Chapter 43
Federal Research and Development in South Dakota

- Approximately $39 million of federal R&D funds are spent each year in South Dakota.
- South Dakota ranks 52nd among the 50 states, District of Columbia, and Puerto Rico in terms of the amount of federal R&D dollars received annually.
- Approximately 2 percent of all federal funds spent in South Dakota 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 43.1 – Sources of Federal R&D Dollars Spent in South Dakota (Total Federal R&D ~$39 million)
BACKGROUND

In recent years, the federal government has spent in the neighborhood of $39 million annually in South Dakota on research and development (R&D) activities. On average, federal R&D dollars account for approximately 2 percent of all federal funds spent in South Dakota 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 South Dakota. Foremost among these agencies are the Department of Interior (DOI), the National Aeronautics and Space Administration (NASA), and the Department of Agriculture (USDA), which account for 31, 23, and 18 percent of all federal R&D dollars spent in the state, respectively. The National Science Foundation (NSF) and the Department of Health and Human Services (HHS) account for an additional 11 and 8 percent of all federal R&D dollars spent in South Dakota, respectively. The remaining federal R&D dollars come collectively the Departments of Transportation (DOT) and Commerce (DOC) and several other federal agencies.43

All federal R&D dollars spent in South Dakota 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 South Dakota.

FEDERAL R&D UNITS IN SOUTH DAKOTA

Brookings, South Dakota, is home to DOI’s South Dakota Cooperative Fish and Wildlife Research Unit and USDA’s Northern Grain Insects Research Laboratory.

- The South Dakota Cooperative Fish and Wildlife Research Unit is part of DOI’s U.S. Geological Survey (USGS). It is on the cam-

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43 For a complete agency-by-agency breakdown of these R&D dollars, see Appendix C.
pus of South Dakota State University. It conducts research on the interaction between wildlife and agriculture. Specific research activities of this unit include studying the ecosystem of the Great Plains. This federal R&D unit annually receives approximately $193,000 of federal R&D funds and has about two FTEs.

- The Northern Grain Insects Research Laboratory is a unit of USDA’s Agricultural Research Service (ARS) located on the campus of South Dakota State University. It conducts research on sustainable production systems that enhance environmental quality. Specific research activities focus on crop and pest management. This federal R&D unit annually receives approximately $3.3 million in federal R&D dollars and has about 26 employees.

Rapid City, South Dakota, is home to USDA’s Forestry Sciences Laboratory and DOI’s South Dakota District Office of Water Resources.

- The Forestry Sciences Laboratory is a unit of the Rocky Mountain Research Station inside USDA’s Forest Service. It conducts research on the management and sustainability of ecological systems. Specific research activities of this lab include studying the structure and function of plant and animal populations, communities, and landscape ecological systems. This federal R&D unit annually receives approximately $714,000 in federal R&D funds and has about six employees.

- The South Dakota 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 $1.6 million in federal R&D funds.

Sioux Falls, South Dakota, is home to DOI’s Earth Resources Observation Systems Data Center and Yankton Field Research Station.

- The Earth Resources Observation Systems (EROS) Data Center is a unit of DOI’s USGS. It is a data management, systems development, and research field center. Its Research and Applications Division conducts research to understand the natural and anthropogenic processes that influence the Earth’s surface. Specific research activities in this division encompass topographic studies that address the assembly, distribution, and application of framework elevation data for the United States and the development of terrain-based global hydrologic data bases; Arctic studies in the Alaska field office that promote research and applications of Geographical Information Service (GIS) and remote sensing technology; technique; and development research projects that explore new technologies and procedures in the development of new products and services, using remotely sensed data, among others. This federal R&D unit annually receives approximately $5.6 million in federal R&D funds and has about 82 FTEs, only about four of whom conduct R&D.

- The Yankton Field Research Station is a unit of the Columbia Environmental Research Center inside DOI’s USGS. It conducts research on surface mining, irrigation drain water, and agricultural activities to observe their effects on natural resources, such as the wetlands associated with the prairie pothole region in the upper Midwest and plains states, endangered fish species in the Colorado basin, and forested aquatic habitats. Specific re-
search activities of this unit include assessing the effects of substances on reproduction of endangered fish as part of the Recovery Implementation Program for the Endangered Fishes of the Upper Colorado River and for the San Juan River (New Mexico) Program. This federal R&D unit annually receives approximately $171,000 of federal R&D funds and has about five FTEs.

**Federal R&D Grants to South Dakota Entities**

Every major institution of higher education in South Dakota 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 USDA, NSF, NASA, and HHS to individual faculty members and therefore ultimately inure to the benefit of such institutions as South Dakota State University (SDSU), South Dakota School of Mines and Technology (SDSM&T), and the University of South Dakota (U of SD). The table below shows the number of R&D grants active in FY 1998, highlighting those made by USDA, NSF, NASA, and HHS to parties at these institutions and estimates of the total dollars transferred to them in FY 1998 pursuant to the terms of these grants. Most of the grants in the “Other Agencies” category going to SDSU come from DOD and the Environmental Protection Agency.

**Table 43.1 – Sources of Federal R&D Grants to Higher Education in South Dakota**

<table>
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<tr>
<th>Institution</th>
<th>USDA</th>
<th>NSF</th>
<th>NASA</th>
<th>HHS</th>
<th>Other Agencies</th>
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<td>Amount #</td>
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<tr>
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<tr>
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<td>0</td>
</tr>
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<td>145</td>
<td>$2M</td>
<td>33</td>
<td>$1M</td>
<td>15</td>
</tr>
</tbody>
</table>
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.

Other nonacademic institutions in South Dakota also receive a significant amount of federal R&D grants each year. Foremost among these institutions in South Dakota that received R&D grants in FY 1998 are the Siouxland Heritage Museums in Sioux Falls ($1.5 million) and the Tribal Chairman’s Health Board in Aberdeen ($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 South Dakota received eight SBIR awards totaling $1 million. Examples include a $200,000 award from USDA to Microconversion Technologies Co. in Brookings to study electronic environmental monitoring and a $100,000 award from HHS to Visualmetrics Corp. in Vermillion to develop a high-efficiency genome informatics data system.

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 South Dakota are ones valued at more than $2.4 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 South Dakota every year to foster research in water and water-related problems.
Other Federal R&D Activities in South Dakota

Several entities in South Dakota also receive notable sums in the form of contracts or cooperative agreements from federal agencies for specific R&D efforts. The majority of the funds go to MSE Technology Applications, Inc., which in FY 1998 received close to $130,000 in R&D contracts from DOD (Navy). In addition, Re/Spec, Inc. ($100,000), and Two Way Service & Engineering ($90,000) received R&D contracts from federal agencies in FY 1998.

A total of $2 million of federal R&D dollars was also received in FY 1998 by entities located in South Dakota in the form of cooperative agreements. By far the largest of these cooperative agreements ($1 million in FY 1998) came from NSF to SDSU to fund EPSCoR (Experimental Program to Stimulate Competitive Research) activities. Other federal agencies awarding cooperative agreements to South Dakota–based entities include USDA.