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The aim of this newsletter is to provide a regular report on the activities of the New York Cooperative Fish and Wildlife Research Unit. The mission of the Unit is to conduct applied research on natural resource issues, participate in graduate education, and provide technical assistance and training for natural resource professionals. The Unit is a cooperative effort of the U. S. Geological Survey, New York State Department of Environmental Conservation, Cornell University, U. S. Fish and Wildlife Service, and the Wildlife Management Institute. For more information about the Unit call us at 607-255-2839 or visit our website: http://www.coopunits.org/New_York/

NY Coop News

NEWSLETTER OF THE NEW YORK COOPERATIVE FISH AND WILDLIFE RESEARCH UNIT

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April 2013

NY Coop Unit Supports NYSDEC at Northeast Fish & Wildlife Conference

The New York State Department of Environmental Conservation (NYSDEC) hosted the 69th Annual Northeast Fish and Wildlife Conference, a conference of the Northeast Association of Fish and Wildlife Agencies. The conference was held in Saratoga Springs, New York, April 7-9, 2013. The New York Cooperative Fish and Wildlife Research Unit supported NYSDEC and our other cooperators through our participation in talks and assistance planning the annual conference.

Angela Fuller was a member of the conference planning committee and was involved in the student affairs sub-committee, tasked with planning student activities for the conference, including a student poster session, student awards, and a student-professional mixer. Additionally, the Coop Unit was involved in organizing two special symposia, and presented 4 research talks.

Bill Fisher helped to organize a fisheries symposium, "Celebrating 100 Years of Fisheries at Cornell University." Seven fisheries faculty and a distinguished alumnus from Cornell recounted the history and impact of Cornell's fisheries program over the past 100 years. Arguably, the oldest university fisheries program in the United States, the first fish-

eries class was taught in 1912 by Professor George Embury. The symposium presentations included an overview and the history of fisheries education and research, fisheries research conducted on Oneida Lake, in the Adirondacks, in the Great Lakes and oceans, and on fish health and culture, with a conclusion about the future of the Cornell fisheries program.

Chris Nadeau organized a wildlife symposium, "Spatial Tools to Address Climate Change Impacts". The six presentations focused on climate change impact and adaptation projects, demonstrating how the incorporation of spatial considerations into climate change assessments can improve the effectiveness of adaptation planning.

The NY Coop Unit had a strong showing with 4 research presentations: 1) Maya Weltman-Fahs and Bill Fisher presented "Understanding the Relationships between Hydraulic Fracturing and Brook Trout Habitat in the Marcellus Shale Region: A Research Agenda" that explored the potential hydrological, physical and chemical impacts of gas shale drilling on stream ecosystems and brook trout, 2) Chris Nadeau and Angela Fuller presented a talk in Chris' wildlife symposium titled, "A Rapid Assessment Tool to Prioritize the Management of

NY Species of Greatest Conservation Need in a Changing Climate", which focused on Chris' M.S. research with the NYSDEC, 3) Kelly Robinson and Angela Fuller demonstrated "A structured decision making approach to white-tailed deer buck harvest management in New York state", to evaluate alternative management strategies for white-tailed deer buck harvest management, and 4) Cat Sun, Angela Fuller, Matt Hare, and Andy Royle presented a research paper, "Joining Resource Selection and Spatial Capture-Recapture into a Single Model: Estimating the population size of black bears in southwestern New York using a spatially-explicit capture-recapture model".

The Federal sequestration prevented Bill, Mitch, and Angela from attending the conference on Federal time, but that couldn't keep us away from such an important conference for our cooperators. The three of us attended on our personal time and dime, and we all felt it was well worth our investment!

Thanks to the NYSDEC for organizing and hosting a well-attended conference with a great line-up of talks and activities!—AKF

Projects

Improving Trout Stocking in New York State Streams — Alex Alexiades, Ph.D. Student

Stocking trout in New York streams provides recreational opportunities that are highly valued by anglers; however, there is recent concern by New York State Department of Environmental Conservation (NYSDEC) professionals that some trout stockings fail and stocked fish are never caught by anglers. We are working cooperatively with NYSDEC to assess the fate of stocked trout, and to estimate stocked trout natural mortality/ emigration and fishing mortality, as well as angling effort and catch rates on stocked trout. This information will be used to update NYSDEC's model for estimating the number of trout

to stock.

In winter-spring-2013, Alex analyzed data from the 2012 field season. Findings thus far have revealed that angler effort and harvest rates have decreased dramatically for many streams since previous estimates were made. Angler catch per unit of effort, however, has remained relatively consistent with historic estimates. Mortality rates for stocked trout in 2011 were found to be an order of magnitude higher than historic estimates in some cases, indicating a decline in stocked trout survival. Alex also spent several weeks last fall collecting and mapping habitat data in the field and contin-

ued with his analysis and modeling of DEC collected data. Initial 2012 estimates indicate similar patterns to 2011 overall, though with some variation. Alex presented these results at the February NYSDEC Trout Team Meeting in Cortland, NY.

This project is funded by NYSDEC. Alex also was awarded a Kieckhefer Adirondack Fellowship from Cornell for 2013. Alex is advised by Bill Fisher, NYCFWRU. Ben Marcy-Quay, a M.S. student, is also working on this project under the advisement of co-PI Pat Sullivan, Cornell University.



Alex Alexiades, Ph.D. student

Alex Alexiades was awarded the Best Student Poster at the NY Chapter of the American Fisheries Society Meeting in Watertown, 1 Feb 2013.

Ecological Relationships of Black Bass Populations in New York Lakes — Christian Perry, Ph.D. Student

Smallmouth bass and largemouth bass, collectively known as black bass, occur in lakes and rivers throughout New York State. The last comprehensive investigation of the status of these black bass populations was conducted in the early 1980s, but according to the 2007 statewide angler survey, their popularity with New York anglers has increased since then.

Christian has been characterizing black bass populations in lakes across the state using data from the NYSDEC statewide fisheries database, Oneida Lake datasets, and databases from the New York por-

tions of Lake Erie and Lake Ontario. He has summarized relative abundance, size structure, relative weights, and lengths-at-age of largemouth bass and smallmouth bass in hundreds of inland lakes and in Lake Erie and Lake Ontario. He is now in the process of comparing these summaries across water bodies to identify spatial and temporal trends. In a parallel effort, he is consolidating statewide water chemistry data, lake morphometric data, and data related to lake watershed characteristics from numerous sources to quantify the influence of chemical, physical and biological factors on

bass populations. To establish the influences of these variables, he is using a hierarchical linear modeling framework.

Christian will be conducting field studies at two New York lakes this summer to investigate how energy expenditure by male nest-guarding black bass to protect their eggs differs between lakes where an invasive species egg predator, round goby, is present (Onondaga Lake) and absent (Oneida Lake). Christian will model black bass – round goby interactions using these data.

This project is funded by the NYSDEC.



Christian Perry, Ph.D. student

Projects

New York Sustainable Flows Project — Jason Taylor, Ph.D., Postdoctoral Research Associate

Working in conjunction with The Nature Conservancy (TNC), this project is focused on developing information to inform flow recommendations for Great Lake tributary streams within NY and PA.

The New York Sustainable Flows Project has come to a close. Jason and TNC conservation and freshwater ecology staff developed draft flow recommendations based on all the work and expert input received over the last year. Those recommendations were presented to the technical working group in February, and input was incorporated into a final set of recommendations. Additionally, Jason worked with TNC and NYSDEC Division of Water

staff to develop water withdrawal scenarios to demonstrate how different water withdrawal policy approaches that meet the environmental flow recommendations will affect a range of current water withdrawal rates across different stream size classes. The previous flow ecology hypotheses and literature review work was combined with the environmental flow recommendations and water withdrawal analyses in a final report, which TNC plans to release this spring.

We are also currently assessing available flow modeling techniques and building hydrological and biological datasets for an environmental flow pro-

ject focused on the four-state Marcellus Shale Region. This project will integrate existing flow modeling techniques with biological data to develop flow ecology relationships in the region, and assess potential hydrologic and ecological impacts of increased water withdrawals for natural gas drilling.

These projects are funded by grants from the Northeast Regional Conservation Needs Program to TNC and Cornell, administered by the Cornell Lab of Ornithology, and the US Fish and Wildlife Service Appalachian Landscape Conservation Cooperative, administered by The Wildlife Management Institute.



Jason Taylor, Postdoctoral Research Associate

Implications of Natural Gas Extraction on the Eastern Brook Trout—Maya Weltman-Fahs, Ph.D. Student

Natural gas extraction from the Marcellus Shale formation using the hydraulic fracturing method is underway in PA and WV, and is expected to commence in NY in the future. Maya is investigating the effects of hydraulic fracturing activities on stream ecosystems using eastern brook trout, a declining native salmonid in the northeastern US, as an indicator species.

Maya's field study during the 2012 field season included chemical, physical, biological, and hydrological data collections at her PA pilot study

sites, which were highly forested watersheds with cold, headwater streams. The PA pilot study compares streams in a watershed across a range of gas shale drilling activities. She conducted replications of her data collection in the PA field sites in spring, summer, and fall of 2012.

During winter 2013, Maya planned her spring 2013 sampling in PA and will complete the same seasonal replications. In New York, her field work will involve collection of baseline data in a suite of sites with similar landscape and instream

characteristics to her PA sites, and high likelihood of future hydraulic fracturing activity. Maya plans to use her observational study in PA as a basis for modeling of potential impacts in NY under a range of predictive drilling scenarios.

Maya's research is being funded by the NYS Water Resources Institute and the US Fish and Wildlife Service Appalachian Landscape Conservation Cooperative.



Maya Weltman-Fahs, Ph.D. Student

Projects

Spatial Ecology and Movements of Black Bears in New York — Matt Adams, M.S. Student

Black bear populations in New York have been expanding in range over the past twenty years, with much of this growth occurring in the southern portion of the state. The northern extent of this recent expansion in central-western New York contains areas with higher proportions of development, higher human densities, and open agricultural areas than the traditional core range to its south.

We are evaluating black bear movements in relation to landscape characteristics (e.g., agriculture, human density, roads, topography), and evaluating habitat selection and temporal variation in space usage between bears in human-modified

landscapes and those in forested landscapes.

Data collection from radio-collared bears concluded in December, 2012. During January through March, 2013, Matt worked with NYSDEC regional personnel in efforts to locate bear dens, conduct den visits, and assess bear health and female reproductive status. We removed GPS collars from bears if the collar battery life was projected to expire before next den season (i.e., within a year). We were able to remove all but 5 collars (3 adult females and 2 males) that fit this profile. Three adult females were accompanied by yearling bears, whose presence made it very difficult to approach the den

without the bears fleeing. One of the adult males also fled his den site as it was approached, and the exact den location of the other adult male was not ascertained. There are also two additional collars that have an expected remaining battery life of more than a year. Both of these collars are on adult males, and we will continue to monitor these collars throughout the year and remove them in the 2014 den season. Matt has been analyzing data retrieved from the GPS collars and is working on completing his thesis.

Matt is advised by Dr. Angela Fuller. This project is funded by NYSDEC.



Matt Adams, M.S. Student

Estimating Black Bear Density Using Genetic Approaches — Cat Sun, M.S./Ph.D. Student

Black bears in New York have been expanding their range and encroaching on agricultural lands and more densely human-populated areas. At present, a rigorously-developed density estimate of this growing and expanding population does not exist. To assist the New York State Department of Environmental Conservation with developing a management plan that incorporates both biological data as well as stakeholder input, Cat is conducting a non-invasive, genetic spatial capture-recapture (SCR) study of black bears in a portion of the southern black bear range in New York. The methods Cat is using could be adapted and

implemented in the future for larger scale, state-wide population estimation.

In Spring 2013, Cat completed the genetic analyses of hair samples that were collected during field seasons in 2011 and 2012. From data collected in 2011, 165 bears were encountered 219 times, averaging 1.33 encounters per bear. In 2012, 212 bears were encountered 337 times, averaging 1.59 encounters per bear. The spatially-explicit capture-recapture models for estimating population density were also finalized.

Cat is now working on writing her Masters Thesis, which will include three chapters. The first chapter will describe the

results of the non-invasive genetic mark-recapture study; the second chapter will focus on simulations that explored different trap configurations and spacings for SCR sampling designs; the third chapter will provide an application, using 2011 and 2012 collected data, of a recently developed model that combines SCR with telemetry data to simultaneously estimate population abundance and resource selection patterns.

Cat is advised by Dr. Angela Fuller, NY Coop Unit, and Dr. Matthew Hare, Cornell University. This project is funded by NYSDEC and a Doris Duke Fellowship awarded to Cat.



Cat Sun, M.S./Ph.D. Student

Projects

Structured Decision Making for Natural Resource Issues in NY—Kelly Robinson, Ph.D., Postdoctoral Research Associate

Structured decision making (SDM) is a framework that is increasingly being used to assess complex natural resource problems. Kelly is using the the SDM framework on fish and wildlife issues in NY. She has been helping the NYSDEC use SDM to identify the best management strategies for reducing the yearling buck proportion of the annual white-tailed deer harvest and stocking fish in Owasco Lake.

Kelly has been working with the Big Game Team of NYSDEC to complete the development of a stochastic population dynamics model that simulates white-tailed deer harvest under different buck harvest management alternatives. The model will provide estimates of age- and sex-specific availability of deer on the landscape, expected harvest, and population growth under different harvest scenarios

relative to current management. The output of the population model, including the sources of uncertainty in the system, are being incorporated into the final decision analysis. Kelly has been working to incorporate the population model output, data from the NYSDEC, and stakeholder values into a decision analysis. The decision analysis is being conducted in a Bayesian Belief Network (BBN). Stakeholder values are an important consideration in the SDM process, and Kelly has been collaborating with both the NYSDEC and the Cornell Human Dimensions Research Unit (HDRU) to understand how the different stakeholders (the NYSDEC and NY hunters) value different aspects of buck harvest management. Kelly is working on this project with Dr. Angela Fuller.

In 2013, Kelly began a new project working with the Fisheries Division of NYSDEC to determine the best fish stocking strategy for Owasco Lake. In this SDM project, Kelly has been meeting with the fisheries managers for Owasco Lake to understand their management problem and objectives (both social and scientific), and what stocking alternatives would likely meet those objectives. To that end, Kelly has been working with the Fisheries Division as well as the Cornell HDRU to create an angler survey to help inform angler preferences in the SDM process. This survey will be administered in early June. Additionally, she has created a Bayesian Belief Network that will help guide the group through the decision-making process. Kelly is working on this project with Dr. Bill Fisher.



Kelly Robinson, Postdoctoral Research Associate

Spatial Capture-Recapture Models for Carnivores—Chris Sutherland, Ph. D., Postdoctoral Research Associate

To estimate the abundance and density of elusive carnivore species in New York State, we are using non-invasive genetic methods (scat and hair collection) to identify individual animals. We are extending traditional spatial capture-recapture (SCR) models for species known to use river and stream corridors. In our situation, the Euclidian assumption for the

distance from trap to activity center in traditional SCR models may not be appropriate. Therefore, we are developing a non-Euclidian metric based on a shortest path approach using a cost function.

We employed scat detection dogs to locate mammals along stream corridors. A scat detection dog proved highly effective in locating scats. We

deployed hair collection devices as an additional source of data. We are using the results of the pilot study and conducting simulations to select an optimal design for the full-scale study during 2013.

This project is being led by Dr. Angela Fuller (NYCFWRU) and Dr. Andy Royle (USGS, Patuxent Wildlife Research Center).



Chris Sutherland, Postdoctoral Research Associate

Projects

Spatial Climate Change Vulnerability Assessment— Chris Nadeau, M.S. Student

Climate change is expected to cause large-scale ecological change that could dramatically affect wildlife. Hence, wildlife management agencies must develop rapid assessment tools to determine which species and areas of the landscape will be most vulnerable to climate change. Chris is working with the NYSDEC to develop a rapid assessment tool to: 1) prioritize the management of Species of Greatest Conservation Need (SGCN) in New York, and 2) identify highly vulnerable and resilient areas of New York State. Specifically, Chris has developed a spatial climate-change vulnerability assessment tool that incorporates both spatial and non-spatial aspects of vulnerability,

including projected climate stress, potential for the landscape to buffer the effects of climate stress, and local-scale landscape connectivity.

In winter-spring 2013, Chris presented his preliminary findings at two conferences where his vulnerability tool was well received: 1) the Northeast Association of Fish and Wildlife Agencies (NEAFWA) Annual Conference, and 2) the U.S. Chapter of the International Association of Landscape Ecologists Annual Conference. Chris also hosted a special climate change session at the NEAFWA conference where his vulnerability tool was highlighted among five other spatially explicit climate change vulnerability and adaptation

efforts. He also worked to complete the first chapter of his thesis outlining a new multivariate method to quantify climate change. Chris was one of 24 graduate students and postdocs from the United States, Canada, Europe, and Australia selected to attend a summer workshop on Meta-Community Theory and Mathematical Modeling hosted by Michigan State University at the Kellogg Biological Station and sponsored by the National Science Foundation. He will be attending this workshop in June 2013.

Chris is advised by Dr. Angela Fuller and the project is funded by NYSDEC.



Chris Nadeau, M.S. Student

Relisting Species of Greatest Conservation Need in NY—Kimberley Corwin, Research Support Specialist

Species assessments are being written for each of the 537 Species of Greatest Conservation Need (SGCN) as the first step in the project to prepare a revised State Wildlife Action Plan, due in 2015. The assessments summarize current information on seven critical criteria: federal status, regulatory mechanisms, trends in abundance and distribution, current abundance in New York, threats to the species,

New York's contribution to the North American range, and knowledge of management actions. These seven criteria will be used in a decision model that has been developed by Dr. Angela Fuller and Dr. Mitch Eaton to place the current SGCN into one of several priority categories.

Progress remains on-track to complete the assessments for all 537 SGCN species by July 2013. A model similar to the

decision model developed for SGCN will be used in conjunction with the information in the assessments to amend the state endangered species list.

This project is funded by the NYSDEC.



Kimberley Corwin,
Research Support Specialist

Activities

Publications

- Fisher, W. L., M. Bozek, Vokoun, J., and R. Jacobson. 2013. Aquatic habitat measurements. Chapter 4, in A. V. Zale, D. L. Parrish, and T. M. Sutton. Fisheries techniques, 3rd edition. American Fisheries Society, Bethesda, Maryland.
- Long, J.M., R.G. Hyler, and W.L. Fisher. 2012. Response by anglers to a differential harvest regulation on three black bass species at Skiatook Lake, Oklahoma. Proceedings of the Oklahoma Academy of Science 92:9-20.
- Royle, J.A., R. B. Chandler, C. C. Sun, and A. K. Fuller. 2013. Integrating resource selection information with spatial capture-recapture. Methods in Ecology and Evolution. doi: 10.1111/2041-210X.12039.
- Weltman-Fahs, M. and J.M. Taylor. 2013. Hydraulic fracturing and brook trout habitat in the Marcellus Shale region: Potential impacts and research needs. Fisheries 38(1):4-15.
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Angela Fuller and Cat Sun with a black bear cub during a den visit in March

Activities

Presentations

- Alexiades, A. V., and W. L. Fisher. 2013. Brown trout population dynamics and angling behavior in New York streams: evaluation of a stocking model. 2013 Annual Meeting, New York Chapter of the American Fisheries Society, Watertown, New York, 30 January - 1 February 2013.
- Alexiades, A.V. 2013. The Fate of Stocked Trout in New York Streams. NYSDEC Trout Team Meeting, Cortland, NY. 26 February 2013.
- Eaton, M.J. The NY Cooperative Fish and Wildlife Research Unit's effort at capacity building in natural resource decision making. Invited presentation to Cornell University Dept. of Natural Resources 10-year external review. Jan 22, 2013.
- Eaton, M.J. Developing a sampling design for multi-state monitoring of the New England cottontail (*S. transitionalis*). Annual Meeting of the New England Cottontail Technical Working Group. Stockbridge, MA. Jan 17-18, 2013.
- Eaton, M.J., Fuller, A.K., Corwin, K., Rosenblatt, D., Ozard, J., Holst, L. 2013. Applying the SGCN decision model for species priority classification. Presentation of draft decision model to external technical review team for NYSDEC State Wildlife Action Plan preparation. 6 February 2013.
- Fuller, A. K. 2013. Spatially explicit models for density estimation of mammals using noninvasive DNA sampling. Invited presentation to the academic program external review team for the Department of Natural Resources, Cornell University. 22 January, 2013.
- Fuller, A.K., Eaton, M.J., Corwin, K., Rosenblatt, D., Ozard, J., and Holst, L. 2013. A decision model for prioritizing New York's Species of Greatest Conservation Need (SGCN). Presentation of draft decision model to external technical review team for NYSDEC State Wildlife Action Plan preparation. 6 February 2013.
- Fuller, A.K., Eaton, M.J., Corwin, K., Rosenblatt, D., Ozard, J., and Holst, L. 2013. A decision model for prioritizing New York's Species of Greatest Conservation Need (SGCN). Presentation of draft decision model to NYSDEC Bureau of Wildlife Manager's Meeting. 11 February 2013.
- Nadeau, C. P., and A. K. Fuller. 2013. Incorporating Spatial Heterogeneity in Climate Change and Landscape Features into Rapid Climate Change Vulnerability Assessments. US Chapter of the International Association of Landscape Ecologists Annual Meeting, Austin, TX.
- Nadeau, C. P., and A. K. Fuller. 2013. Incorporating Spatial Heterogeneity in Climate Change and Landscape Features into Rapid Climate Change Vulnerability Assessments. 69th Annual Meeting of the Northeast Association of Fish and Wildlife Agencies, Saratoga, NY. 7-9 April, 2013.
- Nadeau, C. P., and A. K. Fuller. 2013. A climate change vulnerability assessment to aid in the management of New York Species of Greatest Conservation Need. Department of Natural Resources Symposium, Ithaca, NY. January 18, 2013.
- Perry, P. C. and W. L. Fisher. 2013. Characterizing black bass length-at-age, relative weight, relative abundance and stock densities across New York lakes. 2013 Annual Meeting, New York Chapter of the American Fisheries Society, Watertown, New York, 30 January - 1 February 2013.
- Robinson, K.F. and A.K. Fuller. 2013. A structured decision making approach to white-tailed deer (*Odocoileus virginianus*) buck harvest management in New York state. 69th Annual Northeast Fish and Wildlife Conference (Northeast Association of Fish and Wildlife Agencies), Saratoga Springs, NY. 7-9 April 2013.
- Robinson, K.F. and A.K. Fuller. 2013. A structured decision making approach to white-tailed deer (*Odocoileus virginianus*) buck harvest management in New York state. Department of Natural Resources Symposium, Cornell University, Ithaca, NY. 17-18 January 2013.
- Sun, C. S., M. C. Adams, and A. K. Fuller. 2013. Black Bears in New York: Ecology, History, and Management. National Wild Turkey Federation, New York State Chapter Leadership Meeting. Waterloo, NY. January 12, 2013.
- Sun, C. S., A. K. Fuller, J. A. Royle, and M. P. Hare. 2013. Comparing Spatial and Non-Spatial Capture-Recapture Methods to Estimate Population Size of Black Bears in South-Western New York. Department of Natural Resources Symposium, Cornell University, January 18, 2013.
- Sun, C.S., A.K. Fuller, M.P. Hare, and J.A. Royle. 2013. Joining Resource Selection and Spatial Capture-Recapture into a Single Model: Estimating the population size of black bears in southwestern New York using a spatially-explicit capture-recapture model. 69th Annual Northeast Fish & Wildlife Conference, Saratoga Springs, NY. 7-9 April, 2013.
- Taylor, J. M. and W. L. Fisher. 2013. An evidence-based approach to developing environmental flow needs for Great Lakes tributaries in New York. 2013 Annual Meeting, New York Chapter of the American Fisheries Society, Watertown, New York, 30 January - 1 February 2013.
- Weltman-Fahs, M. and B. Fisher. 2013. Understanding the relationships between hydraulic fracturing and brook trout habitat in the Marcellus Shale region: A research agenda. Northeast Fish and Wildlife Conference. Saratoga Springs, NY. 8 April 2013.
- Weltman-Fahs, M., J.M. Taylor, and B. Fisher. 2013. Hydraulic fracturing and brook trout habitat in the Marcellus Shale region: Potential impacts and research needs. New York Chapter of the American Fisheries Society Annual Meeting. Watertown, NY. 1 February 2013.

Activities

Technical Assistance and Training

Technical Assistance

Fuller, A. K. Expert Reviewer of Canada Lynx Conservation and Assessment Strategy: Inter-agency Lynx Biology Team. 2013. Canada lynx conservation assessment and strategy. 3rd edition. USDA Forest Service, USDI Fish and Wildlife Service, USDI Bureau of Land Management, and USDI National Park Service. Forest Service Publication #RI-13-XX, Missoula, MT. 116pp.

Training

Eaton, M.J. Taught half-day adaptive management course and led a decision analysis workshop for the Diadromous Species Research Restoration Network (DSRRN) conference., University of Maine, Orono. 8-9 January 2013.

Fisher, W. L. Spatial Modeling and Analysis (NTRES 6200). Co-taught with D. G. Rossiter.

Cornell University, 22 January - 2 May 2013.

Fisher, W. L. Stream Fisheries Ecology and Management . Invited guest lecture in Fish Ecology, Conservation, and Management (NTRES 3110). Cornell University, 16 April 2013.

Fuller, A.K. Computational Challenges in Conservation. Invited guest lecture in Topics in Computational Sustainability (CS 6702). Cornell University, 19 February 2013.

Fuller, A.K. Integrating social and ecological science in decision making. Invited guest lecture in Applying Human Dimensions Perspectives to Socio-Ecological Problems (NR 4320). Cornell University, 21 February 2013.

Fuller, A.K. Structured Decision Making for Natural Resource Management. Invited guest lecture in Principles and Practices of Applied Wildlife Science (NTRES 4280/6280). Cornell University, 23 April 2013.



Black bear cub

NY COOP NEWS

Newsletter of the
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Happenings

We've moved back!—The NY Coop Unit staff and students have moved back into the newly renovated Fernow Hall. Offices of our three post-docs, remain in neighboring Bruckner Hall for now.
2013 Coordinating Committee meeting.—We will

be holding our annual Coordinating Committee Meeting at Cornell University in Ithaca, NY on 2 July 2013.
The 2012 Annual Report.—The annual report of unit activities, including project summaries, publications, presentations, and other activities for 2012

will be published in June 2013.
Retirement.—After 24 years of service with the U. S. Department of Interior, including 22 years with the Cooperative Research Units Program, Bill Fisher will be retiring at the end of August 2013.