

COOPERATIVE RESEARCH UNITS

Year In Review

2010

TJ FONTAINE/NE UNIT

In Fiscal Year (FY) 2010, the Cooperative Research Units (CRU) Program operated with an enacted budget of \$19.313 million, which was a \$2.36 million net increase over the enacted FY 2009 budget. This \$2+ million funding increase was included in the President's budget and enacted by Congress. CRU funding in the FY 2011 President's budget was \$19.173 million, which represented a \$0.175 million decrease from enacted CRU funding in FY 2010. However, at present, Congress has not acted on the President's proposed FY 2011 federal budget, which is under a continuing resolution (CR). The FY 2011 CR is currently based on the FY 2010 appropriation level.

CRU has continued to invest the base funding increase in FY 2010 to rebuild science capacity. In FY 2010, new assistant unit leaders were hired in New Mexico, Oklahoma, New York, Alabama, Texas, Colorado (2), Oregon, and Idaho. A new unit leader was hired in Virginia and several assistant unit leaders recruited to unit leader positions (South Dakota, Oregon, Wyoming, and Missouri). At present, positions in New Mexico, South Carolina, New York, Oregon, Massachusetts, Wyoming, Georgia, Idaho, South Dakota, and Pennsylvania are in the process of

FY 2012 OUTLOOK

The President's proposed budget for FY 2012 is \$18.8 million or about \$0.5 million less than the FY 2010 enacted program budget. The CRU program leverages, at a near 3 to 1 ratio, each dollar of federal funding to deliver critical research for the nation and to train the next generation of fish and wildlife professionals. It is unknown how the FY 2012 proposed reduction in funding will affect USGS's ability to fully leverage the funding investment of cooperators. CRU has actively invested funding increases to refill multiple vacant scientist positions since FY 2010, bringing a host of research Units to full staffing and thus fully leveraging the investment of non-federal cooperators. Recent hiring of scientists to fill long standing vacancies has been effective at offsetting natural attrition through retirements. A continued focus on hiring to fill vacant scientist positions will be necessary for CRU to fully tap the significant leveraging opportunities provided by cooperators, for the benefit of fish and wildlife conservation.

being filled. CRU's status towards rebuilding capacity, along with other personnel changes, is found on page 3 of this report. As budgets allow, CRU will continue to work with cooperators to identify high priority hiring actions to rebuild capacity through FY 2011 and beyond.

For the third year in a row, CRU invested significant funding in the Units for operational support, safety equipment and training, diversity, and vehicles for research. Much of the funding is targeted at priority safety needs. The cumulative investments over time in Unit operations and safety have had an effect of reducing the backlog of critical equipment. Through continued investments, CRU will ensure that scientists and students have the adequate resources to safely conduct research of high interest to program cooperators.

ECOSYSTEMS

In FY 2010, changes occurred to the USGS organizational structure, whereby much of the Biological Resources Discipline, the discipline within which CRU has traditionally been located, was moved to a new Ecosystems Mission Area. The reorganization was initiated to match more closely the strategic science direction of the USGS with its science expertise. CRU will maintain its national capacity and orientation within Ecosystems. On page 4, we highlight the research of Joseph Hightower of the North Carolina Unit, focused on ecosystem restoration and effects of dam removal on fish

species, including highly valued migratory populations. This research exemplifies the connection CRU shares with the strategic focus of the new USGS Ecosystems Mission Area.

SUPPORT TO THE NATION

CRU biologists in Louisiana, South Carolina, and Florida were some of the first to respond to state and federal partner research needs associated with the Gulf of Mexico oil spill. Ongoing and new research conducted by these Units will be used to establish baseline conditions and to plan restoration activities for the future. On page 4, we highlight science support activities of several Units working on the Gulf of Mexico Ecosystem. These efforts exemplify how CRU leverages its scientific expertise and cooperator support to deliver research and information critical to the Nation.

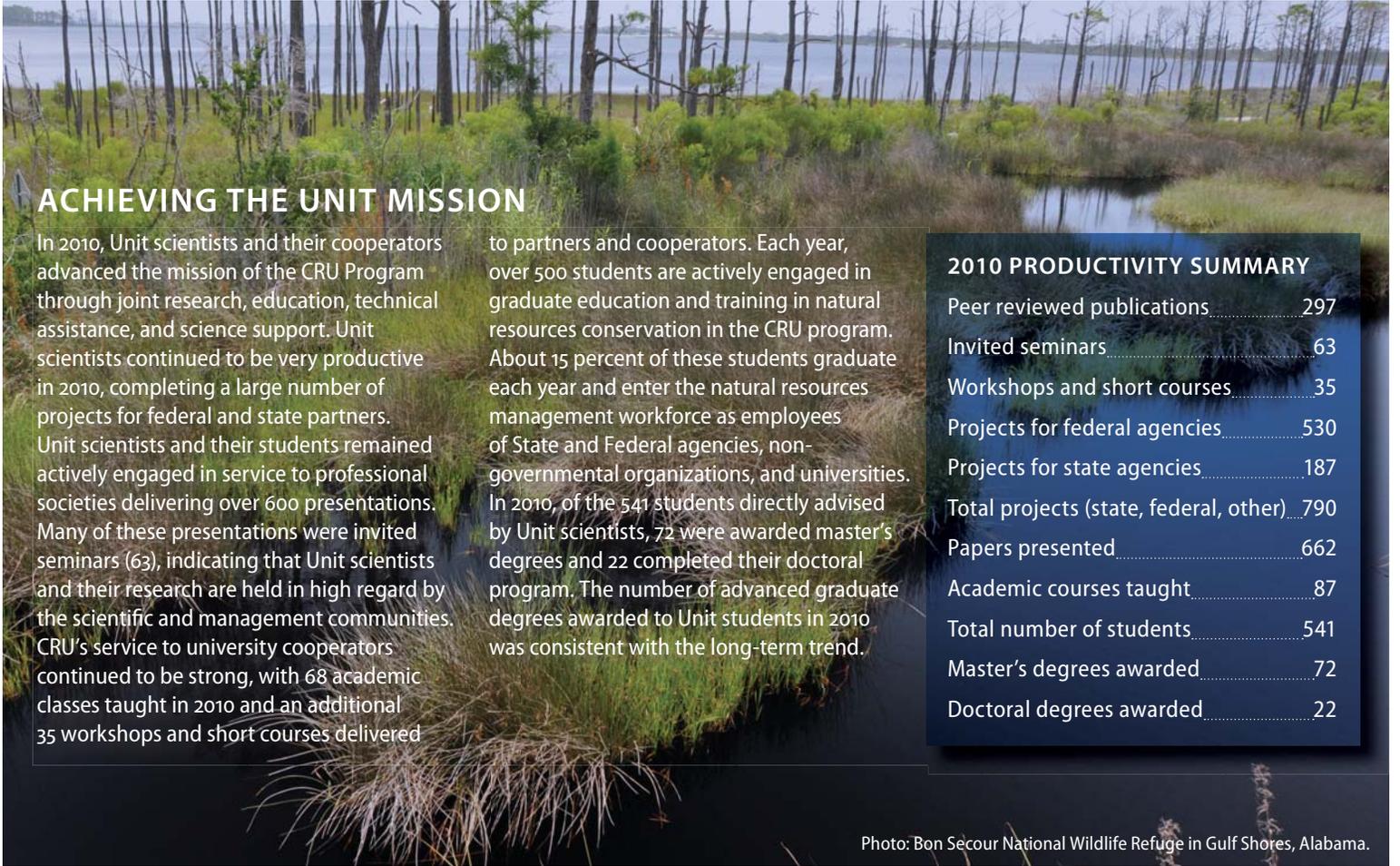
STRATEGIC DIRECTIONS

In FY 2010, CRU continued to advance an agenda to improve the connection of science and management through structured decisionmaking (SDM). In partnership with the U.S. Fish and Wildlife Service National Conservation Training Center (NCTC), CRU sponsored 12 state cooperators to attend week-long training in SDM. Additionally, CRU supported a research and management group from Montana to attend a week-long practicum on SDM to address the management of bighorn sheep herds. *(continued on page 2)*



Tennessee Unit student Aaron Cole, Assistant Leader Phil Bettoli, and Jim Negus of the Tennessee Wildlife Resources Agency, perform tag implantation surgery on a muskellunge.

PHIL BETTOLI/TN UNIT



ACHIEVING THE UNIT MISSION

In 2010, Unit scientists and their cooperators advanced the mission of the CRU Program through joint research, education, technical assistance, and science support. Unit scientists continued to be very productive in 2010, completing a large number of projects for federal and state partners. Unit scientists and their students remained actively engaged in service to professional societies delivering over 600 presentations. Many of these presentations were invited seminars (63), indicating that Unit scientists and their research are held in high regard by the scientific and management communities. CRU's service to university cooperators continued to be strong, with 68 academic classes taught in 2010 and an additional 35 workshops and short courses delivered

to partners and cooperators. Each year, over 500 students are actively engaged in graduate education and training in natural resources conservation in the CRU program. About 15 percent of these students graduate each year and enter the natural resources management workforce as employees of State and Federal agencies, non-governmental organizations, and universities. In 2010, of the 541 students directly advised by Unit scientists, 72 were awarded master's degrees and 22 completed their doctoral program. The number of advanced graduate degrees awarded to Unit students in 2010 was consistent with the long-term trend.

2010 PRODUCTIVITY SUMMARY

Peer reviewed publications.....	297
Invited seminars.....	63
Workshops and short courses.....	35
Projects for federal agencies.....	530
Projects for state agencies.....	187
Total projects (state, federal, other).....	790
Papers presented.....	662
Academic courses taught.....	87
Total number of students.....	541
Master's degrees awarded.....	72
Doctoral degrees awarded.....	22

Photo: Bon Secour National Wildlife Refuge in Gulf Shores, Alabama.

DANNY E. HOOKS

(continued from page 1)

In addition, Unit scientists attended NCTC classes in support of their state cooperators, and a number have volunteered through the NCTC partnership to be mentors, instructors, and leaders in the future. CRU will continue to develop this effective partnership with the U.S. Fish and Wildlife Service in FY 2011 and beyond.

Plans to develop new ways of working across state and regional boundaries have been incorporated as a key goal of this initiative. Units in Wyoming, Utah, and Montana are coordinating with western states to evaluate survival, habitat use, and distribution of elk, a widely ranging species in the West. By coordinating the assessment of elk data across western states, resource managers will develop options for managing elk herds in ways not possible from a single-state perspective. This type of transboundary approach to wildlife research is an important precursor to the multitude of landscape-level wildlife management research issues that will arise as climate changes.

CUSTOMER SURVEY RESULTS

In FY 2010, CRU continued its program of surveying Research Work Order (RWO) customers. The RWO process is CRU's primary funding mechanism for federal research. Survey respondents reported a continuing high level of satisfaction (>95%) with the timeliness, scientific rigor, and technical clarity of Unit research. Almost all (98%) indicated that they would use the Coop Unit again, and 94% replied that they would recommend CRU to others. The majority indicated they would use the research for species management, planning, monitoring, and habitat and land management. Most respondents indicated that they have interactions with graduate students primarily during project planning, implementation, and reporting. Close engagement of graduate students and research supporters is a primary goal of the RWO process and the CRU mission. CRU will continue to monitor these trends to ensure that research sponsors, students, and scientists continue to work closely to meet both research and management objectives.

SERVICE TO PROFESSIONAL SOCIETIES

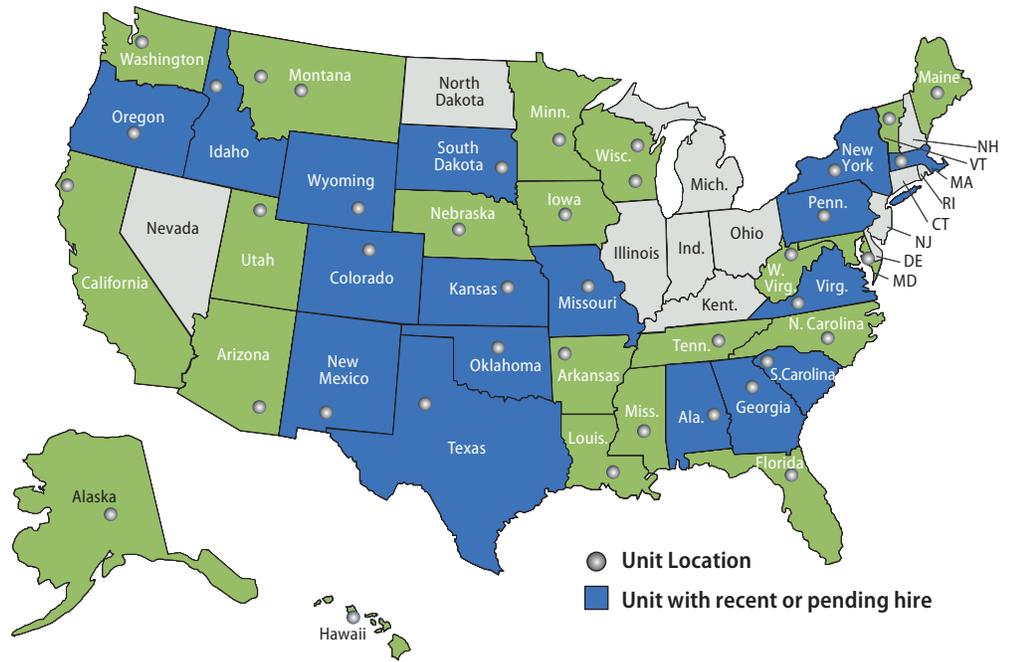
CRU has a long tradition of leadership in service to fish and wildlife professional societies. Within USGS, CRU has 21% of agency scientists with biological expertise (N=89) yet 42% of 123 (N=37) of the total fish and wildlife-oriented society officerships.

LONG-TERM PRODUCTIVITY ANALYSIS

CRU recently assessed program productivity for the 2005 to 2009 period. Over this time period, Unit scientists produced in total several thousand papers (1,845) and presentations/seminars (3,474), and delivered hundreds of courses (456), and workshops (227). The cumulative influence of the CRU program is most well exemplified by the over 600 MS and PhD students that have graduated over this five year period. These students are highly trained and sought after by states, federal bureaus, academia, and non-governmental organizations, and are poised to become leaders in fish and wildlife conservation and science in the future.

REBUILDING SCIENCE CAPACITY

Through FY 2010 and through early FY 2011, CRU continued its efforts to rebuild capacity by filling vacancies at a number of Units. These efforts will result, or have resulted in, 27 of the 40 Units being fully staffed in FY 2011, including Units that have had long-standing vacancies (e.g., Colorado, Texas, Kansas, Oklahoma, Alabama). The hiring process is very fluid – at present, 10 vacancies are in different stages of being filled. Having a complete complement of Unit scientific staff is essential to fully leverage the academic and resource investments of Unit cooperators. As with previous years, staff retirements over the year have also occurred, creating additional vacancies as CRU is concurrently filling positions. Along with program cooperators, CRU will continue to evaluate priority hiring actions in FY 2011 and beyond depending on the outcome of ongoing budget deliberations.



2010 PERSONNEL CHANGES

NEW HIRES

Shannon K. Brewer, Assistant Unit Leader, Oklahoma Unit

James W. Cain, Assistant Unit Leader, New Mexico Unit

William Mark Ford, Unit Leader, Virginia Unit

Angela Fuller, Assistant Unit Leader, New York Unit

Timothy Grabowski, Assistant Unit Leader, Texas Unit

Mevin B. Hooten, Assistant Unit Leader, Colorado Unit

William L. Kendall, Assistant Unit Leader, Colorado Unit

Conor McGowan, Assistant Unit Leader, Alabama Unit

Michael C. Quist, Assistant Unit Leader, Idaho Unit

REASSIGNMENTS

Steven R. Chipps, Assistant Unit Leader to Unit Leader, South Dakota Unit

Matthew J. Kauffman, Assistant Unit Leader to Unit Leader, Wyoming Unit

Dan Roby, Assistant Unit Leader to Unit Leader, Oregon-Wildlife Unit

Craig P. Paukert, Assistant Unit Leader, Kansas Unit to Unit Leader, Missouri Unit

Martha E. Mather, Assistant Unit Leader, Massachusetts Unit to Assistant Unit Leader, Kansas Unit

Jim Peterson, Assistant Unit Leader, Georgia Unit to Assistant Unit Leader, Oregon-Fisheries Unit

J. Jeffrey Isely, Assistant Unit Leader, South Carolina Unit, to NOAA

RETIREMENTS

Robert G. Anthony, Unit Leader, Oregon-Wildlife Unit

Charles R. Berry, Jr., Unit Leader, South Dakota Unit

Charles E. Birkeland, Unit Leader, Hawaii Unit

David L. Galat, Assistant Unit Leader, Missouri Unit

Shari Weant, Administrative Officer

AWARDS

CRU EXCELLENCE IN SCIENCE AWARDS

North Carolina Unit

Pennsylvania Unit

SERVICE EXCELLENCE AWARD

Daniel Magoulick, Assistant Unit Leader, Arkansas Unit

LEADERSHIP EXCELLENCE AWARD

Thomas Kwak, Unit Leader, North Carolina Unit

WILDLIFE MANAGEMENT INSTITUTE ADMINISTRATIVE EXCELLENCE AWARD

Wendy Moore, Administrator, North Carolina Unit



ANGELA FULLER/NY UNIT

Angela Fuller of the New York Unit with a black bear as part of research on black bear spatial ecology and non-invasive genetic methods for density estimation being conducted in association with the New York Department of Environmental Conservation.

MIGRATORY FISH RESPONSE TO DAM REMOVAL



A PIT antenna located at the Goldsboro Water Treatment Plant notched dam to record movement of PIT-tagged fish potentially impeded by the dam during their migration. This study found that low water levels delayed migrations.

JOSH RAABE/NC UNIT

CRU Unit scientists are conducting research to assess species responses to large-scale ecosystem restoration efforts. The removal of dams is one such restoration effort that is an important focus of fisheries management. Dams and other barriers are widely thought to have caused migratory fishes to decline in abundance due to habitat loss (e.g., lack of access to spawning and rearing habitats). These declines can sometimes be reversed by providing fish passage (e.g., fish ladders) or by removing derelict dams that are no longer needed. Scientists and students from the North

Carolina Unit have initiated studies to examine the response of American shad and other migratory fishes to the removal of three low-head dams on the Little River, North Carolina, a tributary to the Neuse River. Migratory fishes were collected and tagged near the river mouth and tag recorders were installed upstream, including at former dam sites. The mark-recapture approach was used to: (1) determine the extent of migrations; (2) identify spawning grounds and migratory cues; and (3) evaluate passage efficiency of a notched dam. Scientists found that a relatively high percentage of fish



JOE HIGHTOWER/NC UNIT

Technician John Bain and Ph.D. student Joshua Raabe measure and tag a flathead catfish captured at a weir near the mouth of the Little River, near Goldsboro, North Carolina.

migrated past former dam sites. Extensive migrations, and subsequently increased usage of upstream habitat at previously blocked locations, were dependent on water temperature and occurred during periods of high flow that also aided in fish passage at the notched dam. Anadromous American shad and resident gizzard shad migrated past the most recently removed dam located at river kilometer (rkm) 56, and a proportion of both populations accessed restored habitat to the farthest upstream extent, an impassable dam at rkm 82. The results provide strong evidence of the benefits to migratory fish populations resulting from the removal of derelict dams. Results from these studies at the North Carolina Unit have broad applicability to river restoration efforts in the United States and beyond.

SUPPORT TO THE NATION



RAY CARTHY/FL UNIT

Scientists from several Units have provided science support to cooperators in Gulf States and the Department of the Interior on the biological effects of the 2010 Gulf of Mexico oil spill, and approaches for restoration.

Scientists from the Florida Unit have initiated research on nesting loggerhead turtles. Data collection is undergoing at sites that span the extent of loggerhead rookeries in the Gulf of Mexico that represent genetically distinct loggerhead nesting subpopulations. Approximately 20 nesting loggerhead females

were satellite tagged during this initial effort. Physiological data and tracking information will be important for assessing possible effects of the oil spill, and other factors, on turtle health, migratory pathways, and foraging areas in the Gulf of Mexico.

Immediately after the oil spill, Louisiana Unit scientists collected data to document oyster population health, the status of resident reef fish communities, and reef trophic organization. Unit scientists also worked to collect baseline data

to enable future assessments of potential long-term chronic and cascading effects. This research will enable the assessment of reef condition and change in areas that may be differentially affected by the oil spill. Initial data, combined with other critical long-term datasets, such as the NOAA Mussel Watch Program, will be invaluable for assessing effects and charting a path for restoration of the Gulf coastal ecosystem in effected areas.

Scientists from the South Carolina Unit have also been involved with assessing effects



MEGAN LAPEYRE/LA UNIT

Louisiana Unit graduate student Steve Beck with oysters collected for a study to assess fish and invertebrate use of oyster reefs in southern Louisiana.

of the oil spill on Gulf of Mexico wildlife. South Carolina Unit scientists are focusing on potential effects of the oil spill on colonial waterbirds, such as Black Skimmers, Brown Pelicans, and Great Egrets. Research aims to develop estimates of survival of colonial waterbirds exposed to oil in the Gulf of Mexico, by tracking radio- and satellite-tagged birds.

TRANSBOUNDARY RESEARCH



JAKE POWELL/WY UNIT

Elk in Wyoming.

WESTERN ELK RESEARCH COLLABORATIVE PROJECT

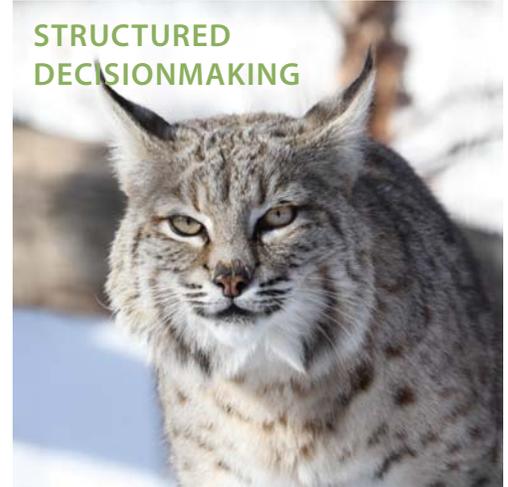
In FY 2010, CRU supported the formation of the Western Elk Research Collaborative (WERC), a group pooling Rocky Mountain elk data from Colorado, Idaho, Montana, Oregon, Utah, Washington, and Wyoming, including Yellowstone National Park. WERC collaborators are contributing data on adult female elk survival from their respective states to conduct a large-scale, multi-regional analysis. Survival factors being assessed include predation from wolves and bears, climate and climate change, human-driven habitat change, and hunting by humans.

Data have been collected from 3,550 individual elk across 46 populations in the 7 states. Elk population distribution data have been entered into a Geographical Information System and climate and land-cover data have been assembled for all populations. The WERC team is also in the process of acquiring habitat information for each population from satellite imagery. Models will be used to assess the

influence of natural and anthropogenic factors on elk survival across the 7 states. The results generated will help inform a wide variety of management decisions by state and federal agencies charged with conserving elk herds.

The WERC effort will create one of the largest survival datasets for any mammal species. Ultimately this region-wide analysis will enable population and harvest modeling of how elk are influenced by management of habitat and predation in the context of climate change. The strength of the collaboration is in the vast spatial scale of analysis; future questions will be addressed region-wide that no one state alone could appropriately tackle. CRU will continue to support the WERC collaboration and will work with cooperators to identify other opportunities to provide cross-Unit science support on management issues that are transboundary in nature.

STRUCTURED DECISIONMAKING



STEVE BYLAND

GPS data collected from bobcats in Vermont are being used to develop habitat suitability and population growth models that will aid in management.

USING RELATIONAL DATABASES TO IMPROVE STRUCTURED DECISION MAKING FOR NATURAL RESOURCE MANAGEMENT

CRU works with natural resource managers to support science-based decisionmaking. With the support of cooperators, CRU has invested in developing structured decisionmaking (SDM) as an approach to more closely connect management with science. In 2009, in cooperation with the State of Vermont, CRU developed the Vermont Database Project. In many cases, uncertainty in management decisionmaking is driven by a lack of organized and comprehensive data. The focus of the Vermont Database Project is to investigate efficient ways to identify, collect, serve, and analyze data to support a structured approach to resolve state-based natural resources management issues. In FY 2010, Vermont Unit scientists and students worked closely with State of Vermont biologists to create a comprehensive wildlife species database that will serve as the focal point for population modeling and decision analysis. Unit scientists, students, and cooperators are now poised to address a number of important species management questions using a data-driven SDM approach. Future plans are to use the relational database to not only support State of Vermont agency wildlife management needs, but to also provide science support to the U.S. Fish and Wildlife Service's North Atlantic Landscape Conservation Cooperative.

DISTANCE LEARNING

NEW DISTANCE LEARNING PARTNERSHIP WITH OREGON STATE UNIVERSITY

Cooperators have agreed on the strategic necessity for CRU to develop new approaches to graduate education and training. CRU has responded to fill this need by developing a partnership with Oregon State University (OSU) to offer a distance learning, graduate level course in SDM by the fall of 2011. CRU's extracurricular partnership with OSU is mutually beneficial. CRU, its scientists, and students will gain access to the established OSU distance learning program and OSU benefits by having a graduate level SDM course developed by Unit scientists who are subject matter experts in the field. CRU's partnership with OSU on distance learning complements other partnerships Unit scientists have developed to advance new approaches to graduate education and training. Terri Donovan (Vermont) and Pat Mazik (West Virginia) have worked with the U.S. Fish and Wildlife Service National Conservation Training Center to expand the number of courses available to CRU students nation-wide. In the future, CRU will continue to seek and identify new partnerships and opportunities to expand and evolve the program's graduate education and training mission.



OPTIMAL TIMING FOR CONDUCTING MARSH BIRD SURVEYS IN SOUTH FLORIDA

CATHERINE AIREY/NC UNIT

Courtney Conway
Arizona Unit

Populations of many species of secretive marsh birds are thought to be declining in North America. U.S. Fish and Wildlife Service National Wildlife Refuges in South Florida have both estuarine and freshwater marshes that provide habitat for most of the focal species identified in the North American Marsh Bird Monitoring program, including Least Bittern, Sora Rail, Clapper Rail, King Rail, Common Moorhen, Purple Gallinule, American Coot, Pied-billed Grebe, and Limpkin. The standardized North American survey protocols for these marsh birds were recently revised to provide more specific guidance on times of year when refuges should conduct marsh bird surveys and suggest that all marsh bird surveys in Florida be conducted between March 15 and April 30. In past years, marsh bird surveys at refuges in Florida were conducted later in the summer. The appropriateness of the new recommended survey dates for refuges in the southeast has been a subject of ongoing debate (and particularly to those in South Florida). Both the time of year and the tide stage can have significant effects on marsh bird detection probability. Because many species of marsh birds are so rare, it is essential to conduct surveys during the time of year and the tide stage when detection probability is both high and varies little. The objective of this project is to examine the most appropriate dates and tide stage for conducting marsh bird surveys. This information will be used to revise the recommended survey times in the Standardized North American Marsh Bird Monitoring Protocols, and help provide detailed guidance on the protocols for the optimal tide stage to conduct surveys for all coastal refuges. Several species that are the target of the national protocols have very limited distributions, but are relatively abundant on refuges in South Florida (e.g., Limpkins and King Rails). Moreover, South Florida has numerous large-scale wetland restoration efforts underway. Marsh birds can serve as ecological indicators of the success of these restoration efforts in the region. The data collected on this project will also provide a mechanism to evaluate the success of these wetland restoration efforts.



WHIRLING DISEASE-RESISTANT TROUT EVALUATION

Dana Winkelman
Colorado Unit

Myxobolus cerebralis, the parasite responsible for whirling disease, has caused widespread population collapses in wild rainbow trout (*Oncorhynchus mykiss*) populations throughout the intermountain west. Disease-resistant rainbow trout have been considered as a potential alternative for reintroducing rainbow trout populations in the presence of the disease. German strain (GR) rainbow trout are at least as resistant to whirling disease as the highly-resistant brown trout (*Salmo trutta*) under laboratory conditions. The GR strain has been crossed with the susceptible Colorado River rainbow (CRR) to produce rainbow trout that are resistant to whirling disease but retain traits necessary for survival in the wild. However, little is known about how these strains will survive and reproduce when stocked in streams and rivers. Our study has two objectives: (1) evaluate the success of ongoing resistant rainbow trout introductions in Colorado; and (2) evaluate brown trout removal as a management option to promote the retention and survival of introduced whirling disease resistant rainbow trout. We will assess survival, reproduction, and recruitment using mark-recapture and genetic methods and will estimate the rate and magnitude of rainbow trout migration in areas with standard levels of brown trout and in areas where brown trout numbers have been reduced. We have marked 4,000 rainbow trout and stocked them into two areas of the Poudre River, Colorado. The study is designed to allow the estimation of the movement and survival of rainbow trout in each section. Additionally, field observations and experiments are being conducted to estimate the effects of new artificial trout ponds on the prevalence and severity of whirling disease in the White River, Colorado. Manipulative experiments are also being conducted to evaluate the potential for using parasite resistant *T. tubifex* to control the severity of whirling disease in pond environments.



MOVEMENTS AND DISTRIBUTIONS OF RADIO-MARKED MALLARDS

DAVE KREMENTZ/AR UNIT

Dave Krementz
Arkansas Unit

The mallard (*Anas platyrhynchos*) harvest in Arkansas peaked in the late 1990s and has declined since. With that decline came an increase in Arkansas hunter concerns over the number and location of fall and wintering mallards. Arkansas hunters felt that mallard availability had declined because of changes in fall migration rates and wintering locations. In addition, the derivation of mallards being harvested in Arkansas may have shifted with the recent large-scale changes in land use in the prairie pothole region of Canada. Such a shift in derivation could also explain changes in mallard availability. In response to these hunter concerns and questions, the Arkansas Game and Fish Commission (AGFC) began a long-term satellite telemetry project on mallards in 2004. Each year from 2004 to 2007, between 28 and 53 mallards were marked with satellite transmitters (platform transmitting terminals or PTTs) during either the fall or late winter. During this time, the PTT locations were accurate to within 1 km. With 174 mallards now marked, the analyses of movement and distribution will ensue for this sample. Four research objectives have been established by the AGFC: (1) track movements and distribution of migrating mallards in spring, and describe habitat characteristics of principle spring staging areas, nesting areas and post-nesting areas of adult female mallards migrating from; (2) determine use of spring migration corridors (e.g., Mississippi Flyway or Central Flyway), spring staging areas, nesting areas and post-nesting dispersal relative to habitat conditions; (3) track movement and distribution of migrating mallards in fall and if possible, determine proportionate use of fall migration corridors, staging areas and dispersal relative to habitat conditions; and (4) track movement and determine distribution and habitat use within Arkansas. Results from these analyses will enable the AGFC to assess causes for the decline in mallard harvest and to pinpoint changes in migration and wintering locations that are important for developing future harvest management strategies.

ASSESSMENT OF POTENTIAL HABITAT VALUE OF CONSTRUCTED WETLANDS



USDA

Dave Otis
Iowa Unit

The U.S. Department of Agriculture's Conservation Reserve Enhancement Program (CREP) is focused on environmental problems associated with large-scale agricultural land use. The Iowa CREP goal is to construct wetlands that reduce the downstream nitrogen loads which have been implicated as a cause of increased stream eutrophication in the Mississippi River basin and for the development of hypoxic conditions in the Gulf of Mexico. Future program implementation strategies could benefit from a more comprehensive assessment of potential environmental services, such as provision of wildlife habitat. Scientists from the Iowa Unit, Iowa State faculty, and U.S. Fish and Wildlife Service used available wildlife species-habitat models to conduct assessments of potential habitat value of CREP wetlands for Species of Greatest Conservation Need identified in the Iowa Wildlife Action Plan. Given rapidly evolving economic influences such as the biofuel industry on Midwestern agriculture, the economic incentives for enrolling highly productive ground in CREP have become less attractive to private landowners. Thus, a significant expansion of the program may require more reliance on floodplain sites devoted to non-crop agricultural use such as pasture. A model comparison of the net increase in potential habitat in four alternative landscape types suggested that net gains in value consistently increased as site location moved from the more intensively tile zoned region at the top of the drainage area into floodplains. This result was due to the concomitant increase in the physical area of the wetland and associated grassland buffer, and the increase in diversity and complexity of the habitat in the surrounding landscape. The next step in providing policymakers with useful information may involve field studies to evaluate hypotheses on wildlife response to CREP wetlands.

MIGRATORY SHOREBIRD HABITAT DECISIONS ACROSS SPATIAL SCALES



TJ FONTAINE/NE UNIT

T.J. Fontaine
Nebraska Unit

Wetland ecosystems function as important stopover habitats for migratory birds and add significantly to local and regional biodiversity. However, these systems are increasingly threatened by climate change and the potential synergistic effects of increasing demand for water and invasion by exotic species. By examining the linkages between climate, hydrology, and the biological factors influencing wetland ecosystem resilience, Unit scientists from Nebraska, in cooperation with the U.S. Fish and Wildlife Service and colleagues from several U.S. Geological Survey science centers, are working to examine the effects of climate and land use change on migratory bird populations throughout the Prairie Pothole Region of North America.

Multi-scale spatial models are being developed that relate habitat decisions of migratory shorebirds to annual and seasonal changes in water resources, and the phenology and growth of wetland plants. By exploring the effects of altered climate and habitat conditions on wetland-dependent birds using a holistic approach that incorporates both top-down and bottom-up constraints, scientists will be better able to predict changes in wetland ecosystems and the corresponding responses of migratory birds. This research will assist managers and conservation professionals within federal, state, and nongovernmental organizations concerned with protecting migratory bird species and managing critical wetland habitats.

CANADA GOOSE NESTING ECOLOGY AND HABITAT USE IN RELATION TO SNOW GESE



DAVE ANDERSON/MN UNIT

David Anderson
Minnesota Unit

For almost 40 years, breeding Eastern Prairie Population (EPP) Canada geese have been monitored in northern Manitoba as part of the management program for this flock. Research into factors affecting distribution and population ecology has been an integral part of that program since its inception in the late 1960s. Minnesota Unit Leader David Anderson and students, in collaboration with state and federal biologists and managers, have extended the EPP research program on species interactions across spatial scales to the entire EPP breeding range. Rapidly increasing and abundant snow goose populations exert significant influence on arctic and subarctic ecosystems, and influence the population ecology of EPP Canada geese and other birds that share their subarctic breeding grounds. To better understand these influences, we have assessed changes in distribution and habitat use of Canada goose broods; compared current and historical distribution and abundance of nesting shorebirds; evaluated how the predominant nest predator (arctic fox) interacts with its primary (lemmings) and secondary prey (ground-nesting birds); and evaluated how interactions between nesting Canada and snow geese at local scales influence distribution patterns at the scale of the entire breeding range. Information derived from these research efforts has been used to develop management plans for EPP Canada geese in the Mississippi Flyway, and is being incorporated into monitoring and management plans for Wapusk National Park of Canada. In addition, we have gained valuable insight into the ecology of Canada geese, other breeding birds, and species that share their breeding range in the face of changing landscapes resulting from increasing snow goose abundance and changes in climate.



Atlantic Puffin in Iceland.

FIRST WORLD SEABIRD CONFERENCE HELD IN 2010

The First World Seabird Conference, focusing on the ecology, management, and conservation of seabirds, was held in Victoria, British Columbia, in September 2010. Patrick Jodice of the South Carolina Unit served as Chair of the Science Program as well as Chair of the International Steering Committee. The conference hosted 800 attendees from over 40 countries, with 130 invited papers, 130 contributed papers, 350 posters, and 10 workshops.

Conference workshops resulted in collaborations that will improve the understanding of seabird populations and contribute to ecosystem-based management and marine spatial planning efforts. Shared databases will be used to prioritize international and regional initiatives, track biodiversity indices, and improve understanding of large-scale effects of environmental change, including climate change. Unit cooperators are encouraged to participate in the database network to share and gain access to data relevant to their research and management needs.

Conference abstracts are available at: www.worldseabirdconference.org.

UNIVERSITY COOPERATORS

STATE NATURAL RESOURCE AGENCY COOPERATORS

U.S. GEOLOGICAL SURVEY

Alabama Fish and Wildlife Unit

Auburn University
Alabama Department of Conservation
and Natural Resources

Alaska Fish and Wildlife Unit

University of Alaska-Fairbanks
Alaska Department of Fish and Game

Arizona Fish and Wildlife Unit

University of Arizona
Arizona Game and Fish Commission

Arkansas Fish and Wildlife Unit

University of Arkansas
Arkansas Game and Fish Commission

California Fish and Wildlife Unit

Humboldt State University
California Department
of Fish and Game

Colorado Fish and Wildlife Unit

Colorado State University
Colorado Division of Wildlife

Florida Fish and Wildlife Unit

University of Florida
Florida Game and Fish Commission

Georgia Fish and Wildlife Unit

University of Georgia
Georgia Department of
Natural Resources

Hawaii Fishery Unit

University of Hawaii
Hawaii Department of Land
and Natural Resources

Idaho Fish and Wildlife Unit

University of Idaho
Idaho Department of Fish and Game

Iowa Fish and Wildlife Unit

Iowa State University
Iowa Department of Natural Resources

Kansas Fish and Wildlife Unit

Kansas State University
Kansas Department of
Wildlife and Parks

Louisiana Fish and Wildlife Unit

Louisiana State University
Louisiana Department of
Wildlife and Fisheries

Maine Fish and Wildlife Unit

University of Maine
Maine Department of Inland
Fisheries and Wildlife

Maryland Fish and Wildlife Unit

University of Maryland, Eastern Shore
Maryland Department of
Natural Resources

Massachusetts Fish and Wildlife Unit

University of Massachusetts
Massachusetts Division of
Fisheries and Wildlife
Massachusetts Division of
Marine Fisheries

Minnesota Fish and Wildlife Unit

University of Minnesota
Minnesota Department of
Natural Resources

Mississippi Fish and Wildlife Unit

Mississippi State University
Mississippi Department of
Wildlife, Fisheries, and Parks

Missouri Fish and Wildlife Unit

University of Missouri-Columbia
Missouri Department of Conservation

Montana Fishery Unit

Montana State University
Montana Department of Fish,
Wildlife, and Parks

Montana Wildlife Unit

University of Montana
Montana Department of Fish,
Wildlife, and Parks

Nebraska Fish and Wildlife Unit

University of Nebraska-Lincoln
Nebraska Game and Parks Commission

New Mexico Fish and Wildlife Unit

New Mexico State University
New Mexico Department
of Game and Fish

WILDLIFE MANAGEMENT INSTITUTE

U.S. FISH AND WILDLIFE SERVICE

New York Fish and Wildlife Unit

Cornell University
New York Department of
Environmental Conservation

North Carolina Fish and Wildlife Unit

North Carolina State University
North Carolina Wildlife
Resources Commission

Oklahoma Fish and Wildlife Unit

Oklahoma State University
Oklahoma Department of
Wildlife Conservation

Oregon Fish and Wildlife Unit

Oregon State University
Oregon Department of Fish and Wildlife

Pennsylvania Fish and Wildlife Unit

Pennsylvania State University
Pennsylvania Fish and Boat Commission
Pennsylvania Game Commission

South Carolina Fish and Wildlife Unit

Clemson University
South Carolina Department
of Natural Resources

South Dakota Fish and Wildlife Unit

South Dakota State University
South Dakota Department of
Game, Fish, and Parks

Tennessee Fishery Unit

Tennessee Tech University
Tennessee Wildlife Resources Agency

Texas Fish and Wildlife Unit

Texas Tech University
Texas Parks and Wildlife Department

Utah Fish and Wildlife Unit

Utah State University
Utah Division of Wildlife Resources

Vermont Fish and Wildlife Unit

University of Vermont
Vermont Department of
Fish and Wildlife

Virginia Fish and Wildlife Unit

Virginia Polytechnic Institute
and State University
Virginia Department of Game
and Inland Fisheries

Washington Fish and Wildlife Unit

University of Washington
Washington Department of Ecology
Washington Department
of Fish and Wildlife
Washington Department
of Natural Resources

West Virginia Fish and Wildlife Unit

West Virginia University
West Virginia Division of
Natural Resources

Wisconsin Fishery Unit

University of Wisconsin Stevens Point
Wisconsin Department of
Natural Resources

Wisconsin Wildlife Unit

University of Wisconsin
Wisconsin Department of
Natural Resources

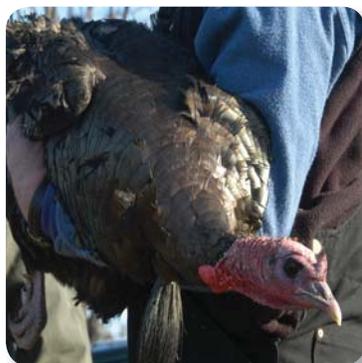
Wyoming Fish and Wildlife Unit

University of Wyoming
Wyoming Game and Fish Commission

COOPERATIVE RESEARCH UNITS PROGRAM

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Kevin Whalen, Deputy Chief
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Unit Supervisor
Joe Margraf, Unit Supervisor
Mike Tome, Unit Supervisor
Rita Raines, Administrative
Officer



PA GAME COMMISSION

Pennsylvania Game Commission
staff banding a gobbler.



BRYAN BAKEVICH/ID UNIT

Male Topeka shiner in spawning colors.



DAVE MCGUIRE/AK UNIT

Alaska Unit student Nicole McConnell
holds a soil core taken at a fen wetland site
to measure soil organic carbon and root
biomass for a project funded by USGS.



HENRY STREBY/MN UNIT

Adult female Golden-winged Warbler
fitted with a transmitter at Tamarac
National Wildlife Refuge, Minnesota.