Chapter 27
Federal Research and Development in Montana

- Approximately $80 million of federal R&D funds are spent each year in Montana.
- Montana ranks 45th among the 50 states, District of Columbia, and Puerto Rico in terms of the amount of federal R&D dollars received annually.
- Approximately 4 percent of all federal funds spent in Montana 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 27.1 – Sources of Federal R&D Dollars Spent in Montana (Total Federal R&D ~$80 million)
BACKGROUND

In recent years, the federal government has spent in the neighborhood of $80 million annually in Montana on research and development (R&D) activities. On average, federal R&D dollars account for approximately 4 percent of all federal funds spent in Montana 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 Montana. Foremost among these agencies are the Departments of Health and Human Services (HHS) and Agriculture (USDA), which account for 27 and 23 percent of all federal R&D dollars spent in the state. The National Science Foundation (NSF), the Department of Defense (DOD), the Department of Energy (DOE), and the National Aeronautics and Space Administration (NASA) account for additional 11, 10, 8, and 5 percent of federal R&D dollars spent in Montana, respectively. The remaining federal R&D dollars come collectively from the Department of Transportation (DOT), the Environmental Protection Agency (EPA), and several other federal agencies.27

All federal R&D dollars spent in Montana 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 Montana.

FEDERAL R&D UNITS IN MONTANA

Bozeman, Montana, is home to the Department of Interior’s (DOI’s) Greater Yellowstone Field Station, Montana Cooperative Fishery Research Unit, and Northern Rocky Mountain Science Center and USDA’s Bozeman Forestry Sciences Laboratory.

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27 For a complete agency-by-agency breakdown of these R&D dollars, see Appendix C.
• The Greater Yellowstone Field Station is a unit of the Northern Rocky Mountain Science Center inside DOI’s U.S. Geological Survey (USGS). It conducts research in many different disciplines, including wildlife biology, vegetation ecology, wetlands, physical science, biometry, and decision analysis. Specific research activities of this unit include specialized work in population management of key species (e.g., grizzly bears, bison) and for public land management. The Interagency Grizzly Bear Study Team is also part of this field station. Current research projects include large mammal population dynamics and ecology, especially of grizzly bear, bison, and mule deer; vegetation condition and management techniques, especially the effects of fire and wild herbivores; and biodiversity, landscape dynamics, and climate trends, especially through the use of geographic information systems and statistical modeling. This federal R&D unit annually receives approximately $881,000 of federal R&D funds and has about 19 FTEs.

• The Montana Cooperative Fishery Research Unit is part of DOI’s USGS. It is on the campus of Montana State University. It conducts research on fishery resources in the Rocky Mountains and the northern Great Plains. The unit was created to enhance graduate education in fisheries science and facilitate cooperative research among its cooperating entities (the Montana Department of Fish, Wildlife, and Parks, Montana State University, and the National Biological Service). Specific research activities of this field station include studying effects of irrigation withdrawal on stream trout populations, ecology of benthic fishes in large Great Plains rivers, sturgeon reproductive physiology, and alpine lake fishery characteristics. This federal R&D unit annually receives approximately $176,000 of federal R&D funds and has about two FTEs.

• The Northern Rocky Mountain Science Center is a unit of DOI’s USGS. It has field stations in Bozeman, Missoula, and West Glacier. It conducts research to enhance the application of science in the interest of wise natural resource conservation
and land management in decisionmaking. It works closely with the National Park Service, Fish and Wildlife Service, Bureau of Land Management, and other DOI partners and clients on all of its research efforts. This federal R&D unit annually receives approximately $79,000 of federal R&D funds and has about two FTEs.

- The Bozeman Forestry Sciences Laboratory is a unit of the Rocky Mountain Research Station inside USDA’s Forest Service. Along with its sister unit in Missoula, it conducts research on forest ecosystem management. Specific research activities in Bozeman include developing information on forest ecosystems and forest health for montane and high-elevation forests. Specific research activities in Missoula include developing silvicultural information for larch, Douglas fir, and ponderosa pine forests. This federal R&D unit annually receives approximately $1 million of federal R&D funds and has about six employees.

Hamilton, Montana, is home to HHS’s Rocky Mountain Laboratories.

- The Rocky Mountain Laboratories are units of the National Institute of Allergy and Infectious Diseases (NIAID) inside HHS’s NIH, which is headquartered in Bethesda, Maryland. The specific laboratories that constitute the Rocky Mountain Laboratories include the Laboratory of Microbial Structure and Function, the Laboratory of Intracellular Parasites, the Laboratory of Persistent Viral Diseases, and the Laboratory of Human Bacterial Pathogenesis. The research activities at these laboratories includes studies of the bacteria that cause such human diseases as gonorrhea, plague, Lyme disease, and trachoma; studies of persistent and latent virus infections; and the molecular basis of human epidemics. Much of the research at these laboratories focuses on the development of vaccines. This federal unit annually receives approximately $5 million of federal R&D funds and has about 101 FTEs.

Helena, Montana, is home to DOI’s Montana District Office of Water Resources.
The Montana 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 $1.3 million in federal R&D funds.

Huson, Montana, is home to DOI’s Arthur Carhart National Wilderness Training Center.

- The Arthur Carhart National Wilderness Training Center is a cooperative unit of DOI’s Bureau of Land Management, Fish and Wildlife Service, and National Park Service and USDA’s Forest Service. It is focused primarily on developing wilderness managers and improving the public’s understanding of wilderness. It also works to improve the link between research and education involving wilderness. This federal unit annually receives approximately $65,000 of federal R&D funds.

Miles City, Montana, is home to USDA’s Fort Keogh Livestock and Range Research Laboratory.

- The Fort Keogh Livestock and Range Research Laboratory is a unit of USDA’s Agricultural Research Service (ARS). It conducts research on grazing management, beef cattle nutrition, carbon
dioxide source/sink relationships on rangelands, and forage grazing trials. Specific research activities of this lab include studying how plants respond to grazing and environmental stress; identifying the molecular genetic markers associated with traits of economic and biological importance; and investigating ways to optimize reproductive efficiency by determining physiological, metabolic, and endocrine mechanisms controlling calf development and survival from conception to weaning. This federal R&D unit annually receives approximately $2.2 million of federal R&D funds and has about 21 FTEs.

Missoula, Montana, is home to DOI’s Montana Cooperative Wildlife Research Unit, and USDA’s Missoula Forestry Sciences Laboratory, Fire Sciences Laboratory, and Aldo Leopold Wilderness Research Institute.

- The Montana Cooperative Wildlife Research Unit is part of DOI’s USGS. It is on the campus of the University of Montana. It conducts research on productivity of birds. Specific research activities of this unit include breeding productivity of birds in Arizona, grassland bird production on the Flathead Indian Reservation, and the Bitterroot riparian bird project. This federal R&D unit annually receives approximately $187,000 of federal R&D funds and has about two FTEs.

- The Missoula Forestry Sciences Laboratory is a unit of the Rocky Mountain Research Station inside USDA’s Forest Service. It conducts research on ecosystem management. Specific research activities of this lab include developing wildlife habitat information, ecosystem management tools, and econometric models. This federal R&D unit annually receives approximately $1.6 million of federal R&D funds and has about 39 employees.

- The Fire Sciences Laboratory is a unit of the Rocky Mountain Research Station inside USDA’s Forest Service. It conducts research on wildland fire. Specific research activities of this lab include investigating wildland fire behavior, providing practical guides and information system to land managers, and charac-
terizing fuel chemistry in wildfires. This federal R&D unit annually receives approximately $2.4 million of federal R&D funds and has about 40 employees.

- The Aldo Leopold Wilderness Research Institute is a unit of the Rocky Mountain Research Station inside USDA’s Forest Service. It conducts research on wilderness management practices. Specific research activities of this institute include studying the biological and social attributes and benefits of the wilderness. This federal R&D unit annually receives approximately $834,000 of federal R&D funds from USDA and has about nine FTEs. It also receives an additional $50,000 of federal R&D funds each year from the Bureau of Reclamation within the Department of Interior.

Sidney, Montana, is home to USDA’s Northern Plain Soils and Water Research Laboratory.

- The Northern Plain Soil and Water Research Laboratory is a unit of USDA’s ARS. It conducts research on ways to develop and implement ecologically based strategies, technologies, and products for the management of crops and rangeland in sustainable agricultural and natural resource systems. Specific research activities of this unit include looking into soil and water stewardship and development methods for biological and cultural management of insects, pathogens, and weeds. This federal R&D unit annually receives approximately $3 million of federal R&D funds and has about 27 FTEs.

West Glacier, Montana, is home to DOI’s Glacier Field Station.

- The Glacier Field Station is a unit of the Northern Rocky Mountain Science Center inside DOI’s USGS. It conducts research on the ecosystem of the Northern Rockies area known as the Northern Continental Divide Ecosystem. This location is ideal for large-scale research because a large portion of the area is protected for future generations. Specific research activities of this field station include studying bear ecology, global climate
change, whitebark and limber pine ecology, mountain landscape ecology, and amphibian ecology. This federal R&D unit annually receives approximately $565,000 of federal R&D funds and has about nine FTEs.

**Federal R&D Grants to Montana Entities**

Every major institution of higher education in Montana 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 NSF, HHS, DOC, and USDA to individual faculty members and therefore ultimately inure to the benefit of such institutions as Montana State University (MSU) and the University of Montana (including the Montana Tech campus). The table below shows the number of R&D grants active in FY 1998, highlighting those made by NSF, HHS, DOC, and USDA to parties at these institutions 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 MSU are ones from DOD ($2 million) and NASA ($1 million). The comparable grants going to the University of Montana include $1 million each from DOE and the Department of Education.

<table>
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<th>Institution</th>
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</table>

These activities are particularly significant because they fund much of the “basic research” so critical to expanding our knowledge and un-
derstanding 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.

Other nonacademic institutions in Montana also receive a significant amount of federal R&D grants each year. Foremost among these institutions in Montana that received R&D grants in FY 1998 are the McLaughlin Research Institute in Great Falls ($1 million) and Montec Associates, Inc., in Butte ($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 Montana received 12 SBIR awards totaling $3 million. Examples include a $750,000 award from HHS to Montana Immunotech, Inc., in Bozeman to develop a food test for E. coli to prevent infections and a $500,000 award from DOD (Ballistic Missile Defense Organization) to Scientific Materials Corp. in Bozeman for work on improved crystals for optical memories.

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 Montana are ones valued at more than $2.3 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 Montana every year to foster research in water and water-related problems.
Other Federal R&D Activities in Montana

Several entities in Montana also receive notable sums in the form of contracts or cooperative agreements from federal agencies for specific R&D efforts. By far the majority of the funds go to MSE Technology Applications, Inc., which in FY 1998 received close to $25 million in R&D contracts, primarily to support a DOE-sponsored effort to test, evaluate, and demonstrate waste treatment technologies. The University of Montana ($1.5 million) also received contracts from various federal agencies to conduct R&D for the federal government. 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 $3 million of federal R&D dollars was also received in FY 1998 by entities located in Montana in the form of cooperative agreements. By far the largest of these cooperative agreements ($2 million in FY 1998) came from NSF to MSU for the support of the Engineering Research Center for Interfacial Microbial Process Engineering. Other federal agencies awarding cooperative agreements to Montana-based entities include USDA and the Department of Interior.