Chapter 12

Federal Research and Development in Hawaii

- Approximately $223 million of federal R&D funds are spent each year in Hawaii.
- Hawaii ranks 37th among the 50 states, District of Columbia, and Puerto Rico in terms of the amount of federal R&D dollars received annually.
- Approximately 5 percent of all federal funds spent in Hawaii each year on matters other than the direct support of individuals (i.e., such entitlements as retirement, disability, and housing assistance) is spent on R&D.

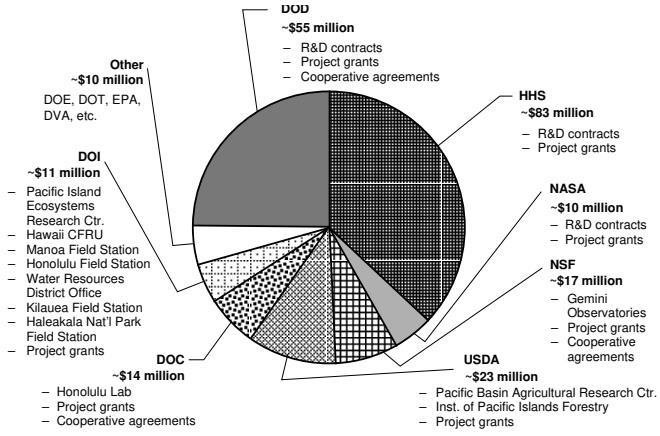

Figure 12.1 – Sources of Federal R&D Dollars Spent in Hawaii (Total Federal R&D ~$223 million)

Background

In recent years, the federal government has spent in the neighborhood of $223 million annually in Hawaii on research and development (R&D) activities. On average, federal R&D dollars account for approximately 5 percent of all federal funds spent in Hawaii each year on matters other than the direct support of individuals (i.e., such entitlements as retirement, disability, and housing assistance).

Most major federal agencies that currently support federal R&D efforts provide funding for R&D activities in Hawaii. Foremost among these agencies are the Department of Health and Human Services (HHS) and the Department of Defense (DOD), which account for 37 and 25 percent of all federal R&D dollars spent in the state, respectively. The Department of Agriculture (USDA), the National Science Foundation (NSF), the Department of Commerce (DOC), the Department of Interior (DOI), and the National Aeronautics and Space Administration (NASA) account for an additional 10, 8, 6, 5, and 5 percent of all federal R&D dollars spent in Hawaii, respectively. The remaining federal R&D dollars come collectively from the Department of Energy (DOE) and several other federal agencies.[12]

All federal R&D dollars spent in Hawaii either cover the costs of operating federal R&D units in the state, including paying the salaries of federal R&D personnel working at these units, or are awarded as grants, contracts, or cooperative agreements to entities in the state. The following is an overview of what becomes of these federal R&D dollars once they arrive in Hawaii.

Federal R&D Units in Hawaii

Hilo, Hawaii, is home to USDA's Pacific Basin Agricultural Research Center.

- The U.S. Pacific Basin Agricultural Research Center is a unit of USDA's Agricultural Research Service (ARS) located on the campus of the University of Hawaii at Hilo. It houses the Na-

[12] For a complete agency-by-agency breakdown of these R&D dollars, see Appendix C.

tional Clonal Germplasm Repository for Tropical and Subtropical Fruit and Nut Crops, which evaluates, preserves, and distributes germplasm of tropical and subtropical fruit and nut crops. It also houses the Tropical Fruit and Vegetable Research Laboratory, which studies the factors that limit the productivity of fruits and vegetables; develops environmentally acceptable strategies for the management of crop pests; develops methods for controlling quarantine pests; and identifies ways of increasing the profitability of marine species while reducing the ecological impact of harvesting them. This federal R&D unit annually receives approximately $8.7 million of federal R&D funds and has about 71 FTEs.

Honolulu, Hawaii, is home to USDA's Institute of Pacific Islands Forestry; DOC's Honolulu Laboratory; DOI's Pacific Island Ecosystems Research Center, Hawaii Cooperative Fishery Research Unit, Manoa Field Station, Honolulu Field Station, and Hawaii District Office of Water Resources; and a Department of Veterans Affairs (DVA) R&D unit.

- The Institute of Pacific Islands Forestry is a unit of the Pacific Southwest Research Station inside USDA's Forest Service. It conducts research on the restoration of ecosystem functions, forested wetland ecosystems, and control of nonindigenous species. Specific research activities of this institute include the conservation of threatened and endangered species, and exotic invasive species research. This federal R&D unit annually receives approximately $2.1 million of federal R&D funds and has about 15 employees.
- The Honolulu Laboratory is a unit of the Southwest Fisheries Science Center inside DOC's National Oceanic and Atmospheric Administration (NOAA). It conducts research on fish biology and ecology, ecosystems and environment, stock assessment, fishery management and performance, and protected species. Specific research activities include studies on tuna and billfish resources of the Pacific Ocean, assessment of the magnitude of commercially important fish and shellfish species, and

investigation of population recovery of marine turtles and the Hawaiian monk seal. This federal unit annually receives approximately $4.6 million of federal R&D funds and has about 56 FTEs, only a portion of whom are involved in R&D activities.

- The Pacific Island Ecosystem Research Center is a unit of DOI's U.S. Geological Survey (USGS). It conducts research on native bird species recovery, avian pox and malaria, Hawaiian predators, and feral pigs. Specific research activities of this unit include developing a serological test for avian malaria and studying the possibility of translocating the endangered Laysan duck. This federal R&D unit annually receives approximately $121,000 of federal R&D funds and has about five FTEs.
- The Hawaii Cooperative Fishery Research Unit is part of DOI's USGS. It is on the Manoa campus of the University of Hawaii. It conducts research on freshwater, estuarine, and inshore marine ecology. Specific research activities of this unit include studying the life history of fishes and invertebrates; and analyzing aquatic ecosystems and trophic systems. This federal R&D unit annually receives approximately $135,000 of federal R&D funds and has one FTE.
- The Manoa Field Station is a unit of the Pacific Island Ecosystems Research Center inside DOI's USGS. It is on the Manoa campus of the University of Hawaii. Specific research activities of this unit include studying conservation biology of the Hawaiian silversword, plant ecology and restoration of Hawaiian bogs, and vegetation of Palau. This federal R&D unit annually receives approximately $553,000 of federal R&D funds and has about two FTEs.
- The Honolulu Field Station is a unit of the National Wildlife Health Center inside DOI's USGS. Specific research activities of this unit include evaluating the mortality of seabirds and endangered species; assessing wildlife health on lands added to the National Wildlife Refuge system; and investigating Hawaiian

wildlife diseases. This federal R&D unit annually receives approximately $166,000 of federal R&D funds and has about two FTEs.

- The Hawaii District Office of Water Resources is a unit of DOI's USGS. It oversees the R&D activities of USGS's National Water-Quality Assessment (NAWQA), Ground-Water Resources Assessment, Toxic Substances Hydrology, and Federal State Cooperatives programs. The NAWQA program conducts research on the nation's surface and groundwater resources to better understand the effect of pesticides, erosion, and bacterial contamination on water quality. The Ground-Water Resources Assessment program studies groundwater systems to develop models and simulations to better understand the workings of these systems. The Toxic Substances Hydrology program studies the behavior of toxic substances in hydrologic environments. These research activities investigate subsurface contamination at local releases and aquatic ecosystem contamination on a watershed and regional scale. The Federal State Cooperatives program studies the effects of agricultural chemicals, floods, droughts, and waste disposal on water supply and groundwater quality. This federal unit annually receives approximately $1.1 million in federal R&D funds.

- While the principal focus of the Honolulu VA Medical Center is providing medical care to veterans, it is also the location of a number of research activities. In a recent year, this federally owned and operated facility was the site of 19 projects with total funding of approximately $150,000. These R&D activities focus on a wide range of topics, including posttraumatic stress disorder, ethnicity, and Alzheimer's disease.

Kilauea, Hawaii, is home to DOI's Kilauea Field Station.

- The Kilauea Field Station is a unit of the Pacific Island Ecosystems Science Center inside DOI's USGS. Kilauea Field Station is the sum of two merged units, the Hawaii Field Station and the Hawaii Volcanoes National Park Field Station. They conduct

research in avian biology and disease, invertebrate biology, marine and aquatic biology, and plant ecology, focusing on the status and distribution of endangered plants and animals. Specific research activities of this unit include avian diseases, the recovery of native bird species, and the restoration of habitats. These federal R&D units combined annually receive $1.2 million in federal R&D funds and have about 21 FTEs.

Makawao, Hawaii, is home to DOI's Haleakala National Park Field Station.

- The Haleakala National Park Field Station is a unit of the Pacific Island Ecosystems Research Center inside DOI's USGS. It conducts research on protecting native ecosystems and native species and develops ways to combat threats from invasive alien species. Specific research activities of this unit include recovery planning for Maui and Hawaii endangered plant taxa; studying ways to control the Argentine ant within Haleakala National Park; and discovering mechanisms of invasion of intact rain forest by nonnative plant species. This federal R&D unit annually receives approximately $172,000 of federal R&D funds and has about two FTEs.

Mauna Kea, Hawaii, is home to a portion of NSF's Gemini Observatories.

- The Gemini Observatories project is a partnership among the United States, the United Kingdom, Canada, Australia, Chile, Brazil, and Argentina, which is headquartered in Tucson. With NSF through its National Optical Astronomy Observatories FFRDC headquartered in Tucson, Arizona, acting as the executive agent for this project, one eight-meter optical/infrared telescopes is in operation in Mauna Kea, Hawaii, and a second is under construction in Chile. Both telescopes are designed to operate on-site or remotely. The total U.S. contribution to this international R&D effort has annually totaled approximately $35 million of federal R&D funds in recent years, a sizable portion of which is spent in Hawaii.

Federal R&D Grants to Hawaii Entities

Every major institution of higher education in Hawaii is the recipient of significant federal R&D dollars each year through grants made by federal agencies to faculty, graduate students, and research centers. The vast majority of the R&D grants are made by HHS, NSF, and NASA to individual faculty members and therefore ultimately inure to the benefit of such institutions as the University of Hawaii. The table below shows the number of R&D grants active in FY 1998, highlighting those made by HHS, NSF, and NASA to parties at this institution and estimates of the total dollars transferred to them in FY 1998 pursuant to the terms of these grants. Among the grants in the "Other Agencies" category going to University of Hawaii are ones from DOD ($3 million), USDA ($3 million), DOC ($2 million), and DOE ($2 million).

Table 12.1 – Sources of Federal R&D Grants to Higher Education in Hawaii

	HHS		NSF		NASA		Other Agencies		Total	
Institution	Amount	#	Amount	#	Amount	#	Amount	#	Amount	#
U of Hawaii	$18M	50	$10M	179	$4M	110	$10M	230	$43M	569
Other	<$1M	2	0	0	0	0	0	0	<$1M	2
Total	$18M	52	$10M	179	$4M	110	$10M	230	$43M	571

These activities are particularly significant because they fund much of the "basic research" so critical to expanding our knowledge and understanding of fundamental scientific phenomena. In addition, these funds account for a substantial portion of the dollars available each year to various academic departments within these institutions.

Several other nonacademic institutions in Hawaii also receive a significant amount of federal R&D grants each year. Foremost among the institutions that received R&D grants in FY 1998 are the Kuakini Health System in Honolulu ($2 million), Pacific Health Research Institute in Honolulu ($1 million), Hawaii Biotechnology Group, Inc., in Aiea ($1 million), and the Oceanic Institute in Waimanalo ($1 million).

Scattered among these grants, as well as among the contracts discussed in the section below, are small business innovative research (SBIR) awards. These are special awards made by the SBIR programs supported by the 10 federal agencies with annual budgets for extramural R&D of more than $100 million. In a recent year, small businesses in Hawaii received 19 SBIR awards totaling close to $2.5 million. Examples include a $500,000 award from DOD (Air Force) to Orincon Corp. in Kailua for work on the application of wavelets, fractal geometry, and statistics to automatic target recognition for laser radar ("ladar") systems and a $200,000 award from DOC to Oceanic Laboratories, Inc., in Honolulu to develop an omnidirectional cloud height indicator.

Also included among these grants are formula grants from federal agencies. Formula grants differ from the much more common project grants in that the money transmitted through formula grants is allocated to a state or one of its subdivisions in accordance with a distribution formula prescribed by law or regulation. Among the formula grants benefiting Hawaii are ones valued at more than $1.2 million from USDA's Cooperative State Research, Education, and Extension Service (CSREES) to State Agricultural Experiment Stations, forestry schools, and veterinary colleges for the support of research in agriculture, forestry, and animal health and disease. Similarly, a modest formula grant goes from DOI's USGS to the Water Resources Research Institute in Hawaii every year to foster research in water and water-related problems.

Other Federal R&D Activities in Hawaii

Several entities in Hawaii also receive notable sums in the form of contracts or cooperative agreements from federal agencies for specific R&D efforts. A large portion of these funds go to Science and Technology International, which in FY 1998 received close to $2 million from DOD for R&D contracts in support of programs such as the Advanced Airborne Hyperspectral Imaging System for the Navy. In addition, Pacific Health Research Institute ($2 million), the Kuakini Health System ($1 million), and Papa Ola Lokahi, Inc. ($500,000), re-

ceived significant R&D contracts from federal agencies in FY 1998. Note that these amounts are in addition to the federal R&D grants also received by Pacific Health Research Institute and the Kuakini Health System. The University of Hawaii ($9 million) also received contracts in FY 1998 from various federal agencies to conduct R&D for the federal government. One of these contracts ($2 million) was for the Science Surveillance, Epidemiology, and End Results Program for the Division of Cancer Control and Population, while another ($1 million) was for a Women's Health Initiative clinical trial. Although this amount is notable, it does not come close to eclipsing the funds that this institution receives from federal R&D grants.

A total of $15 million of federal R&D dollars was also received in FY 1998 by entities located in Hawaii in the form of cooperative agreements. The largest of these cooperative agreements ($7 million in FY 1998) came from DOD to the Natural Energy Laboratory of Hawaii Authority in Kailua Kona to manage the National Defense Center of Excellence for Research in Ocean Sciences. Another of these cooperative agreements ($859,000 in FY 1998) came from DOC to the University of Hawaii to operate the Joint Institute for Marine and Atmospheric Research (JIMAR). Other federal agencies awarding cooperative agreements to Hawaii-based entities include the Department of Interior and DOC.