Chapter 35
Federal Research and Development in North Dakota

- Approximately $58 million of federal R&D funds are spent each year in North Dakota.
- North Dakota ranks 49th among the 50 states, District of Columbia, and Puerto Rico in terms of the amount of federal R&D dollars received annually.
- Approximately 3 percent of all federal funds spent in North 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 35.1 – Sources of Federal R&D Dollars Spent in North Dakota (Total Federal R&D ~$58 million)
BACKGROUND

In recent years, the federal government has spent in the neighborhood of $58 million annually in North Dakota on research and development (R&D) activities. On average, federal R&D dollars account for approximately 3 percent of all federal funds spent in North 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 North Dakota. Foremost among these agencies is the Department of Agriculture (USDA), which accounts for 53 percent of all federal R&D dollars spent in the state. The Departments of Interior (DOI), Energy (DOE), and Health and Human Services (HHS), and the National Science Foundation (NSF) account for an additional 12, 9, 6, and 6 percent of all federal R&D dollars spent in North Dakota, respectively. The remaining federal R&D dollars come collectively the Department of Transportation (DOT), the Environmental Protection Agency (EPA), and several other federal agencies.35

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

FEDERAL R&D UNITS IN NORTH DAKOTA

Bismarck, North Dakota, is home to DOI’s North Dakota District Office of Water Resources.

- The North Dakota District Office of Water Resources is a unit of DOI’s U.S. Geological Survey (USGS). It oversees the R&D activities of USGS’s National Water-Quality Assessment (NAWQA), Ground-Water Resources Assessment, Toxic Sub-

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35 For a complete agency-by-agency breakdown of these R&D dollars, see Appendix C.
stances 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 $855,000 in federal R&D funds.

Fargo, North Dakota, is home to USDA’s Red River Valley Agricultural Research Center, and a Department of Veterans Affairs (DVA) R&D unit.

- The Red River Valley Agricultural Research Center is a unit of USDA’s Agricultural Research Service (ARS) located on the campus of North Dakota State University. It consists of the Biosciences Research Laboratory, the Northern Crop Science Laboratory, and the Hard Spring and Durum Wheat Quality Laboratory. The activities of the Biosciences Research Laboratory focus on animal metabolism and agricultural chemicals, plant science, and insect genetics and biochemistry. Specific research activities of this laboratory include reducing the impact of foreign chemicals on food-producing animals and food as it is being processed, the biology of weed plants to reduce crop losses, and controlling and managing pest and beneficial insects. The Northern Crop Science Laboratory conducts research on developing breeding lines of sunflowers to resist diseases and insects, identifying sugarbeet genotypes that exhibit hybrid vigor and increased production efficiency, and identifying and characterizing biochemical mechanisms of resistance in...
sugarbeet against Rhizoctonia solani and Cercospora beticola. Specific research activities of the Hard Spring and Durum Wheat Quality Laboratory include investigating the genetics of disease resistance, lodging resistance, and other agronomic traits and developing germplasm and genetic stocks useful in genetic analyses and in breeding of improved varieties. These federal R&D units combined receive approximately $9.8 million of federal R&D funds and have about 110 FTEs.

- While the principal focus of the Fargo 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 48 projects with total funding of less than $25,000. These R&D activities focus on a wide range of topics, including cerebrovascular disorders, antineoplastic agents, unstable angina, and microbial drug resistance.

Grand Forks, North Dakota, is home to USDA's Grand Forks Human Nutrition Research Center.

- The Grand Forks Human Nutrition Research Center is a unit of USDA's ARS located on the campus of the University of North Dakota. It is composed of the Mineral Nutrient Requirement Laboratory and the Mineral Nutrient Functions Laboratory. The center conducts research to determine the roles of nutrients, with an emphasis on mineral elements, in regulating physiological and psychological function and performance in the presence of a variety of nutritional, environmental, and psychological stressors. Specific research activities of this unit include a magnesium study to establish the importance of magnesium in the adult diet and a weight loss study to examine how copper and magnesium interact while a person is losing weight. This federal R&D unit annually receives approximately $7.7 million of federal R&D funds and has about 60 FTEs.

Jamestown, North Dakota, is home to DOI's Northern Prairie Wildlife Research Center.

- The Northern Prairie Wildlife Research Center is a unit of DOI's USGS. It conducts research on the quantitative ecologi-
cal requirements for sustainable wildlife populations. Specific research activities of this center include designing and conducting studies of numbers and distribution of flora and fauna, including identification of change resulting from habitat loss and modification. Recent research includes a study on the influence of agriculture on aquatic invertebrate communities of temporary wetlands in the prairie pothole region of North Dakota. This federal R&D unit annually receives approximately $1.6 million of federal R&D funds and has about 51 FTEs.

Mandan, North Dakota, is home to a unit of USDA’s Northern Great Plains Research Laboratory.

- The Northern Great Plains Research Laboratory is a unit of the USDA’s ARS located on the Mandan campus of North Dakota State University. It is composed of the Natural Resource Research Management Unit. The unit conducts research to develop integrated crop and livestock management systems for conservation and efficient use of natural resources. Specific research activities of this unit include investigating plant-soil-water-animal interactions; developing soil, water, crop/forage, and nutrient management strategies; and developing improved tree and forage cultivars/germplasm. This R&D unit receives approximately $2.6 million of federal R&D funds and has about 34 FTEs.

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

Every major institution of higher education in North 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, HHS, NSF, and NASA to individual faculty members and therefore ultimately inure to the benefit of such institutions as North Dakota State University (NDSU) and the University of North Dakota (UND). The table below shows the number of R&D grants active in FY 1998, highlighting those made by USDA, HHS, NSF, and NASA 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 NDSU are from DOD and the Department of Transportation. The comparable grants going to UND are primarily from EPA.

Table 35.1 – Sources of Federal R&D Grants to Higher Education in North Dakota

<table>
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<tr>
<th>Institution</th>
<th>USDA</th>
<th>HHS</th>
<th>NSF</th>
<th>NASA</th>
<th>Other Agencies</th>
<th>Total</th>
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</thead>
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<td>3</td>
<td>$2M</td>
</tr>
<tr>
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<td>$1M</td>
<td>$1M</td>
<td>$2M</td>
<td>10</td>
<td>$1M</td>
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<tr>
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<td>0</td>
<td>&lt;$1M</td>
<td>1</td>
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<td>$2M</td>
<td>$2M</td>
<td>$2M</td>
<td>15</td>
<td>$2M</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.

Several other nonacademic institutions in North Dakota also receive federal R&D grants each year. Foremost among the institutions that received R&D grants in FY 1998 are Blue Cross/Blue Shield of North Dakota in Fargo ($1 million) and St. Luke’s Hospitals in Fargo ($500,000).

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 North Dakota received four SBIR awards totaling close to $300,000. Examples include a $100,000 award from DOD (Air Force) to Dakota Technologies in Fargo to develop a real-time fuel leak detector and a $60,000 award from USDA to Harvest Fuels, Inc., in Walhalla for work on the bioprocessing of wheat midds and screenings to improve protein.
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 North Dakota are ones valued at more than $2.2 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 North Dakota every year to foster research in water and water-related problems.

**Other Federal R&D Activities in North Dakota**

Several entities in North Dakota 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 from DOD to Wheeler Contracting, Inc., which in FY 1998 received close to $500,000 in support of Army Strategic Defense Command activities. In addition, Uniband, Inc. ($300,000), and Dakota Technologies ($200,000) received 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 Dakota Technologies ($75,000). UND ($500,000) and NDSU ($150,000) also received contracts from various federal agencies to conduct R&D for the federal government. Although these amounts are notable, they do not come close to eclipsing the funds that these institutions receive from federal R&D grants.

A total of $7 million of federal R&D dollars was also received in FY 1998 by entities in North Dakota in the form of cooperative agreements. The largest of these cooperative agreements ($2 million in FY 1998) came from DOE to the Energy and Environmental Research Center at UND for work on the Gas Industry Groundwater Research Program. Other federal agencies awarding cooperative agreements to North Dakota–based entities include NSF and USDA.