

OFFICE OF POLAR PROGRAMS (OPP)

\$527,990,000
+\$76,830,000 / 17.0%

OPP Funding
(Dollars in Millions)

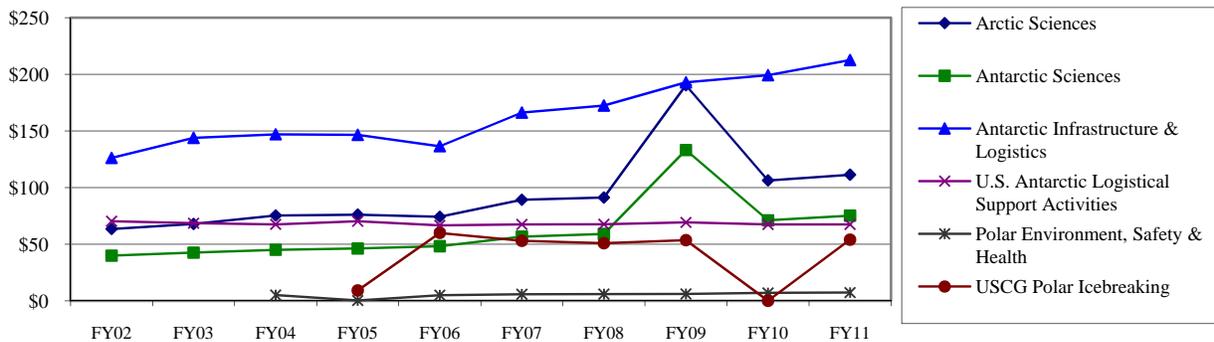
	FY 2009	FY 2009	FY 2010	FY 2011	Change Over	
	Omnibus	ARRA			FY 2010 Estimate	FY 2011 Request
	Actual	Actual	Estimate	Request	Amount	Percent
Arctic Sciences (ARC)	\$98.60	\$91.86	\$106.31	\$111.36	\$5.05	4.8%
Antarctic Sciences (ANT)	68.64	64.53	71.08	75.18	4.10	5.8%
Antarctic Infrastructure & Logistics (AIL)	246.66	15.50	266.76	280.18	13.42	5.0%
<i>U.S. Antarctic Logistical Support</i>	69.24	-	67.52	67.52	-	-
Polar Environment, Health & Safety (PEHS)	6.12	-	7.01	7.27	0.26	3.7%
U.S. Coast Guard Polar Icebreaking ¹	53.52	-	[54.00]	54.00	54.00	N/A
Total, OPP	\$473.55	\$171.89	\$451.16	\$527.99	\$76.83	17.0%
Research	113.75	147.29	117.06	123.96	6.90	5.9%
Education	5.23	2.10	7.28	6.99	-0.29	-4.0%
Infrastructure	349.67	22.50	321.43	391.15	69.72	21.7%
Stewardship	4.90	-	5.39	5.89	0.50	9.3%

Totals may not add due to rounding.

¹ Funding for U.S. Coast Guard Polar Icebreaking for FY 2010 excludes a one-time appropriation transfer of \$54.0 million to U.S. Coast Guard per P.L. 111-117.

Polar research provides insights into ice sheets, the atmosphere, oceans, and solid earth, without which the behavior of and changes in the global climate system cannot be understood. For example, the study of polar ice sheets reveals how the Earth’s climate has changed in the past and provides information essential to predicting future global sea level change. Polar regions also offer important opportunities for environmental research. The extreme sensitivity of polar ecosystems to changes in climate enables study of the linkages between the physical and living components of the coupled earth systems. A key goal of these studies is to predict climate change and its impacts on a regional scale. In addition, the Arctic and Antarctic are premier natural laboratories whose extreme environments and geographically unique settings enable research on phenomena and processes not feasible elsewhere. For example, the cold, dry environment and high altitude at the South Pole make it the world’s best location for key astrophysics measurements, and research in polar regions reveals how organisms have adapted to the extreme polar environment at a genetic level.

OPP Subactivity Funding
(Dollars in Millions)



NOTE: U.S. Antarctic Logistical Support Activities are shown separately from the Antarctic Infrastructure & Logistics Division, where it is administered. Funding for USCG Polar Icebreaking for FY 2010 excludes a one-time appropriation transfer of \$54.0 million to USCG per P.L. 111-117.

OPP in Context

OPP provides primary U.S. support for fundamental research in polar regions through several mechanisms. In addition, NSF provides interagency leadership for U.S. activities in polar regions. In the Arctic, NSF leads research planning as directed by the Arctic Research Policy Act of 1984. The NSF Director chairs the Interagency Arctic Research Policy Committee created for this purpose. In the Antarctic, per Presidential Decision Directive, NSF manages all U.S. activities as a single, integrated program, supporting the U.S. governance role through the Antarctic Treaty and making research possible in Antarctica by scientists supported by NSF and by U.S. mission agencies. The latter includes the National Aeronautics and Space Administration, the National Oceanic and Atmospheric Administration, the U.S. Geological Survey, the Smithsonian Institution, and the Department of Energy.

Research in polar regions addresses critical aspects of the global earth system – glacial and sea ice, permafrost, terrestrial and marine ecosystems, the ocean, and the atmosphere – that help shape the global environment and climate. This work addresses the Administration’s focus on making the U.S. a world leader on climate change and builds on a foundation established during the International Polar Year (IPY) 2007-2009. The vision for IPY established by the National Academies of Science/Polar Research Board included an “... intense, coordinated campaign of polar observations, research, and analysis ... that will benefit society by exploring new frontiers and increase understanding of the key roles of the polar regions in globally linked systems.” Although IPY has officially concluded, continuing and future synthesis of the research results will provide much needed information about climate evolution and will improve the reliability of the prediction of future climate change on both regional and temporal scales. OPP continues to place a high priority on these investments in climate change research and the necessary observing systems, as well as in climate change education. Research in polar regions also offers opportunities for fundamental advances in each of the disciplinary sciences, ranging from the behavior of the Earth’s inner core, the formation of galaxies, the biology of life in the cold and dark, and how Arctic residents and institutions are affected by environmental change.

The Administration is assessing the overarching issues facing the Arctic, including those associated with impacts of climate change, increased human activity, new or additional information needs, and conservation of Arctic resources. This approach will necessarily include identifying implementation issues associated with the U.S. Arctic Policy released in January 2009.

Since 1958, the Nation has reviewed the U.S. Antarctic Program roughly once a decade to determine whether it is effectively structured, appropriately balanced, and in line with national goals. The landmark Antarctic Treaty marked its 50th anniversary on December 1, 2009, and the time is particularly ripe for a high-level strategic review of the U.S. Antarctic Program for several reasons: the new South Pole Station is nearing completion, the official IPY activities have just concluded and they point to new research directions and modalities, and the last such strategic review was completed in 1996/1997. During FY 2010, NSF—which administers the U.S. Antarctic Program on behalf of the U.S. Government—will initiate a new independent review of the program. The results of the review will inform the FY 2013 budget request for NSF and other affected agencies.

OPP’s priorities support national energy security goals. The seasonal and permanent research facilities supported by OPP in the Arctic and the Antarctic are served by sea and air links and have been powered mostly via conventional fossil fuels. Reducing our usage of fossil fuels will reduce our impact on polar and global environments while also improving the quality of measurements in these pristine environments. The requested funding for increased reliance on renewable energy sources will also reduce costs over the longer term.

The FY 2011 Request for OPP continues a \$4.0 million investment to leverage activities across the office aimed at increasing support for transformative, high-risk/high-reward research. Special attention will be focused on processes for identifying potentially transformative research, and on assessing whether they are successful.

Factors Influencing the Allocation Across Divisions and Major Programs

Maintaining a balance of research and education with the need to provide support for that research and education in remote and harsh environments is an essential element in determining the allocation of OPP funds. Research in the Antarctic, for example, cannot be done without significant investments in a transportation system to deliver people and supplies, in the instrumentation necessary for their productivity, and in the infrastructure that ensures their safety. While these same requirements exist for Arctic-based research and education, it is in most instances more readily available and less costly to acquire. Use of renewable and alternative energies to reduce reliance on fossil fuels is a priority for both Arctic and Antarctic stations.

System-level study is necessary to address the complexity of current research questions, and the manner of support for research and education evolves as the frontiers of science advance. OPP is responding to this evolution through the continued development of its system science programs. System Science is an example of the “open innovation model”, whereby inputs from various constituents such as multiple research communities and eventual user communities participate in the design and execution of a research program. In the case of climate change, this is evidenced by the participation of and linkages with the world meteorological community in the development of research programs studying climate change. OPP’s Arctic Sciences Division has a well-developed system science program under which the Arctic Observing Network (AON) was launched. The success of this program spurred the Antarctic community to incorporate similar inter- and multi-disciplinary approaches in designing their research programs and, as a result, the Antarctic Sciences Division developed a system science program to strengthen studies of ice-ocean-atmosphere interactions and to support research to integrate information about sub-ice sheet conditions, such as hydrological information, into ice sheet models. In addition, support is provided for research to integrate physical observations associated with ocean acidification into ecosystem models.

OPP will continue to develop its emphasis on climate change research and education, a topic of clear interest and importance to researchers and policy-makers, by providing the science to inform policy and advance knowledge. For example, the IPY research focus areas responded to knowledge gaps identified by the influential Intergovernmental Panel on Climate Change (IPCC) Fourth Assessment and, in turn, research results will inform the next assessment. Surveys of the public’s awareness of polar research issues, conducted before IPY and scheduled to be conducted again following the conclusion of IPY, will provide an indication of the success of the IPY public education component.

The need for additional observational data is recognized as a major shift in climate change research, informing regional climate modeling. OPP will continue to address this need through development of finer-grained observational systems increasingly linked with funding for climate modeling. The use of advances in cyberinfrastructure, such as simulations, will improve the models and their usefulness. Investments include sensitivity analyses for assessing where model assumptions are weakest and to show where further development is needed for AON, a cornerstone in interagency and international efforts to provide a comprehensive data stream for system modeling. Development will likely be most rapid in the physical systems (atmosphere, ocean, and ice), but it is anticipated to progress quickly in the biological and chemical realms as well.

OPP will continue support of the Graduate Research Fellowship program to increase the number and diversity of participants in polar research. The significance of polar research to issues of global importance, such as climate change, and the need to develop system level thinkers drives OPP to encourage those at the beginning of their careers in participating in its programs. Coupled with the successful Polar Postdoctoral program, this strategy is responsive to Administration priorities by increasing the productivity of the research and education enterprise and broadening participation in STEM.

In the Antarctic, continuing to ensure the resupply of McMurdo Station, increasing the use of alternative and renewable energies throughout the U.S. Antarctic Program, and maintaining communications and data handling capabilities to support science and operations are high priorities. In the Arctic, the same priority applies to increasing alternative and renewable energies, as well as improving the sustainability, cost-effectiveness, and efficiency of Summit Station in Greenland through innovations in transportation and building technologies.

Based on U.S. Coast Guard estimates, OPP is requesting \$54.0 million for the operations and maintenance of the polar icebreakers *Polar Sea* and *Healy* in FY 2011, which includes significant funding for a triennial dry dock for each vessel.

OPP Funding for Centers and Facilities

OPP Funding for Centers and Facilities

(Dollars in Millions)

	FY 2009 Omnibus Actual	FY 2009 ARRA Actual	FY 2010 FY 2010 Estimate	FY 2011 FY 2011 Request	Change over FY 2010 Estimate Amount	Percent
Centers	\$4.45	-	\$4.45	\$4.45	-	0.0%
<i>STC: Center for Remote Sensing of Ice Sheets (ANT)</i>	4.45	-	4.45	4.45	-	-
Facilities	\$349.66	\$22.50	\$321.43	\$391.15	\$69.72	21.7%
<i>Arctic Research Support & Logistics (ARC)</i>	43.42	7.00	45.51	47.20	1.69	3.7%
<i>IceCube Neutrino Observatory (ANT)</i>	2.16	-	2.15	2.50	0.35	16.3%
<i>U.S. Antarctic Facilities & Logistics (AIL)</i>	175.20	15.50	199.24	212.66	13.42	6.7%
<i>U.S. Antarctic Logistical Support (AIL)</i>	69.24	-	67.52	67.52	-	-
<i>Polar Environment, Health & Safety (PEHS)</i>	6.12	-	7.01	7.27	0.26	3.7%
<i>U.S. Coast Guard Polar Icebreaking (USGC-PI)¹¹</i>	53.52	-	[54.00]	54.00	54.00	N/A

¹¹ Funding for USCG Polar Icebreaking for FY 2010 excludes a one-time appropriation transfer of \$54.0 million to USCG per P.L. 111-117.

Detailed information on individual Centers can be found in the NSF-Wide Investments chapter. For further detail about individual facilities, please see the Facilities chapter.

Centers

STC: Center for the Remote Sensing of Ice Sheets (CReSIS)

- The Center's research and education program is aimed at determining ice sheet thickness and the nature of the lithosphere/ice sheet interface that are critical to developing models of ice sheet behavior and that will result in improved understanding of the contribution of ice sheets to sea level rise.
- CReSIS has been credited internationally for development of ice penetrating radar data analysis methods that improve existing data sets by removing clutter and other confounding effects.
- Funding for CReSIS remains unchanged in FY 2011.

Facilities

- Changes in research directions lead to changes in science support, and a systems approach is central to efficient and effective infrastructure and logistics. The FY 2011 request includes funds for a review of U.S. Antarctic Program facilities and logistics. This review will take a systems approach to reviewing science drivers and identifying the complementary logistics and infrastructure that are needed to support that science into the next decade and beyond.
- Priorities remain ensuring the resupply of McMurdo Station, increasing the use of alternative and renewable energies throughout the U.S. Antarctic Program, and maintaining communications and data handling capabilities to support science and operations.
- A comprehensive review of McMurdo Station’s energy supply and usage was recently completed, setting the stage for improvements and savings in FY 2011. As an example, \$3.0 million is requested to fund energy upgrades at McMurdo Station’s Black Island Telecommunications Facility.
- At Summit Station in Greenland, energy needs are being reduced as a result of innovations in transportation and building technologies, as well as through alternative and renewable energy systems, thereby improving sustainability, cost-effectiveness, and efficiency.
- Shifts in funding may be made necessary by increases in the cost of fuel and fuel-dependent services such as airlift.

OPP Administration Priority Programs and NSF Investments

OPP Administration Priority Programs and NSF Investments

(Dollars in Millions)

	FY 2009	FY 2009	FY 2010 Estimate	FY 2011 Request	Change Over		
	Omnibus	ARRA			FY 2010 Estimate	FY 2010 Estimate	Percent
	Actual	Actual			Amount	Percent	
Faculty Early Career Development (CAREER)	\$0.01	\$0.35	-	-	-	N/A	
Graduate Research Fellowships (GRF)	-	-	0.20	0.20	-	-	
Climate Change Education Program	-	-	1.50	1.50	-	-	
Science, Engineering and Education for Sustainability (SEES)	N/A	N/A	65.26	69.26	4.00	6.1%	

OPP’s FY 2011 budget will continue funding for NSF programs that support students, early-career researchers, and the next generation of environmentally engaged scientists and engineers. The budget also encourages potentially transformative research and supports critical priorities in global climate change.

Specific OPP investments include:

- Continued support of the Graduate Research Fellowship program to increase the number and diversity of participants in polar research. The significance of polar research to issues of global importance, such as climate change, and the need to develop system level thinkers drives OPP to encourage the participation of those at the beginning of their careers in its programs. Coupled with the successful Polar Postdoctoral program, this strategy is responsive to Administration priorities by increasing the productivity of the research and education enterprise and broadening participation in STEM.
- Participation in the multidisciplinary, multi-faceted climate change education program, engaging the full spectrum of its research and education communities. OPP will continue its existing investment of \$1.50 million supporting this program.

- Participation in the NSF-wide investment of Science, Engineering, and Education for Sustainability (SEES). Current OPP investments in climate change research total \$65.26 million, with an additional \$4.0 million planned for FY 2011. One emphasis area focuses on funding for observation, analysis, and modeling of regional climate change, human interactions with the Bering Sea ecosystem, global patterns in the human response to ecological change on millennial time scales, and changing permafrost. Another is a system approach to climate change research through further study of ecosystem response to change, including ocean acidification, the interplay of atmospheric and oceanic circulation in adding or removing mass from the ice sheets, and advancing ice sheet dynamics research and modeling to reduce uncertainties in future sea level rise.

For more information on Administration priority programs and NSF Investments, please refer to the Overview and NSF-wide Investments sections.

Program Evaluation and Performance Improvement

The Performance Information chapter provides details regarding the periodic reviews of programs and portfolios of programs by external Committees of Visitors and directorate Advisory Committees. Please see this chapter for additional information.

As stated previously, the planned review of the U.S. Antarctic Program will inform the FY 2013 budget request for NSF and other affected agencies.

Aspects of the Office of Polar Environment, Health and Safety requiring medical input are reviewed annually by a medical panel. Specialized reviews, such as that of the scientific diving program, are conducted periodically.

Other performance indicators, such as funding rates, award size and duration, and numbers of people supported on research and education grants, are also factored into OPP's program evaluation and performance improvement processes.

Number of People Involved in OPP Activities				
	FY 2009	FY 2009	FY 2010	FY 2011
	Estimate	ARRA Estimate	Estimate	Estimate
Senior Researchers	927	1,007	1,048	1,060
Other Professionals	652	706	742	762
Postdoctorates	102	172	114	116
Graduate Students	338	604	378	397
Undergraduate Students	236	429	272	282
Total Number of People	2,255	2,918	2,554	2,617

OPP Funding Profile

	FY 2009	FY 2010	FY 2011
	Estimate	Estimate	Estimate
Statistics for Competitive Awards:			
Number of Proposals	859	1,071	1,105
Number of New Awards	420	310	325
Regular Appropriation	117	310	325
ARRA	303	-	-
Funding Rate	49%	29%	29%
Statistics for Research Grants:			
Number of Research Grant Proposals	822	1,033	1,069
Number of Research Grants	388	279	293
Regular Appropriation	93	279	293
ARRA	295	-	-
Funding Rate	47%	27%	27%
Median Annualized Award Size	\$174,709	\$154,342	\$158,900
Average Annualized Award Size	\$218,102	\$189,400	\$193,800
Average Award Duration, in years	2.8	2.8	2.8

DIVISION OF ARCTIC SCIENCES (ARC)

\$111,360,000
+\$5,050,000 / 4.8%

ARC Funding						
(Dollars in Millions)						
	FY 2009	FY 2009			Change Over	
	Omnibus	ARRA	FY 2010	FY 2011	FY 2010 Estimate	
	Actual	Actual	Estimate	Request	Amount	Percent
ARC	\$98.60	\$91.86	\$106.31	\$111.36	\$5.05	4.8%
Research	54.43	84.86	59.30	62.66	3.36	5.7%
Education	0.75	-	1.50	1.50	-	-
Infrastructure	43.42	7.00	45.51	47.20	1.69	3.7%
<i>Arctic Research Support & Logistics</i>	<i>43.42</i>	<i>7.00</i>	<i>45.51</i>	<i>47.20</i>	<i>1.69</i>	<i>3.7%</i>

ARC is organized into several programs that support research in social science, earth system science, and a broad range of natural science. Educational projects are also supported. The Research Support & Logistics program assists researchers with access to the Arctic, improves safety and environmental stewardship, and increases the ability of researchers to share plans and results with local Arctic communities. The Arctic is at the forefront of global climate change. Observations have revealed an estimated 14 percent per decade reduction in sea ice extent in the Arctic over the past 30 years, and significant summer melting of the Greenland Ice Sheet. These and many other phenomena are forcing change and uncertainty in traditional Arctic populations, present challenges and opportunities for industry and commerce, and have the potential to affect the global population through changes in sea level. Arctic Sciences funds a broad range of activities to provide an integrated understanding of environmental change in the Arctic, including study of significant, system-scale environmental change and its human dimension.

The Research Support & Logistics program is driven by and responds to research and education funded by the division. Funding is provided directly to grantees or to key organizations that provide or manage Arctic support and logistics. Emphasis will be placed on improving access to and the energy security of the remote facilities used by Arctic researchers and educators.

In general, 60 percent of the division’s portfolio is available for new research grants. The remaining 40 percent funds continuing grants made in previous years, and research support and logistics.

Factors Influencing the Allocation Across ARC Programs

- Shifts in funding may be made necessary by increases in the cost of fuel and fuel-dependent services such as airlift.
- ARC will emphasize funding for observation, analysis, and modeling of regional climate change, human interactions with the Bering Sea ecosystem, global patterns in the human response to ecological change on millennial time scales, and changing permafrost. This work is part of the larger climate change research program, providing an additional \$2.0 million in FY 2011 for a total investment of \$38.45 million.
- Development of the cyberinfrastructure tools needed to support all aspects of ARC-supported work is a priority. In FY 2011, ARC continues a \$3.0 million investment to undertake a much-needed comprehensive design effort using approaches such as observing system simulation experiments for AON.
- Building on the successful polar education program developed during IPY, ARC maintains its investment in polar education (\$750,000) and participates in the multidisciplinary, multi-faceted

climate change education program, engaging the full spectrum of its research and education communities (\$750,000).

- Planning for more energy efficient, modular building systems at Summit Station in Greenland will continue with the Department of Energy for future implementation.

DIVISION OF ANTARCTIC SCIENCES (ANT)

\$75,180,000
+\$4,100,000 / 5.8%

ANT Funding
(Dollars in Millions)

	FY 2009		FY 2010	FY 2011	Change Over	
	Omnibus	ARRA			FY 2010 Estimate	FY 2011 Request
	Actual	Actual	Estimate	Request	Amount	Percent
ANT	\$68.64	\$64.53	\$71.08	\$75.18	\$4.10	5.8%
Research	\$65.73	\$64.53	\$67.43	\$71.18	\$3.75	5.6%
<i>STC: Center for Remote Sensing of Ice Sheets</i>	4.45	-	4.45	4.45	-	-
Education	0.75	-	1.50	1.50	-	-
Infrastructure	2.16	-	2.15	2.50	0.35	16.3%
<i>IceCube Neutrino Observatory</i>	2.16	-	2.15	2.50	0.35	16.3%

ANT funds research in all areas of science that can only be done, or is best done, in Antarctica. Antarctic Sciences enables research on Earth’s physical, biological, geological, glaciological, oceanographic, and atmospheric processes in Antarctica, as well as on interactions between the ice sheets, the underlying continent, the surrounding ocean, and the overlying atmosphere, toward a comprehensive understanding of Antarctica’s role in the evolution of Earth and life on Earth, as well as the Antarctic environment’s role in the whole Earth system. In particular, a new programmatic emphasis fosters linkages across the disciplines in order to better advance understanding of Antarctic climate as a system. Antarctic Sciences also enables research in astronomy and astrophysics to advance understanding about high-energy phenomena such as supernovae and events associated with black holes, about the nature of dark energy and dark matter (which is now known to be a major component of the universe), as well as advancing general understanding about the origin and evolution of the universe.

In general, 40 percent of the Antarctic Sciences portfolio is available for new research grants. The remaining 60 percent is used primarily to fund continuing grants made in previous years.

Factors Influencing the Allocation Across ANT Programs

- An international collaboration growing out of IPY led to strong interest for geological and paleontological work in the Central Transantarctic Mountains. ANT will give priority to supporting small and medium-sized projects in this region to investigate deep-time paleoclimate change.
- Priority is given to completion of IPY projects which had been deferred due to budget constraints in prior years.
- Development of instrumentation and equipment for making critical scientific observations with the potential to transform data collection, monitoring, and modeling in all areas of Antarctic science is a continuing priority, increasing \$1.0 million to \$3.0 million. Examples are gliders and oceanographic drifters, and sensors and systems for airborne research. A successful program would reduce “boots on the ground” and energy requirements, and also make the resulting data more widely available and accessible.
- Efforts to implement new system-scale research to integrate information about sub-ice sheet conditions, such as hydrological information, into ice sheet models, as well as research to integrate physical observations associated with ocean acidification into ecosystem models will continue. This work is part of the larger climate change research program, providing an additional \$2.0 million in FY 2011 for a total investment of \$30.81 million.

- Building on the successful polar education program developed during IPY, ANT maintains its investment in polar education (\$750,000) and participates in the multidisciplinary, multi-faceted climate change education program, engaging the full spectrum of its research and education communities (\$750,000).

DIVISION OF ANTARCTIC INFRASTRUCTURE AND LOGISTICS (AIL)

\$280,180,000
+\$13,420,000 / 5.0%

AIL Funding
(Dollars in Millions)

	FY 2009		FY 2010 Estimate	FY 2011 Request	Change Over	
	Omnibus	ARRA			FY 2010 Estimate	Percent
	Actual	Actual			Amount	
AIL	\$246.66	\$15.50	\$266.76	\$280.18	13.42	5.0%
Infrastructure	246.66	15.50	266.76	280.18	13.42	5.0%
<i>U.S. Antarctic Facilities & Logistics</i>	177.42	15.50	199.24	212.66	13.42	6.7%
<i>U.S. Antarctic Logistical Support</i>	69.24		67.52	67.52	-	-

AIL supports research through a network of stations, labs, equipment, and logistics that enable research activities in Antarctica. This includes operation of a year-round inland research station at the South Pole; two year-round coastal research stations (McMurdo and Palmer) with extensive laboratory, transportation, housing, communication, and computing capabilities; summer camps as required for research; icebreaking research ships—the *Laurence M. Gould* and the *Nathaniel B. Palmer*; small fixed-wing aircraft and helicopters; and icebreakers for channel breaking and ship escort at McMurdo Station. The division uses a mix of government and civilian contract service providers for research support activities in Antarctica.

The U.S. Antarctic Logistical Support budget line funds support provided by the U.S. Department of Defense (DoD). DoD operates as a primarily logistical support provider on a cost-reimbursable basis. Major funding elements of DoD support include: military personnel, LC-130 flight operations, maintenance, and facilities support of the 109th Airlift Wing (AW) of the New York Air National Guard in Scotia, New York, and Antarctica; transportation and training of military personnel supporting the U.S. Antarctic Program; support for air traffic control, weather forecasting, and electronic equipment maintenance; the charter of Air Mobility Command airlift and Military Sealift Command ships for the resupply of McMurdo Station; bulk fuel purchased from the Defense Logistics Agency; and reimbursement for use of DoD satellites for communications.

Factors Influencing the Allocation Across AIL Programs

- Shifts in funding may be made necessary by increases in the cost of fuel and fuel-dependent services such as airlift.
- Priorities remain ensuring the resupply of McMurdo Station, increasing the use of alternative and renewable energies throughout the U.S. Antarctic Program, and maintaining communications and data handling capabilities to support science and operations.
 - A study of the feasibility and benefits of shifting the McMurdo Station resupply effort was recently concluded and is under review. The study will inform decisions concerning a new resupply plan as early as FY 2011, subject to funding availability and the conclusions of the study.
 - A project to install “smart grid” technology for power distribution at McMurdo is planned to continue in FY 2011 (\$2.0 million). This project will install metering and networked direct digital controls to enable monitoring and management of power, lighting, heating, and water for more cost-effective and efficient operation of the McMurdo Station power grid. The system will be scalable and adaptable to meet future distribution configurations and new technologies.

- Energy upgrades at McMurdo's Black Island Telecommunications Facility are fully funded with a \$3.0 million investment in FY 2011. This facility provides mission essential satellite communications supporting McMurdo as well as the National Polar-Orbiting Operational and Environmental Satellite System (NPOESS) and NASA's Ground Networks for the relay of data. The project will maximize wind and solar energy generation, introducing redundancy to ensure services continue in the event of a fire or other potentially disruptive event.
- Work continues on the proof of concept for a more energy-efficient South Pole Summer Camp; production of modular berthing/living units is planned for future years.
- Funds are allocated toward sustaining communications capability from the South Pole Station due to increased usage fees from NASA to access its next-generation satellite – Flight 3, or "F3". The cost increases by approximately \$1.0 million to \$2.0 million per year.
- Construction of the earth station to replace MARISAT capability with access to SkyNet-4C, providing high quality data/voice connectivity to South Pole to fill a critical gap in continuous communications coverage formerly filled by the MARISAT satellite, will proceed in FY 2011. Approximately \$1.0 million is needed to begin this effort.
- The FY 2011 request includes funds to complete the review of U.S. Antarctic Program facilities and logistics being started in FY 2010. This review will take a system approach to reviewing science drivers and identifying the complementary logistics and infrastructure that are needed to support that science into the next decade and beyond.

**OFFICE OF POLAR ENVIRONMENT, HEALTH
AND SAFETY (PEHS)**

\$7,270,000
+\$260,000 / 3.7%

PEHS Funding

(Dollars in Millions)

	FY 2009	FY 2009	FY 2010	FY 2011	Change Over	
	Omnibus	ARRA			FY 2010	FY 2011
	Actual	Actual	Estimate	Request	Amount	Percent
PEHS	\$6.12	-	\$7.01	\$7.27	0.26	3.7%
Infrastructure	6.12	-	7.01	7.27	0.26	3.7%
<i>Polar Environment, Health & Safety</i>	<i>6.12</i>	<i>-</i>	<i>7.01</i>	<i>7.27</i>	<i>0.26</i>	<i>3.7%</i>

PEHS within OPP manages and oversees the environmental, health and safety aspects of research and operations conducted in polar regions. It ensures compliance with environmental, safety, and health related regulatory, statutory, and international treaty requirements. The Office has overall responsibility for guiding the implementation of both environmental protection and environmental stewardship to minimize the environmental impact of OPP-supported activities in polar regions. The Office also develops and oversees programs to ensure the safety and health of all participants.

Factors Influencing the Allocation Across PEHS Programs

- Priority is given to ensuring continued protection and stewardship of the environment and attention to the immediate health and safety needs of participants in polar field work.
- PEHS will continue a long-term initiative to establish an electronic medical records system, adding \$250,000 in FY 2011 to prior investments of approximately \$100,000.

U.S. COAST GUARD POLAR ICEBREAKING

\$54,000,000
\$54,000,000 / N/A

U.S. Coast Guard Polar Icebreaking Funding

(Dollars in Millions)

	FY 2009		FY 2010 Estimate	FY 2011 Request	Change Over		
	Omnibus	ARRA			FY 2010 Estimate	Amount	Percent
	Actual	Actual					
U.S. Coast Guard Polar Icebreaking	\$53.52	-	[\$54.00]	\$54.00	\$54.00	N/A	
Infrastructure	53.52	-	[54.00]	54.00	54.00	N/A	
<i>U.S. Coast Guard Polar Icebreaking</i>	53.52	-	[54.00]	54.00	54.00	N/A	

Funding for U.S. Coast Guard Polar Icebreaking for FY 2010 excludes a one-time appropriation transfer of \$54.0 million to USCG per P.L. 111-117.

This budget line item funds the operation and maintenance of the *Polar Sea* and the *Healy* in support of NSF science and, on a reimbursable basis, the needs of other federal agencies. The U.S. Coast Guard estimates that \$54.0 million will be needed to fund operation and maintenance of the two vessels in FY 2011, which includes significant funding for a triennial dry dock for each vessel.