

Montana Forest and Conservation Experiment Station
2003 and 2004

The MFCES seeks to enhance understanding of forestry and conservation and contribute to the wise use of our nation's timber, water, range, wildlife, wilderness, and recreation resources.

Director's Message

Since its founding in 1937, the MFCES has been an integral component of Montana's natural resource heritage. It is Montana's premier natural resources research organization and an economic enterprise helping build Montana's economy.



Over the past biennium the faculty and students of MFCES have conducted leading-edge fundamental and applied research and outreach, and they have brought millions of dollars into the Montana economy while generating knowledge important for using and conserving Montana's natural resources. With base support provided by the Montana Legislature, over \$18 million of

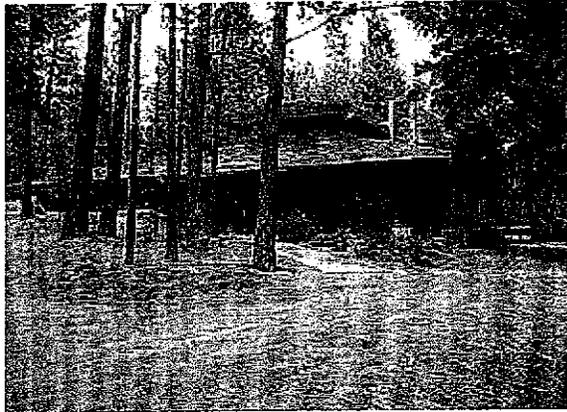
external funds have been brought to the State over the biennium. This money has provided jobs for faculty, staff, and research technicians, and assistantship and employment opportunities for undergraduate and graduate students. And, it has funded research and outreach activities on important Montana issues such as wildfire prevention and suppression, impacts of coal-bed methane development on wildlife populations, accurate inventory and growth analysis of forest stands, tourism and recreational development, relationships between forest habitat and rare or endangered species of wildlife, and management of forest stands.

With a world class faculty in the MFCES Montanans can be proud of its national leadership in natural resource science. Truly significant things are happening at the MFCES.

Perry Brown, Director

MFCES Creates Science Jobs in Montana

Programs of the MFCES result in quality, full-time jobs for scientists and technicians. For example, the National Center for Landscape Fire Analysis employs three persons who earn more than \$50,000 and six more who earn between \$30,000 and \$40,000. The Numerical Terradynamics Simulation Group likewise employs three people earning more than \$50,000 and three others between \$40,000 and \$50,000. These are just two MFCES programs employing full-time people in good wage jobs. Added to these kinds of jobs are several part-time positions and many graduate student assistantships and undergraduate wage jobs, and faculty summer pay. Clearly, the MFCES contributes directly to Montana's economy by creating jobs similar to those created by small businesses in Montana.



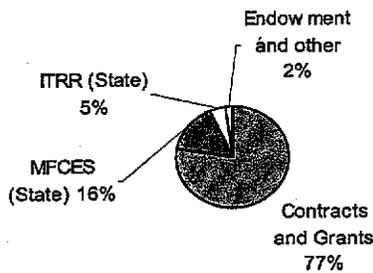
MFCES Facilities and People

The MFCES holds title to 21,000 acres of the Lubrecht Experimental Forest (another 7,000 acres are managed by the DNRC cooperatively with the MFCES) and the 3,500 acre Bandy Experimental Ranch. In addition to the forest itself, at Lubrecht MFCES maintains lodging and conference facilities used by the College of Forestry and Conservation, other UM programs, and several state agencies. Both the Lubrecht Experimental Forest and the Bandy Experimental Ranch are lands on which timber, recreation, and ranch management activities occur along with research, demonstration, and educational programs.

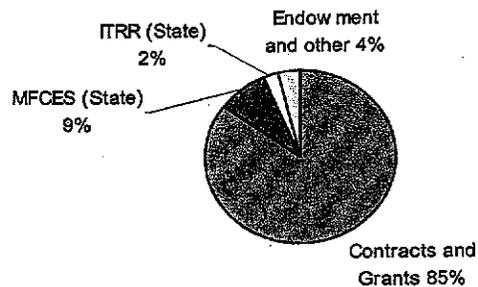
During the FY2003-FY2004 period 37 faculty were employed in MFCES activities. It is these faculty scientists who then employed and supervised the several hundred technicians, staff, and students who were engaged in the research and outreach programs.

MFCES Revenue

FY 1995 and FY 1996



FY 2003 and FY 2004



| | FY 1995 and FY 1996 | | FY 2003 and FY 2004 | | |
|----------------------|---|-------------|---|--------------|-------|
| Contracts and Grants | 77% | \$7,070,400 | 85% | \$18,095,800 | +156% |
| MFCES (State) | 16% | \$1,439,300 | 9% | \$1,833,500 | +27% |
| ITRR (State) | 5% | \$424,200 | 2% | \$514,000 | +21% |
| Endowment and Other | 2% | \$179,100 | 4% | \$835,700 | +367% |
| | \$1 in state investment generated \$3.90 of other revenue | | \$1 in state investment generated \$8.10 of other revenue | | |

Partners

Approximately 100 external partners were involved in MFCES programs. The forms of involvement varied considerably from making land available for study sites, to having staff collect data, to providing funds for research and outreach activities. Some of the most prominent partners were organizations such as the USDA Forest Service, USDI BLM and NPS, Montana Fish, Wildlife and Parks, Plum Creek Timber Co., the University of Idaho, NASA, NSF, and several timber companies that are members of either the Inland Growth and Yield Cooperative or the Forest Biometrics Research Program.

One significant partnership involving the MFCES is the Rocky Mountains Cooperative Ecosystem Studies Unit, hosted by The University of Montana. This unit is a partnership involving 10 college/university partners (UM, MSU, Colorado-Boulder, Colorado-Denver, Colorado State, Idaho, Salish-Kootenai College, Utah State, Washington State, and Wyoming) and six Federal agencies (USDA Forest Service and Natural Resources Conservation Service and USDI BLM, Bureau of Reclamation, National Park Service, and USGS). Over the past few years hundreds of research, technical assistance, and education projects have been coordinated through the RM-CESU.

Wildfire



A major thrust of the MFCES is wildfire. MFCES scientists are engaged in a wide variety of studies that focus on fuels management, fire suppression, information technologies for fire, social issues surrounding fire, post fire effects, and post fire restoration. Over a dozen MFCES faculty members have fire projects and much of their work is done cooperatively with the Missoula Fire Research Laboratory of the USDA Forest Service.

After the fires of 2000 in the Bitterroot, studies were launched to assess the fire severity on the Valley Complex fires. One overall finding is that the Valley Complex fires of 2000 did not burn in an extraordinary manner and the resulting severity was consistent with vegetation type and physical setting through which the fires burned. More importantly, however, MFCES scientists learned how slope and aspect affect fire severity and they have tested remote sensing means of assessing fire severity. This is really important for ensuring cost-effective

future assessments of fire severity and knowing about fire severity is critical for developing prescriptions for rehabilitation.

In response to an information need, MFCES scientists developed an electronic reporting system for all fires over 100 acres. Our scientists modified a manual system employed in the Northern Region of the Forest Service to an electronic format, dubbed the 209 Form, that has become a national resource and now resides at the National Interagency Fire Center in Boise, Idaho.

Under a grant from the Joint Fire Sciences Program (JFSP) MFCES scientists and scientists from the Missoula Fire Sciences Laboratory are developing a rapid response research protocol. They are developing a common database architecture to facilitate data sharing. The prototype for this was the Cooney Ridge fire, which burned in August 2003 southeast of Missoula. The resulting geodatabase allows researchers to share data and build a common data source without duplication of effort, thus saving both time and money.

Other wildfire projects deal with fire and hydrology, fire and soils, the economics of wildfire, alternative vegetation management treatments to reduce the severity of fire, the ability to use spatial information about fire by incident commanders and their staffs, and the effects of wildfire on wildlife populations.

Knowing the Forest

With financial assistance from the Forest Industry and Indian Tribes in the western US, in 2002 the MFCES launched the Forest Biometrics Research Program to serve the forest biometrics information needs of the industry and tribes. Foresters need to know the status of species, sites, stocking, and silviculture (stand management) found in our forests and they need to know how these elements change under varying vegetation management scenarios. The FBRP maintains a current data base of pertinent information and, as needed, subjects these data to different management scenarios so that effects can be estimated and decisions made about management.



Since its founding, western forest industry and Indian tribes have been providing both operational and endowment funds for FBRP to maintain the data base, evaluate and test biometrics methods, assist landowners in localizing growth and yield projections, and support graduate students. In addition, industrial partners have sponsored regional cooperative research using the Forest Projection and Planning System developed by FBRP scientists. The FBRP is an excellent example of the collaborative research and outreach activities that make the MFCES so important to the use and stewardship of natural resources in Montana and the West.

Timber, Lynx, and Snowshoe Hares



Since lynx were federally listed as threatened in 2000, interest in lynx, snowshoe hares, and timber management has heightened. Professor Scott Mills and his graduate and undergraduate students have stepped up to the challenge and have been investigating the interaction of snowshoe hares (the preferred food of lynx) and characteristics of forest stands. Working in the Seeley and Tally lake areas of Montana, and with funding from the USDA Forest Service, the National Science Foundation, and Plum Creek Timber Company, they have found that hares survive better and increase numbers more in stands with canopies that are closed. Hares use young closed canopy stands (including those regenerated from clearcuts and other disturbances) disproportionately in the summer, and they use multi-layered stands (often generated by uneven-aged management harvesting) heavily in the winter.

Since there has been concern about how pre-commercial thinning of regenerating forests affects hares, the Mills team collaborated with the USDA Forest Service and Plum Creek Timber Company to investigate responses of hares to pre-commercial thinning. As one might hypothesize, they found that standard pre-commercial thinning of sapling and shrub density led to rapid short-term declines in hares, but that a novel approach where 20% of the total area was retained in uncut $\frac{1}{4}$ hectare patches led to less hare decline, with hares preferring the retained patches and surviving there.

The Mills team also has been focusing on lynx through studies of their populations and population distributions. One of the prime findings is that lynx move long distances when necessary and knowing that is important for understanding how northern populations might support populations at the southern edge of the lynx range in the western US. All of this work by Scott Mills and his team underscores the education of graduate and undergraduate students at UM. Among the 20 undergraduate students participating in a program Scott calls REAP (Research Education and Assistance Program) 10 were women and one an American Indian. All of the REAP students have become outstanding field biologists, with the American Indian becoming a tribal bison manager in Eastern Montana.

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