFS forest plots to investigate key indicators of global environmental health.

Smithsonian science aims to transform the CTFS global network of forest plots into the SIGEO system in four steps. First, scientists at the National Museum of Natural History will significantly improve assessment of the impact of global change on biodiversity through focused surveys of vertebrates, insects, and microbes on CTFS forest plots. Second, studies of independent Smithsonian forest plots monitored by the Smithsonian Conservation Research Center in Virginia, and the Smithsonian Environmental Research Center in Maryland, will be integrated into the network of forest plots to improve the latitudinal sample of biodiversity responses to global change. This will be the first such quantification of temperate-tropical comparison ever attempted. Third, the time scale of the global change and biodiversity assessment will be enhanced through paleontological and genetic analyses of complete forest communities. Fourth, scientists at the Smithsonian Astrophysical Observatory and National Air and Space Museum will develop instrumentation and methods to monitor indicators of forest health from space. These four steps will lead to the most significant inter-unit scientific cooperation ever envisioned at the Smithsonian.

Realizing that the full set of SIGEO goals will require additional public and private funding, STRI has accomplished significant recent success toward this end by raising \$18 million from individuals, U.S. universities, corporate sources, and the National Science Foundation (NSF) for the period 2007–2011. STRI’s fundraising success in the private sector leverages the federal support that serves as the base for the Smithsonian global network of forest observatories, and anticipates future additions to the base that will be necessary to ensure the long-term continuity of the unique SIGEO database that measures the response of forest ecosystems to global climate change.

## **STRATEGIC GOALS AND FY 2008 ANNUAL PERFORMANCE GOALS**

### **Increased Public Engagement**

#### ***Engage and inspire diverse audiences (5 FTEs and \$276,000)***

- Engage and inspire diverse audiences in a lifelong exploration and understanding of science through high-quality public programs at four STRI sites, and with tools based on our research content

#### ***Provide reference services and information (4 FTEs and \$187,000)***

- Place scientific data on the Web and integrate the information with other databases at the regional and global levels
- Provide the public with reference services and information derived from ongoing research stored in the STRI library

## Strengthened Research

### ***Engage in research and discovery focused on biological diversity and human culture (119 FTEs and \$6,801,000)***

- Begin to transform the CTFS network, monitoring forest dynamics at 17 sites in 15 nations, into the SIGEO system by including standardized studies of key vertebrates, insects, and microbes to develop a predictive science of global change and biodiversity
- Advance studies of tropical soils to further understanding of the role of soil and microbial interactions on global climate
- Develop *in-situ* research capability for monitoring and surveillance of wildlife that could serve as potential carriers for avian influenza and other animal-borne diseases
- Advance studies on animal behavior and environmental monitoring, including detection systems for animal-borne disease, using state-of-the-science animal tracking methods developed at STRI and Geographic Information Systems (GIS)
- Publish at least 250 books and scientific papers in peer-reviewed journals to share research results with the international scientific community on the origins, maintenance, and loss of tropical biodiversity
- Facilitate tropical research for at least 900 visiting scientists and students working in STRI facilities, including projects funded by the NSF and National Institutes of Health (NIH), to increase our understanding of the distribution, interactions, and evolution of tropical organisms and their relevance to human health and global climate change
- Offer scientists opportunities to test research hypotheses on tropical forests, and disseminate the basic information needed to restore degraded areas and provide enhanced environmental services
- Strengthen the Smithsonian Marine Science Network collaborative mangroves projects on marine environments, such as on coral reefs in the tropical eastern Pacific and Caribbean, to better understand their diversity, threats, and conservation opportunities
- Build inter-unit collaboration through joint appointments (with staff, collaborators, and postdoctoral fellows) and workshops conducted at STRI facilities
- Support the work of terrestrial paleoecologists studying changes in tropical communities over geologic time frames, and determine conditions that lead to the degradation of tropical forests
- Continue archaeological research aimed at revealing the importance of prehistoric tropical societies in New World cultural development
- Develop a better understanding of human occupation in neotropical forests, from the first colonization 15,000 to 11,000 years ago

## Enhanced Management Excellence

### ***Execute an aggressive, long-range revitalization program and limited construction of new facilities (7 FTEs and \$437,000)***

- Continue to execute plans to revitalize Gamboa facilities as an integrated educational and research center that meets current safety and laboratory standards

### ***Implement an aggressive and professional maintenance program (25 FTEs and \$994,000)***

- Advance structural assessment of STRI facilities to ensure their continued safe and effective use for tropical research and education
- Improve staff training to implement reliability centered maintenance programs throughout STRI facilities

### ***Improve the overall cleanliness and efficient operation of Smithsonian facilities (15 FTEs and \$428,000)***

- Conduct regular monitoring of all facilities, including buildings, vessels, vehicles, and docks, to ensure their safety and operational capacity to support ongoing research

### ***Provide world-class protection for Smithsonian facilities, staff, visitors, and volunteers (23 FTEs and \$709,000)***

- Provide additional surveillance of contractors participating in the Panama Canal expansion, from the perspective of safety, security, and logistics, to ensure continued effective operations of the Barro Colorado Nature Monument
- Introduce new patrolling procedures and electronic surveillance of the Barro Colorado Nature Monument to increase protection of the area against poachers
- Expand existing electronic security system to remote facilities such as Bocas del Toro Research Laboratory

### ***Provide a safe and healthy environment (6 FTEs and \$238,000)***

- Bring STRI facilities into compliance with safety standards to ensure safety and protection of staff, visitors, volunteers, collections, infrastructure, and equipment

### ***Modernize the Institution's information technology systems and infrastructure (4 FTEs and \$301,000)***

- Strengthen STRI's scientific capability to analyze tropical biodiversity information by implementing technologies for automated animal tracking and environmental monitoring, including access to GIS
- Increase information-sharing within the Institute via improved connectivity among STRI facilities through the Local Area Network (LAN) system

- Increase efficiency of administrative procedures by promoting time-saving and error-reducing practices such as online transactions via the STRI intranet

***Strengthen an institutional culture that is customer centered and results oriented (12 FTEs and \$441,000)***

- Increase internal customer satisfaction (i.e., STRI staff and visitors) by streamlining the acquisitions process and adopting the Enterprise Resource Planning (ERP) system for financial, budget, procurement, and human resources management

***Ensure that the Smithsonian workforce is efficient, collaborative, committed, innovative, and diverse (8 FTEs and \$773,000)***

- Implement necessary changes in the performance evaluation process to ensure effectiveness in reinforcing the Institution's strategic vision and goals

***Modernize the Institution's financial management and accounting operations (7 FTEs and \$384,000)***

- Conduct regular monitoring of financial processes in place at the various STRI facilities to ensure the effective management and necessary controls are in place at all sites
- Modernize financial management and accounting operations by continuing training and development of staff
- Improve financial management by providing all internal clients with accurate and timely transaction records and reports

***Enhance the reputation of the Smithsonian by maintaining good relations with the news media and with federal, state, and local governments (3 FTEs and \$222,000)***

- Conduct targeted seminars and visits to research sites for journalists and policy makers to keep them informed about relevant research discoveries

***Modernize and streamline the Institution's acquisitions management operations (10 FTEs and \$247,000)***

- Review current acquisition practices for cost effectiveness and client satisfaction, and propose alternatives which adhere to established policies

**NONAPPROPRIATED RESOURCES**—General trust funds provide support and salaries for a small percentage of STRI employees involved in research, public outreach, and fund raising. Donor/sponsor-designated funds support specific programs and projects, such as the global network of 17 sites monitoring 10 percent of all tree species in the tropics, which the Smithsonian aims to transform into the SIGEO system to investigate key indicators of global environmental health. Donor-designated support includes an endowed staff position in tropical paleoecology that studies past climates and environments in the tropics, postdoctoral positions that study the relationship between brain size and behavioral complexity, and postdoctoral fellowships in tropical marine biology using STRI's Bocas del Toro field station.

Government grants and contracts support programs such as the Panama International Cooperative Biodiversity Group (ICBG), funded by the NIH and administered by STRI, which conducts innovative biomedical research and training, and monitors and provides surveillance of wildlife that could serve as carriers for avian influenza and other animal-borne diseases.