

Cooperative Research Units Subactivity

Subactivity	FY 2000 Estimate	Uncontrol. & Related Changes	Program Changes ¹	FY 2001 Budget Request	Change from FY 2000
Cooperative Research Units	13,180	+228	+700	14,108	+928
Total Requirements \$000	13,180	+228	+700	14,108	+928

¹ See Program Change Section for details on Cooperative Research Units.

Current Program Highlights

The Cooperative Research Units program is a unique cooperative partnership among Federal and State Governments and academia, and is one of USGS' strongest links to Federal and State management agencies. The program provides the natural resource management community with scientific information and trained personnel to implement sound resource management. Federal scientists stationed at universities:

- coordinate and implement research programs to meet the information needs of Unit Cooperators and partners;
- provide access to scientific expertise among Unit scientists, university faculty, and other Unit Cooperators, especially where the required expertise is not readily available within Federal resource agencies; and
- provide State, Federal and other natural resource managers access to a geographically dispersed science organization of Units to meet information needs that transcend State and regional boundaries.

Federal support of the Cooperative Research Units is augmented by State and university Cooperator contributions of expertise, equipment, facilities, and project funding, thereby enhancing the program's cost-effectiveness. Local guidance of individual Units by Unit Cooperators ensures that projects addressed by the Units are of high priority. Through university affiliations, Unit scientists train future natural resource professionals, and provide opportunities through graduate education to diversify the Federal workforce.

**Cooperative Research Unit Locations
Cooperative Fish and Wildlife Research Units**

Alabama	Auburn University
Alaska	University of Alaska
Arizona	University of Arizona
Arkansas	University of Arkansas, Fayetteville
California	Humboldt State University
Colorado	Colorado State University
Florida	University of Florida
Georgia	University of Georgia
Hawaii	University of Hawaii
Idaho	University of Idaho
Iowa	Iowa State University
Kansas	Kansas State University
Louisiana	Louisiana State University
Maine	University of Maine
Maryland	University of Maryland, Eastern Shore
Massachusetts	University of Massachusetts
Minnesota	University of Minnesota
Mississippi	Mississippi State University
Missouri	University of Missouri
Montana	Montana State University (Fish Unit) University of Montana (Wildlife Unit)
New Mexico	New Mexico State University
New York	Cornell University
North Carolina	North Carolina State University
Oklahoma	Oklahoma State University
Oregon	Oregon State University
Pennsylvania	Pennsylvania State University
South Carolina	Clemson University
South Dakota	South Dakota State University
Tennessee	Tennessee Tech University
Texas	Texas Tech University
Utah	Utah State University
Vermont	University of Vermont
Virginia	Virginia Polytechnic University
Washington	University of Washington
West Virginia	West Virginia University
Wisconsin	University of Wisconsin, Stevens Point (Fish Unit) University of Wisconsin, Madison (Wildlife Unit)
Wyoming	University of Wyoming

Training Projects with Historically Black Colleges and Universities

Arkansas	University of Arkansas, Pine Bluff
Louisiana	Grambling State University

The Unit program consists of 39 Cooperative Fish and Wildlife Research Units located in 37 States, and two undergraduate education programs at Historically Black Colleges and Universities. The Federal Government is responsible for staffing each Unit with two to four

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scientists. During FY 99 the Cooperative Research Units program, as directed by Congress, aggressively worked to fill existing science vacancies in Alabama, Alaska, Arizona, Arkansas, California, Georgia, Hawaii, Louisiana, Maine, Massachusetts, New Mexico, Pennsylvania, South Dakota, Tennessee, Vermont, Washington, West Virginia, and Wisconsin. In FY 2000 science vacancies in Arkansas, Louisiana, and Maryland were staffed. Operating support for individual units was increased for the first time in ten years providing units with greater opportunities to partner with their State and university cooperators to address local program needs.

During FY 1999, Unit scientists published more than 380 scientific papers, submitted more than 280 reports to management agencies, and presented more than 750 papers and workshops to natural resource professional societies and agencies. In total, over 1,100 research projects were active in FY 1999, with 200+ projects completed and 200+ new or expanded projects initiated in response to State and Federal agency needs. Unit projects covered a wide range of disciplines, including fisheries and wildlife management, ecosystem management, population biology and genetics, conservation biology, restoration ecology, environmental contaminants and diseases, and aquaculture and fish propagation.

Through affiliations with host universities, Unit scientists advise and mentor more than 600 graduate students. More than 100 of these students received graduate degrees in FY 1999. Activities also involve Unit sponsorship of undergraduate and graduate education programs for minorities that are underrepresented in the Federal workforce. These efforts focus on minority student recruitment and career training in natural resources and include USGS programs for minority students at Grambling University, University of Arkansas-Pine Bluff, and University of Arizona.

Unit research programs will continue to coordinate and address the research needs of multiple agencies at the local, State, regional, and national level. During FY 2000, research and technical services were provided to land and resource managers from the Fish and Wildlife Service, Bureau of Land Management, National Park Service, Bureau of Reclamation, Department of Defense, National Atmospheric and Oceanographic Administration, Department of Agriculture, Environmental Protection Agency, other Federal and state agencies from 37+ states and Puerto Rico.

Recent Accomplishments

Environmental Contaminants - The Texas Cooperative Fish and Wildlife Research Unit determined the sequence of an estrogen receptor-beta in frogs, enhancing the basic knowledge of estrogen receptors in amphibians. This information will be used in investigations of amphibian populations declines by providing techniques to study the effects of environmental contaminants on sex hormone disruption.

The South Dakota Cooperative Fish and Wildlife Research Unit assessed the status of the aquatic biota in Whitewood Creek where mine wastes have accumulated for many years. The study provided information to the U.S. Fish and Wildlife Service for use in a Natural Resource Damage Assessment of the area.

For the Missouri Department of Conservation, U.S. Fish and Wildlife Service, and the Columbia Environmental Research Center, the Missouri Cooperative Fish and Wildlife Research Unit studied the potential impact of environmental contaminants on the endangered Indiana bat. The findings will be incorporated into recovery strategies for this species.

Non-Game Species - For the USGS, the Alaska Cooperative Fish and Wildlife Research Unit conducted a study of Pacific walrus body condition that will assist federal resource managers from several agencies assess the status and health of the Pacific walrus population.

For the National Marine Fisheries Service, the Florida Cooperative Fish and Wildlife Research Unit prepared a manual of research and management techniques for the conservation of sea turtles. More than 60 authors collaborated to present in a single document the latest techniques applicable to sea turtle research. This document will serve to guide global research and management of sea turtles into the 21st century.

For a regional Fishery Bureau in China, the New York Cooperative Fish and Wildlife Research Unit identified information needs, study tasks, and options for restoring a critically endangered fish native to some large rivers of inner Asia. The U.S. Fish and Wildlife Service program to recover endangered fishes of the Colorado River will be used as a model for a recovery effort in China.

Imperiled Species - For the U.S. Fish and Wildlife Service, the Wyoming Cooperative Fish and Wildlife Research Unit developed and tested protocols to enhance the survival of captive-reared black-footed ferrets released into the wild.

For the White Mountain Apache Tribe and the U. S. Fish and Wildlife Service – Arizona Fisheries Resources Office, the Arizona Cooperative Fish and Wildlife Research Unit completed a study on growth and survival of juvenile Apache trout restocked into streams. Apache trout are a threatened species where several existing populations have hybridized with rainbow trout. Project sponsors will use this information to better management of Apache trout.

For the U.S. Fish and Wildlife Service, scientists at the North Carolina Cooperative Fish and Wildlife Research Unit released 49 captive-reared Hispaniolan Parrots in the Dominican Republic and monitored their survival and use of habitat. Survival rates and factors limiting the success of release efforts were identified and are being incorporated into management strategies for the release of the endangered Puerto Rican Parrot into native habitats in Puerto Rico.

Game Management - For the Arkansas Game and Fish Commission and the Rocky Mountain Elk Foundation, the Arkansas Cooperative Fish and Wildlife Research Unit determined habitat use and movement of female elk, landowners' attitudes towards elk on private lands, and prevalence of meningeal worm. Results will be used to understand successes and failures of reintroduced populations of elk in the East and will help Arkansas Game and Fish Commission biologists to better manage elk in Arkansas.

For the Canadian Wildlife Service, Delta Waterfowl and Wetlands Research Station, and the Edward K. Love Foundation, the Missouri Cooperative Fish and Wildlife Research Unit studied the interaction of black ducks and mallards and reaffirmed that competition from mallards has contributed to the decline of the black duck. These findings have important ramifications in developing habitat management programs and establishing hunting regulations for these species by both the Canadian Wildlife Service and the U.S. Fish and Wildlife Service.

For the U. S. Fish and Wildlife Service, the South Dakota Cooperative Fish and Wildlife Research Unit evaluated the effect of the over abundant population of snow geese on shorebirds near Hudson Bay. These findings help understand secondary and tertiary effects of the over abundant snow goose population and will assist management agencies in developing a justification and strategy for management actions.

Fisheries Management - With funding from the U.S. Fish and Wildlife Service, the Colorado Cooperative Fish and Wildlife Research Unit assimilated from state submissions, all historical information on the occurrence and distribution of fish pathogens and parasites in wild fish. The information gathered has been incorporated into the USFWS National Wild Fish Health database and is being made available to state and federal agencies in their quest to improve the health of the nation's fish populations.

For the National Partnership on the Management of Wild and Native Coldwater Fisheries, the Colorado Cooperative Fish and Wildlife Research Unit determined that hatchery-infected fish are a primary source of whirling disease in salmonids in some Colorado trout waters. These findings helped to further understand how the disease manifests itself in a typical Rocky Mountain trout stream and will aid in the development of management techniques to combat the disease.

For Georgia Department of Natural Resources, the Georgia Cooperative Fish and Wildlife Research Unit completed an assessment of the reproductive success of striped bass in the Chattahoochee River above West Point Lake, Georgia. Results will help Georgia Department of Natural Resources manage the fishery for striped bass in West Point Reservoir and the fishery for stocked brown and rainbow trout in the upper reaches of the river.

Ecosystem Management - For the U.S. Forest Service, the Alaska Cooperative Fish and Wildlife Research Unit evaluated the regional economic responses of the global forest habitats to a range of climate change scenarios associated with different trajectories of global emission controls. The Forest Service now has the capability to assess how international protocols to control the growth of atmospheric carbon dioxide may influence the world's timber trade and to evaluate the potential economic consequences for the U.S. timber sector.

For the National Marine Fisheries Service, the Florida Cooperative Fish and Wildlife Research Unit determined movement and distribution patterns, habitat use, growth rates, and carrying capacity for sea turtles in the Bahamas. Results from this project will be used by the Bahamian government to assess habitats and designate foraging locations for protected area status for the conservation and management of sea turtles.

For the Maryland Department of Natural Resources and Coastal Zone Management, the Maryland Cooperative Fish and Wildlife Research Unit conducted an ecological evaluation of Maryland's coastal bays and facilitated the development of biological protocol for site selection of spoil disposal areas. The biological criteria will be available to evaluate the impact of future projects on the natural resources within Maryland's coastal bays.

Animal Biodiversity, Surveys, and Monitoring - For the National Park Service, the Sonoran Desert Field Station and the Arizona Cooperative Fish and Wildlife Research Unit completed a study on inventory techniques for small mammals and herps on Tonto National Monument. Techniques and information is of interest to management agencies that need to inventory wildlife populations.

For the USGS/BRD, the Colorado Cooperative Fish and Wildlife Research Unit assembled a national database for bat population monitoring data for use by research and management people in North America. The project terminated with a conference on bat monitoring held in September 1999 in Estes Park, Colorado.

For the U.S. Fish and Wildlife Service, the Colorado Cooperative Fish and Wildlife Research Unit examined banding and recovery data for all species of birds where >30 years of continuous data were available. From these data, we estimated long-term trends in survival probability and

estimated components of variance. These results are being used by use by several federal and state management agencies and research groups.

Habitat Management and Restoration Ecology - For the Arizona Game and Fish Department, the Arizona Cooperative Fish and Wildlife Research Unit completed a study on effects of desert waterholes (both natural and man made) on the distribution of small mammals, reptiles, and birds. This information should be used by state and federal management agencies determining whether to develop or maintain waterholes in desert areas.

For the Panther National Wildlife Refuge, the Florida Cooperative Fish and Wildlife Research Unit conducted studies on the effects of fire management on forage at the refuge. The fire management plans of the refuge will be altered to accommodate the finding of this study, providing improved habitat conditions for white-tailed deer, a key prey for the endangered Florida panther.

For the U.S. Geological Survey, the Iowa Cooperative Fish and Wildlife Research Unit examined the effects of field size on population density and nest success of birds nesting in Conservation Reserve Program (CRP) fields in west-central Minnesota. Managers will use these findings to evaluate conservation benefits of the CRP and similar federal programs.

Biometrics and Modeling - For the USGS/BRD, the Colorado Cooperative Fish and Wildlife Research Unit analyzed the extensive striped bass tag recovery and recapture data on the eastern U.S. coast and provided advice to the U.S. Fish and Wildlife Service on improving sampling strategies to optimize use of the data for science-based management of striped bass populations.

For the Iowa Department of Natural Resources and the Iowa Department of Transportation (IDOT), the Iowa Cooperative Fish and Wildlife Research Unit investigated deer-vehicle accidents on Iowa roadways. Data were incorporated into a geographic information system and combined with other USGS data to develop a model using landscape factors to predict where and when the most likely deer-vehicle collisions might occur. Results of this study have been provided to the State of Iowa for deer management and road planning.

For the Pacific Flyway Waterfowl Council, U.S. Fish and Wildlife Service Office of Migratory Bird Management, Ducks Unlimited, Inc., and the California Waterfowl Association, the New York Cooperative Fish and Wildlife Research Unit completed quantitative models for the adaptive harvest management of North American pintail ducks and western mallards. Model sets were then developed that provide a framework for making objective decisions about future management actions for these species.

For the U.S. Fish and Wildlife Service, the North Carolina Cooperative Fish and Wildlife Research Unit developed a deterministic and stochastic version of a wild turkey population model. This was placed on the World Wide Web to make it accessible to any turkey biologist with a PC, internet connection, and web browser. The model is very user friendly, and will be useful to states in establishing hunting regulations.

Other - For the U.S. Geological Survey, the Idaho Cooperative Fish and Wildlife Research Unit used geographic information systems to correlate fire ignition patterns from 1980-1996 with vegetation cover-types, precipitation, and topography within portions of five semi-arid ecoregions in the western U.S. The methods used in this study provide fire managers with a procedure that can be applied at a variety of spatial scales and may be important in evaluating fire danger on the local scale. A large number of municipalities were identified as priorities for fire danger planning,

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especially in the suburban areas surrounding the major western population centers.

For the U. S. Fish and Wildlife Service – Conte National Fish and Wildlife Refuge, the Massachusetts Cooperative Fish and Wildlife Research Unit compared two wetlands rapid assessment methods to help the refuges in the Connecticut River watershed evaluate wetlands for acquisition or protection.

For the Government of Brazil, the Arizona Cooperative Fish and Wildlife Research Unit found that plants were very efficient at extracting inorganic nitrogen from effluent from fish culture facilities, but that there was insufficient nitrogen in the effluent to provide for optimum plant growth. This information will assist fish culturist to optimize the use of nitrogen from aquaculture effluent, for upland crop production.

For the U.S. Geological Survey and the National Park Service, the Idaho Cooperative Fish and Wildlife Research Unit determined that as presently managed, traffic volume and disturbance did not have an effect on the moose, caribou or grizzly bears along the road corridors in Denali National Park. Wildlife distribution along the road corridor was more keyed to habitat characteristics than any other factor. This information will be incorporated into park management programs.