# NEW YORK COOPERATIVE FISH AND WILDLIFE RESEARCH UNIT

2009

## Annual Report

The New York Cooperative Fish and Wildlife Research Unit is embarking on a new era. With the addition of a new Assistant Leader for Wildlife, we are forming new relationships with our cooperators and planning research projects to address natural resource issues in New York State and beyond.

Front cover photo: Esopus Creek, New York.
(Photo: Tyler J. Ross)

# New York Cooperative Fish and Wildlife Research Unit

## 2009 ANNUAL REPORT

Fernow Hall
Cornell University
Ithaca, NY 14853

Phone: 607-255-2839
Fax: 607-255-1895
http://www.coopunits.org/New_York/

Cooperators:

United States Geological Survey
Cornell University
New York State Department of Environmental Conservation
United States Fish and Wildlife Service
Wildlife Management Institute

# TABLE OF CONTENTS

# INTRODUCTION

The Cooperative Research Units (CRU) program was established in 1935 as a cooperative partnership between the Federal and State biological resource agencies and Land Grant universities to conduct research on managing wildlife populations and habitats, train wildlife managers, and disseminate information to management agencies. Seventy-five years later, the mission of the program remains unchanged. Now with 40 Units in 38 states, the CRU program employs over 100 scientists that conduct research on natural resource issues of importance to State and Federal agencies and other organizations, teach graduate-level courses at their host universities, and conduct workshops and short courses for their cooperators and other partners. In 2009, over 500 students were involved in conducting research and along with the Unit scientists, cooperating faculty and agency staff. Together, they produced 305 peer-reviewed publications, made 639 presentations at scientific meetings, and taught 68 academic courses and 36 workshops and short courses.

The New York Cooperative Fish and Wildlife Research Unit was established in1961 under the leadership of Dr. Daniel Thompson. Originally established as a separate wildlife unit, the fishery unit was added in 1963 and led by Dr. Alfred Eipper. In 1984, the units were combined and led thereafter by Dr. Milo Richmond. Over its 49 year history, the New York Coop Unit has had five wildlife scientists and seven fishery scientists who have conducted research on a diversity of natural resource issues ranging most recently from assessing vertebrate biodiversity in New York State to evaluating immunocontraception of white-tailed deer to studying the ecology of Atlantic and shortnose sturgeon in the Hudson River.

The New York Coop Unit is undergoing a complete change in personnel. Dr. Mark Bain, Assistant Unit Leader-Fisheries left the CRU program in 2003 to join the faculty of the Cornell University Department of Natural Resources. Dr. Rich Malecki, Assistant Unit Leader-Wildlife retired from the CRU program in 2008 after 24 years of service to the New York Coop Unit, and Dr. Milo Richmond, Unit Leader-Wildlife, retired in 2008 after 40 years of service, all at the New York Coop Unit. Dr. Bill Fisher assumed the Unit Leader position in 2008 after serving nearly 18 years as Assistant Unit Leader-Fisheries for the Oklahoma cooperative Fish and Wildlife Research Unit. And in 2009, Dr. Angela Fuller became the new Assistant Unit Leader-Wildlife, coming to CRU and the New York Coop Unit from the University of Maine where she was a postdoc studying the effects of forest fragmentation on mammals. A search is currently underway for the vacant Assistant Leader position, which we hope to fill in 2010.

As we approach the 50th anniversary of the New York Coop Unit, we look forward to embarking on new research directions with a fully-staffed Unit and in cooperation with our partners at Cornell University, the New York State Department of Environmental Conservation, U. S. Geological Survey, U. S. Fish and Wildlife Service and other organizations. We see a bright future for the newly re-formed New York Coop Unit.

*The Scientists and Staff of the*
*New York Cooperative Fish and Wildlife Research Unit*

# PROGRAM DIRECTION STATEMENT

*(NOTE: This statement was developed by the previous New York Coop Unit scientists and reflects their expertise, research directions, and accomplishments.)*

The New York Cooperative Fish and Wildlife Research Unit, one of 40 in a national Cooperative Research Units program, is established for the purpose of enhancing the management of this nation's renewable natural resources. Basic support for the Unit program comes from three primary cooperating agencies: Biological Resources Discipline of the U.S. Geological Survey, New York State Department of Environmental Conservation, and the New York State College of Agriculture and Life Sciences at Cornell University. Other cooperators include The Wildlife Management Institute, and the U.S. Fish and Wildlife Service. Designed to be led by three research scientists working closely with a Coordinating Committee consisting of one member from each of the cooperating agencies, priorities and opportunities are developed for programs that address fisheries and aquatic resources, wildlife and terrestrial/wetland resources, and fish and wildlife biodiversity assessment and management. These subject areas are further unified by location of the Unit in Cornell's Department of Natural Resources. The Department provides an academic setting for enhanced educational and employment opportunities for students, while facilitating collaboration with other colleges/universities, institutes, and agencies. In accomplishing our goals, we are aided by a select, highly motivated group of graduate students and research affiliates who understand scientific research and the need for application that will enhance the impact of research results.

Unique partnerships fostered by the Unit create strategic alliances between state and federal agencies, encourage research and management teamwork within agencies, and allow benchmark research among scientists. As leaders of the program, Unit personnel support well-integrated organization with broad representation that promotes creativity, full development of ideas, and a collaborative approach. Our ideas and research achievements are shared with colleagues, graduate students, and undergraduates through publication, formal teaching, seminars, lectures, and mentoring of students who seek out Unit personnel and projects to enhance their education.

Particular attention is given to the resource problems and issues of the Northeastern states, with New York as the focal point. Current themes in fisheries and aquatic resources focus on better understanding the dynamics of watersheds and large aquatic systems in the context of active human land use and development. Socioeconomic studies focus on the interplay of harbor management, navigation needs, and water levels. On the Hudson River, research focuses on ecosystem processes to increase knowledge of the estuary biota and food web and emphasize long-term and large-scale management of water resources to benefit fish and aquatic communities. Modeling techniques are being developed that integrate environmental quality, socioeconomic values, and water management. Additional attention to pressing fisheries management challenges is desired. Program themes in wildlife and terrestrial/wetland resources have addressed the ecology and management of continental populations of waterfowl, with emphasis on Canada geese, cormorants, common terns, tundra swans, mute swans, mallards, widgeon, and pintails. Studies were enhanced by telemetry using satellite-tracking technology that provided needed information on migration movements, the chronology of movements, and mortality. Computer-assisted modeling of population dynamics facilitates development of adaptive harvest management strategies designed to optimize both protection and utilization of important wildlife resources throughout North America. Research included a focus on the ecology and management needs of other native species, such as snapping turtles and black bear. Inquiry includes attention to studies of wildlife species that exceed population levels deemed acceptable or compatible with

human activities, including developing feasible alternatives to conventional harvest practices for managing these abundant species. The Research Unit continues involvement in fish and wildlife biodiversity assessment and management, responding to concerns regarding wildlife populations that are habitat-limited or otherwise less viable. Research focuses on issues of maintaining or enhancing biodiversity, population viability, and landscape-level resource inventory using a myriad of computer-assisted technologies. Application of geographic information systems (GIS) technology allows investigation and improved understanding of biological contaminant issues, land cover and land use trends, and other non-traditional wildlife-related concerns. These cutting-edge issues are readily addressed by the Research Unit and we continue to focus on them to meet State and Federal Cooperator needs. The presence of an innovative Human Dimensions Research Unit within the same Department of Natural Resources offers numerous partnering opportunities for integration of human elements of resource management with the biological dimensions. Research that combines expertise of these two units serves to expand graduate education opportunities, increase staff flexibility, and enhance planning and leadership opportunities while offering more integrated, user-oriented management and research findings. Such leadership, integration, and planning with cooperators are key to the quality research and service-oriented program that we strive to maintain.

Approved: May 17, 2006 (Minor corrections made: June 15, 2010)

# COOPERATORS AND PERSONNEL

## COORDINATING COMMITTEE

### United States Geological Survey

MIKE TOME, Eastern Supervisor, Cooperative Research Units, Leetown Science Center, 11649 Leetown Road, Kearneysville, WV 25430

### New York State Department of Environmental Conservation

PATTY RIEXINGER, Director, Division of Fish, Wildlife, and Marine Resources, 625 Broadway, Albany, NY 12233

### Cornell University

MARIANNE KRASNY, Chair, Department of Natural Resources, Fernow Hall, and

JAN NYROP, Senior Associate Dean, College of Agriculture and Life Sciences, Roberts Hall, Cornell University, Ithaca, NY 14853

### United States Fish and Wildlife Service

DAVID STILWELL, Field Supervisor, U.S. Fish and Wildlife Service, New York Field Office, 3817 Luker Rd., Cortland, NY 13045

RICHARD O. BENNETT, Regional Scientist, U.S. Fish and Wildlife Service, Northeast Regional Office, 300 Westgate Center Dr., Hadley, MA 01035

### Wildlife Management Institute

SCOT WILLIAMSON, Northeast Regional Representative and Vice-President, Wildlife Management Institute, 69 Clinton Avenue, St. Johnsbury, VT 05819

## UNIT PERSONNEL

### Scientists

WILLIAM L. FISHER, Unit Leader-Fisheries, USGS, and Courtesy Associate Professor, Department of Natural Resources

ANGELA K. FULLER, Assistant Unit Leader-Wildlife, USGS, and Courtesy Assistant Professor, Department of Natural Resources

VACANT, Assistant Unit Leader-Ecology

### Staff

MELINDA VON GORDON, Administrative Assistant

### Postdoctoral Research Associate

TITUS SEILHEIMER, Department of Natural Resources

### Cornell University Cooperating Faculty

PAUL CURTIS, Department of Natural Resources

CLIFFORD KRAFT, Department of Natural Resources

### Collaborators

BARRY BALDIGO, U. S. Geological Survey, New York Water Science Center

GORDON BATCHELLER, New York State Department of Environmental Conservation

STEVE HURST, New York State Department of Environmental Conservation

JOHN MAJOR, New York State Department of Environmental Conservation

# GRADUATE EDUCATION

## CURRENT STUDENTS

TYLER J. ROSS, M. S., Natural Resources, Fishery and Aquatic Science (Advisor: Fisher)

## RECENT GRADUATES

JEREMY COLEMAN, Ph. D., Natural Resources, Wildlife Science (Advisor: Richmond)

## COURSES TAUGHT

None

# RESEARCH – FISHERIES AND AQUATIC

## COMPLETED PROJECTS

### Evaluating the Influence of Recreational Flow Releases on the Availability of Thermal Refuge Habitat and the Behavior and Persistence of Brown Trout in the Indian and Hudson Rivers

INVESTIGATORS: Barry Baldigo and Anne Gallagher-Ernst, (USGS)
Clifford Kraft (Cornell)
Milo Richmond and William Fisher (NYCFWRU)
Richard Preall and Richard Fenton (NYSDEC)

STUDENT: Bethany Boisvert, M.S.

SPONSORS: U. S. Geological Survey
New York State Department of Environmental Conservation
Kieckhefer Adirondack Fellowship

COMPLETED: September 2009

A cooperative study was conducted during the summers of 2005 and 2006 to assess the effects of recreational flow releases from Lake Abanakee on the quantity of thermal refuge habitat and the behavior and persistence of brown trout in the lower Indian River and the Hudson River Gorge Primitive Area. Ambient river temperature was not substantially altered by the recreational releases, but regularly exceeded stressful levels for brown trout. Releases increased discharge by an order of magnitude. Thermal remote sensing identified five potential thermal refuges, all at tributary confluences within the Hudson River between the Boreas River and the town of North River; no thermal refuges were identified in the Indian River. During releases, the refuge area for four of the five identified tributary confluences were reduced by 100%, the fifth was reduced by 50%. Telemetry results showed that trout within these refuge areas, as well as others not identified by remote sensing, were sometimes (up to 30% of the time) observed at temperatures lower than ambient mainstem river temperatures. For those trout using thermal refugia, impacts of recreational releases on the ability of a fish to remain at cooler temperatures were found in both the Indian and Hudson Rivers; thermoregulation was disrupted in some trout, while others were able to avoid the release effects by moving into or holding within tributaries. Daily movements by trout in the Hudson River were significantly greater than in either the Indian River or the Cedar River. Recreational releases were not found to influence daily movement in either the Indian or Hudson Rivers. Trout persisted significantly longer in the Cedar River than in either the Indian or Hudson Rivers; most trout had died or exited the release-affected reaches by mid-August during both summers.

## CURRENT PROJECTS

### Use of Telemetry to Assess Potential Effects of Schoharie Reservoir Waters on Trout Populations in the Upper Esopus Creek

INVESTIGATORS: Barry Baldigo, (USGS)
William Fisher (NYCFWRU)
Tom Baudanza (NYCDEP)
Mike Flaherty (NYSDEC)
Clifford Kraft (Cornell)

STUDENT: Tyler J. Ross, M.S.

SPONSORS: U. S. Geological Survey
New York State Department of Environmental Conservation
New York City Department of Environmental Protection
Cornell University Cooperative Extension

STARTED: August 2009

T. J. ROSS TRACKING FISH IN ESOPUS CREEK

The New York City (NYC) Watershed Protection Management Plan identifies the potential adverse effects of turbid Schoharie Reservoir water discharged through the Shandaken Portal on trout populations in the Upper Esopus Creek as a priority concern. Investigators from the U. S. Geological Survey (USGS), New York State Department of Environmental Conservation (NYSDEC), New York City Department of Environmental Protection (NYCDEP), and Cornell University have implemented a fish radio-telemetry study to evaluate impacts of releases on trout behavior, growth, survival, and use of thermal refuges in the Upper Esopus Creek. We are assessing differences in trout 1) behavior (rates of movement and utilization of thermal refuges), 2) apparent survival, and 3) measured and modeled growth in the Esopus Creek using radio-frequency telemetry on tagged trout released upstream and downstream of the Shandaken Portal. Trout location and temperatures are being linked with stream turbidity, flow, habitat, and temperature data that are being gathered in a companion study to quantify potential positive and negative effects that releases may have on physical habitat, individual trout, and their populations. Results will help resource managers better define current thermal, turbidity, and sedimentation impacts and more accurately plan and predict (model) effects that alternative portal-release scenarios might have on habitat and trout populations in parts of the Upper Esopus Creek.

## Biological Assessment of Environmental Flows for Oklahoma

INVESTIGATORS: William Fisher (NYCFWRU)

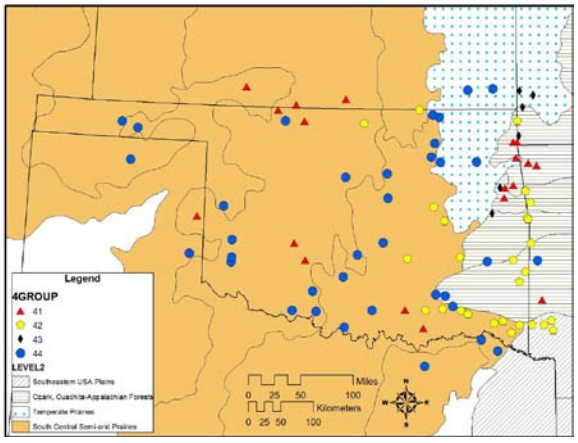
STAFF: Titus Seilheimer, Postdoctoral Associate (NYCFWRU)

SPONSORS: U. S. Geological Survey

STARTED: August 2009

Environmental flows are being considered for inclusion in the Oklahoma Comprehensive Water Plan that is currently under development. In 2008, a project was initiated by investigators at Oklahoma State University in conjunction with the U. S. Geological Survey (USGS) to assess environmental flows in Oklahoma's perennial streams using the Hydroecological Integrity Assessment Process (HIP) developed by the USGS. The HIP approach identifies 10 non-redundant hydrologic indices that are ecologically relevant, specific to stream classes, and characterize the five components of the natural flow regime. The HIP approach has been used to set environmental flow prescriptions in New Jersey and is also being used in Missouri, Pennsylvania and Texas. HIP analysis can be used to classify reference streams in a state or region, which is the first step in developing environmental flow rules.

Characteristics of the indices for reference streams (e.g., frequency distributions) can be compared with those of hydrologically-modified, flow-impaired streams in the same class to quantify deviations from reference conditions. The final and most critical step of this approach is an ecological validation of the classification. A flow-response relationship is developed between the hydrologic indices within each class of reference and impaired streams, and indicators of ecological conditions (e.g., species richness, number of fluvial specialist species, population abundance). This relationship provides a benchmark to help guide environmental flow allocations for each class of streams. With the development of stream classes from the HIP analysis for Oklahoma, flow-response relationships will need to be developed for these hydrologic classes. Oklahoma has 176 species of fish and 55 species of mussels, including four fish and three mussels that are federally-listed as threatened or endangered, and many of these species are fluvial specialists that are suitable for assessing flow-response relationships in Oklahoma.




A comparison of the four-group cluster analysis stream classification and level II ecoregions of Oklahoma. Group stream classes: 41 (red triangle) – perennial run-off, 42 (yellow circle) – perennial flashy, 43 (black diamond) – stable groundwater, 44 (blue circle) intermittent.

# RESEARCH – WILDLIFE AND HABITATS

## CURRENT PROJECTS

**None**

# RESEARCH – ECOLOGY AND LANDSCAPES

## CURRENT PROJECTS

**None**

# PUBLICATIONS AND PRESENTATIONS

## JOURNAL ARTICLES

Remshardt, W. J., and W. L. Fisher. 2009. Effects of variation in streamflow and channel structure on smallmouth bass habitat in an alluvial streams. River Research and Applications 25:661-674.

## TECHNICAL REPORTS

Fuller, A. K., and D. J. Harrison. 2009. Home Range, Habitat Use, Edge Relationships, Mortality Sources, Age Structure, and Survival of White-Tailed Deer on Mount Desert Island, Maine, 1992-1994. Final contract report to Resource Management Division, Acadia National Park and Natural Resource Stewardship Science Office, National Park Service. 70pp.

Seilheimer, T. S., and W. L. Fisher. 2009. Instream flow assessment of Mill Creek, a stream draining the Arbuckle-Simpson aquifer. Final Report, Oklahoma Water Resources Board, Oklahoma City, OK. 43 pp.

Turton, D., W. Fisher, T. Seilheimer, and R. Esralew. 2009. An assessment of environmental flows for Oklahoma. Final Report for Oklahoma Water Resource Research Institute. 63 pp.

Vashon, J., D. Harrison, A. Fuller, D. Mallet, S. McLellan, W. Jakubas, and J. Organ. 2009. Documenting the response of Canada lynx to declining snowshoe hare populations in an intensively managed private forest landscape in northern Maine. Maine Cooperative Forestry Research Unit 2008 Annual Report, University of Maine, Orono.

## THESES AND DISSERTATIONS

Coleman, J. T. H. January 2009. Diving behavior, predator-prey dynamics, and management efficacy of double-crested cormorants in New York State. Dissertation. Cornell University, Ithaca, NY. 204 pp. [M.E. Richmond, advisor]

## PRESENTATIONS AND SEMINARS

Brinkman, E. L. and W. L. Fisher. 18 January 2009. Life history and management of alligator gar in the Red River, Oklahoma-Texas. Spring Meeting of Southern Division of the American Fisheries Society, New Orleans, Louisiana.

Fisher, W., and W. Hubert. 1 September 2009. American Fisheries Society's past, present and future efforts towards promoting demographic diversity. Annual Meeting, American Fisheries Society, Nashville, Tennessee. (Invited)

Lorensen, J., and W. L. Fisher. 19 March 2009. Lateral migration of fishes in the lower Verdigris River, Oklahoma. Annual Meeting, Oklahoma Chapter of the American Fisheries Society, Ardmore, Oklahoma.

Lorensen, J. and W. L. Fisher. 18 January 2009. Lateral migration of fishes in the lower Verdigris River, Oklahoma. Spring Meeting of Southern Division of the American Fisheries Society, New Orleans, Louisiana.

Patterson, C. P. and W. L. Fisher. 18 January 2009. Movements and distribution of a reintroduced population of paddlefish in Lake Texoma. Spring Meeting of Southern Division of the American Fisheries Society, New Orleans, Louisiana.

Seilheimer, T. S. and W. L. Fisher. 18 January 2009. Habitat use by fish species in groundwater dependent ecosystems of southern Oklahoma. Spring Meeting of Southern Division of the American Fisheries Society, New Orleans, Louisiana.