July 2009

U.S. FISH & WILDLIFE SERVICE, REGIONS 3 AND 5

Refuge Biology Bulletin

Region 5 Names Linda Welch Refuge Biologist of the Year

Region 5 Project Leader and Biologist Conference

Managers and biologists from refuges throughout Region 5 met in Virginia Beach, Virginia during the first week of March to discuss Strategic Habitat Conservation (SHC), Structured Decision Making (SDM), Adaptive Management (AM), and Climate Change. Highlights from the conference included presentations and discussions on climate change impacts on sea level rise, coastal salt marshes, wildlife, water resources, land protection and land acquisition. During the conference attendees heard from many notable speakers, among them were Dr. Brian Watts (Center for Conservation Biology/College of William & Mary) who discussed a prioritization model for conservation of critical habitat for bald eagles, Dr. Virginia Burkett (USGS) who discussed climate change impacts on natural systems, Noah Kahn and Noah Matson (Defenders of Wildlife) who discussed Federal legislation and climate-related recommendations for Refuges, and Dr. Doug Tallamy (University of Delaware) who discussed impacts of invasive species on wildlife. Most notable were the presentations and posters given by Refuge biologists and Project Leaders highlighting their work with SDM, AM, and SHC on the first day of the conference and other important biological projects on the second day of the conference. An impressive 35 excellent posters were presented. See Appendix 1 for abstracts for a sample of the various posters presented at the conference.

During the conference, the first annual Northeast Region Refuge Biologist of the Year Award was presented to Linda Welch, a biologist at **Maine Coastal Islands National Wildlife Refuge Complex**. The award recognized Linda's professional impact on the biological programs at the refuge and at regional and national levels. In addition, it recognized her many contributions to: the refuge's successful seabird restoration programs; her work in fostering many seabird coalitions and scientific groups; her involvement in professional groups such as The Wildlife Society; her contributions to scientific literature, meetings, and conferences; her guidance of many Master's Degree candidate researchers; and her recent work in bringing oil spill restitution funds into the Service. Other nominees for the award included John Gallegos (**Back Bay NWR**), Kevin Holcomb (**Forsythe NWR**), Stephanie Koch (**Eastern Massachusetts NWR Complex**), Kate O'Brien (**Rachel Carson NWR**), Nancy Pau (**Parker River NWR**), and Ken Sturm (**Canaan Valley NWR**).

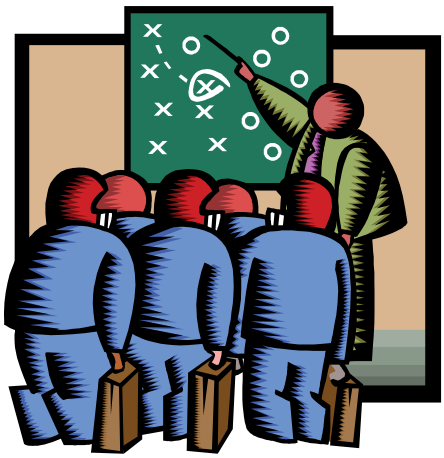
Linda Welch (3rd from L) receives the Region 5 Refuge Biologist of the Year award from (L to R) Jan Taylor, Wendi Weber, and Tony Leger. Photo by Greg Thompson, USFWS.

Conservation Planning Workshops and Wildlife and Habitat Reviews in R3
By Pat Heglund, RRB

We completed a Biology Pre-Planning Workshop at **Big Stone National Wildlife Refuge** in Minnesota in January.

These workshops are a new step in the comprehensive planning process. Part of the planning process is to develop a range of alternatives, each of which potentially could be the Comprehensive Conservation Plan (CCP) that provides Refuge management guidance for the following 15 years. These "alternative CCPs" must help fulfill the purpose, vision, and goals of the Refuge as well as address pressing issues identified by those inside and outside the agency. Done well, this process helps us consider options we may otherwise overlook and improves the quality of our decision making. The general ingredients of alternatives are common to all CCPs: habitat management and monitoring, population management and monitoring, visitor services and facilities, and outreach to those beyond refuge boundaries. The goal of wildlife and habitat pre-planning for CCP development is to gather relevant biological information in advance of the formal planning process. From this body of information, we can develop a draft set of realistic, alternative states for the refuge, provide an articulation of the motivation behind each alternative and prepare a list of tradeoffs and benefits for each. The information and draft alternatives provide the biological and human dimension basis for developing and evaluating the final proposed alternatives.

We completed a joint Biology and Visitor Services Workshop, now fondly referred to as a *Resource Priorities and Scenario Planning Workshop*, at **Crane Meadows NWR** in Minnesota in March. This was our first attempt at combining biology with visitor services in a single workshop. By combining the two entities we are better able to coordinate between the interest groups. The visitor services panel could think about how to creatively support the ecological themes identified for a station and the biology panel could openly converse about where and what types of visitor services might be most valuable and how to protect sensitive areas.



We will be conducting another Resource Priorities and Scenario Planning Workshop at **Neal Smith NWR** in August. We will be conducting a Wildlife and Habitat Review at **Minnesota Valley National Wildlife Refuge** in September or October.

Wildlife and Habitat Reviews are conducted once a station has a comprehensive conservation plan and either wishes to use the guidance from a review in the development of a Habitat Management Step-Down or an Inventory and Monitoring Plan or, if an HMP and or IMP has been completed, to see how they are progressing toward the desired future condition of the station as stated in the comprehensive conservation plan.

Climate Change and the FWS
By Pat Heglund RRB

Revised drafts of the National Climate Change Strategic Plan and Draft Action Plans are currently undergoing a “fatal flaw” review and should be available for public consumption soon. Pat Heglund will send a link to the Climate Change website when they are released.

The National Geographic Framework Group met the week of June 22nd and focused on developing a geographic framework for landscape conservation cooperatives.

Todd Sutherland and Melinda Knutson will be on a detail for 2-4 months helping to design a Refuge System Inventory and Monitoring Program under the leadership of the Washington Office. There is a strong possibility that up to $12 M may be allocated for such a program in the FY 2010 budget.

Ultimately, we expect that a Refuge System I&M program will meet the needs of the System while supporting Service's information needs at landscape scales. The team will also be expected to review existing national I&M programs including the National Park Service's Vital Signs and the Forest Service's Forest Inventory Analysis programs, both to explore collaborative opportunities and to discern the applicability of various aspects of these programs to our needs.

Pat Heglund has been assigned to the Regional Climate Change Workgroup for R3.

Pat Heglund and Melinda Knutson participated in a panel that considered the inventory and monitoring needs of the FWS (not just Refuges) the week of July 13 at Patuxent Wildlife Research Center.

Coordinated Bird Monitoring in Region 3
By Pat Heglund, RRB

Refuges in R3 are committed to working closely with Migratory Bird Management staff on coordinated bird monitoring. This past spring the Regional Biology staff met with Migratory Bird Management staff in La Crosse Wisconsin to meet Katie Koch (she's new!), to discuss coordinated bird monitoring, and to share ideas and progress with one another. Here is a sampling of efforts on-going in Region 3:

Katie Koch, lead for Migratory Bird Management's Coordinated Bird Monitoring effort in Region 3 hosted a series of three workshops. The Biological Monitoring and Database Team was asked to present information about regional efforts within refuges to monitor bird populations. Hopefully, many of you were able to attend these workshops as well and are interested in providing ideas and support for this effort.

Jessica Lee attended the Quincy, IL Coordinated Bird Monitoring Workshop as a representative from the **Big Rivers Network** and forwarded her notes to the Big Rivers Network. Jessica - THANK YOU for attending and for sharing these notes. A copy of Jessica's note can be found at the BMDT's web site: http://www.fws.gov/bmt/ (We'll be using this site for all postings until we get the Regional Biology portal on line.)

Soch, Melinda, Frank Durbian, and Pat Heglund have been working with folks from Regions 3, 4 and 5 on a very large scale integrated water bird management and monitoring project. This is one of the first to address strategic land acquisition and strategic habitat conservation along flyways as well as to address regional information needs and local scale management. A new fact sheet about this effort can be found on the project web site: http://www.acjv.org/waterbird_project.htm.

Tom Will from Migratory Bird Management began working this spring with a few stations in MN and WI to coordinate golden-winged warbler studies. Rice Lake, Tamarac, Necedah, Upper Mississippi River and our staff here in La Crosse have joined forces with MBM, Cornell, and USGS to look at a variety of habitat, breeding ecology, and genetic components for this species.

Melissa Meier of the USGS-UMESC and Pat Heglund have been working with the **Big Rivers refuges** to secure and analyze multiple years of water bird data from the **Upper Mississippi and Illinois River refuges**. Melissa and programmers from UMESC created a database for water bird surveys and is now working with station biologists to summarize those data based on the purposes identified for collecting the information. Melissa spent nearly a full year getting paper copies of legacy data entered into the new database and sent each participating station copies of the system so that they can continue entering their information. Last fall Melissa held a training class on how to input data into the database. This effort was supported by funding from the Long Term Resource Monitoring Program for the Upper Mississippi River System. In addition to the analyses, she is preparing guidance on how well the data collected are meeting management information needs stated by the biologists.

Least bittern, photo by Melinda Knutson

Soch Lor is now working with several refuges that have multiple years of secretive marsh bird data in filing cabinets and in electronic files. Soch is collaborating with the station biologists to analyze this information over the next 6 - 12 months. Soch has been dedicated over the past few years to getting a national marsh bird monitoring protocol revision completed and has conducted training sessions for staff interested in conducting surveys.

Frank Durbian working with Dr. Adrian Farmer (retired from the USGS Fort Collins Science Center) recently completed the development of a database for shorebird information and conducted several webinar training sessions this past spring. This work was supported by a combination of Station and Network funds. An example of how Frank was able to use the database and summary queries to provide some very useful information on the importance of Squaw Creek as a stop over location in the Midwest can be found at the BMDT's web site: http://www.fws.gov/bmt/. This summary has gotten the attention of the folks in the Great Lakes Joint Venture Office. Hopefully it will stimulate more of you to think about how your station fits into larger scale population goals!

Melinda Knutson completed a standard protocol for point count surveys of landbirds in 2008 that we are now encouraging all FWS biologists who wish to monitor landbirds via point counts use. She and Todd Sutherland have been instrumental in working with USGS and the American Bird Conservancy to improve, manage, and use the National Bird Point Count Database which is housed at Patuxent Wildlife Research Center. Melinda has been tirelessly working with Regions 3 and 5 to get point count data from multiple stations analyzed with Drs. Frank Thompson (USFS - Columbia, MO) and Wayne Thogmartin (USGS-UMESC) among others. The land bird point count protocol can get downloaded from:
http://www.fws.gov/bmt/documents/Landbird%20Monitoring%20Protocol%202008.pdf

These are just a few examples of how Refuges are focusing their attention on refining our biological surveys, learning what the data can tell us and refining how our surveys can better address the information needs we have at our stations, regionally, and nationally. We are excited to strengthen our partnership with Migratory Bird Management through the Coordinated Bird Monitoring Program! This is a very exciting time!

Strategic Habitat Conservation and Climate Change in R3
By Pat Heglund, RRB

In April several of you were invited to participate in a train-the-trainer workshop on Strategic Habitat Conservation hosted by the Regional SHC Support Team. Trainees have since been asked to host their own "Listening Sessions" at individual stations. You may have already or soon will be invited to come, learn more about SHC and have an opportunity to ask your own questions. Check the Regional Strategic Habitat Conservation Support Team website on the Intranet for more information.

Ashley Berkler is a SCEP Visitor Services Specialist with Region 3. In January she attended a workshop called "Interpreting Climate Change" at the Mather Training Center in West Virginia. As part of this workshop Ashley was asked to present climate change training sessions to FWS employees. These sessions, a sort of Climate Change 101 where the basics of climate change science are presented, are to stimulate conversations about how best to communicate Climate Change with regard to the Refuge System to the public. She currently has scheduled sessions for Tamarac NWR and Detroit Lakes WMD in August and the Region 3 Visitor Services workshop in September. Biologists may find her training sessions informative and a real opportunity to inject how your efforts might be addressing climate change. I encourage you to attend if there is a session scheduled near you.

Wildlife Disease Contingency Plans and the Status of Disease Management in Region 3
By Pat Heglund, RRB

Jennifer Sauer and Drs. Scott Wright and Anne Ballman worked with Michelle McDowell and Gwen Kolb to evaluate the status of Wildlife Disease preparedness in Region 3. A report was completed and can be accessed at http://www.fws.gov/bmt/

A one page disease response information sheet is being prepared by Gwen and Michelle and will be distributed to all stations by early September. This fact sheet will provide everyone at your station with important information regarding where to report a disease outbreak and where to obtain expertise and/or equipment and training. Many thanks Michelle and Gwen who volunteered their expertise and time to help us get our wildlife disease response plans up to date!

Rice Lake has developed a contingency plan template and is overseeing a biological technician who will be contacting those stations with the highest disease rates and offering to develop or update a station disease contingency plan. The technician is supported by Regional Biology funding.

Wildlife Disease response kits are being prepared for all stations and will be distributed by the end of the calendar year.

Eastern Broadleaf Forest Network
By Perry Williams

Ongoing Network Projects:

Planning a project to examine the possibility of invasive plant mapping using color-infrared (CIR) aerial photographs. Pilot Study will include mapping **Big Oaks and Muscatatuck NWRs**. If mapping invasive plants using CIR for these refuges is successful, mapping will be conducted for all refuges within the Eastern Braodleaf Forest Network.

Conducting an invasive plant (occupancy) study at **Big Oaks, Mingo, and Muscatatuck NWRs**. These refuges are working closely using similar protocols to estimate factors associated with invasive plant occupancy, as well as collecting spatial information of invasions. Mary Balogh (Region 3 GIS Coordinator) has been working closely with each refuge providing technical assistance.

Cane restoration occurring at **Mingo NWR** as a result of Network Workshop conducted last year.

Personnel Changes

Jason Lewis converted from Wildlife Biologist to Assistant Manager at Mingo NWR

Perry Williams converted from SCEP Wildlife Biologist at Fergus Falls WMD to Wildlife Biologist at Big Oaks NWR. Perry replaced Jason Lewis as Network Leader after Jason's conversion.

Scheduled Events

Forest Structured Decision Making workshop (October 5 – 7)

Network Meeting at Patoka River NWR (October 19 – 22)

Publications

Flory, S. L., and **J. Lewis**. *In Press.* Non-chemical methods for managing Japanese stiltgrass. Invasive Plant Science and Management.

Region 3 Big River Network News
By Jessica Lee

June 17-18, 2009: Notes from the Midwest Coordinated Bird Monitoring Workshop - Quincy, IL

The meeting started with a short introduction into coordinated bird monitoring by Katie Koch from migratory birds. Marshall Iliff, Avian Knowledge Network, gave a presentation on what AKN does and how it could benefit us in the Midwest. The AKN is an organization that focuses on understanding the patterns and dynamics of bird populations. The AKN brings together millions of bird observations from all sorts of entities (e-birds, Christmas bird counts, breeding bird surveys, bird banding, etc.) and makes the data available to individuals. They are a place where data can be entered, stored, shared, and retrieved for a variety of reasons. They have 11 nodes throughout North and South America that store and manage data more specific for that area or project. The Midwest currently does not have a node. To start a node in the Midwest, funding and personnel would need to be established. Katie is looking into what is needed to accomplish this. You can find out more at their website http://www.avianknowledge.net/.

Katie Koch, FWS migratory birds, explained the marshbird monitoring program that was piloted in WI in 2008. WI DNR used the Conway national protocol and selected sites all over the state to begin annual marshbird monitoring. The state of Michigan will begin the implementation of their marshbird monitoring program in 2010 and other non-Midwest states are beginning statewide surveys over the next few years. It was discovered at the meeting the IL Natural History Survey has been conducting marsh surveys for the last 27 years using a protocol similar to the Conway protocol and they are going to look at modifying their protocol to fit the national protocol. Judy Pollock, Chicago Audubon, showed how citizen science work they have been performing helps land managers conserve birds in urban-rural interface. She gave specific examples of the monitoring work they have done before and after restoration projects.

Greg Soulliere, Upper Mississippi River & Great Lakes Region Joint Venture, and Todd Jones-Farrand, Central Hardwoods Joint Venture, both spoke about conservation priorities in their respective JVs.

After presentations we broke into 3 working groups – rivers/wetlands, grasslands/shrublands, and forests. Each group set top priorities for what they want out of coordinated bird monitoring and what tools they need to accomplish those priorities. I participated in the rivers/wetlands groups. As a group we decided that our #1 priority for this region of the Midwest is stopover ecology – What is the length of stay at stopovers for each species of waterfowl, shorebirds, and marsh birds? How do we successfully monitor *migrating* waterbirds, specifically shorebirds and marshbirds? What are the energetic requirements for waterbirds? How can we ensure we are providing enough food to meet those requirements? We ranked the waterbird groups by need with regard to migration information. We ranked shorebirds the highest, marshbirds were next, then waterfowl.

We went through an exercise to determine what information already exists in the area of stopover ecology, existing monitoring efforts that could be improved, specific research or projects that we would like to see accomplished, and which other individuals or entities should be included.

Some of the last ideas we discussed were – How do we move forward? What is needed to work towards our priorities? Where do we go from here? Who should oversee and coordinate bird monitoring in the Midwest? (The general sentiment to this question was FWS). It was never stated outright but the overall feel from the group was that a Midwest node (AKN) would be a good idea. We all felt there was a lot of information out there either hiding in filing cabinets or is inaccessible to users. There needs to be a better way of organizing and using the information that is available. This was also the feeling after the first meeting held in Indiana in May.

There is one more meeting July 28-29 in La-Crosse if you are interested in attending. Contact Katie, Katie_Koch@fws.gov, for more info.

The Region 5 Biologist of the Year Trophy of a Winter Wren will be displayed at **Maine Coastal Islands NWR** this year. 2009 is the first year Region 5 has bestowed this award.

As a follow-up, Linda Welch reports that the station funds that were part of her award are being used to track Greater Shearwater movements by satellite. This will help the Service understand how wind power and offshore development may affect the birds.

Photo by Greg Thompson, USFWS

Region 3 Prairie Biology Network
By Sara Vacek and Karen Viste-Sparkman

Service biologists have extensive knowledge of and experience with and wetland restoration for wildlife habitat. But are there abiotic clues in the landscape that might help explain why a restoration doesn't go as planned? Or could some of those clues help us make better decisions about restoring or managing a wetland in the future?

In mid-June, the Prairie Biology Network gathered for a workshop to explore these issues. The venue was Minnesota Valley NWR's brand new Rapids Lake Environmental Learning Center, near Chaska, MN. Trainers included experts from Minnesota Board of Soil and Water Resources, NRCS, Corps of Engineers, North Dakota State University, and the Service. We kicked off the workshop with three network biologists presenting case studies from their station. The trainers provided talks on wetland assessment, hydrology, soils, and plants. The highlight of the workshop was a day in the field, putting the classroom ideas into practice; one participant called it "Wetland CSI." The workshop wrapped up with an excellent discussion about the case studies and what we observed in the field.

Though it was challenging to get away during the field season, the group agreed that it was well worth the sacrifice to spend some quality time in the field with your peers and the trainers.

Prairie Network Personnel Changes:

Frank Durbian is now the Assistant Refuge Manager at **Morris WMD**. Shawn Papon moved from the Wisconsin Private Lands office to **Fergus Falls WMD**, where he is still a private lands biologist. Scott Ralston is the new Partners for Fish and Wildlife Biologist at **Windom Wetland Management District**.

A new addition in the Prairie Network family: Becky Esser of **Detroit Lakes WMD** is the new mother of Ava Rebecca Esser, born May 12.

Prairie Biology Network News (winter 2009)
By Sara Vacek

The Prairie Biology Network met Feb. 3-5 in New Richmond, Wisconsin, hosted by **St. Croix WMD.** The highlight of the meeting was a tour to some oak savanna restoration sites. St. Croix staff has taken advantage of the biofuels market to bargain with contractors who do tree removal in exchange for the wood chips that they produce. They have also been successful in building relationships with neighboring landowners and working with them to remove trees and restore savanna. Despite frigid temperatures, the network members appreciated the opportunity to get out into the field.

Several network members presented updates on research going on at their stations, which included discussions on management and restoration techniques. Teresa Woods shared information on FWS involvement in climate change issues and especially how they relate to our region and prairie ecosystems. She also walked us through the process of publishing in the new Service on-line publications. Jim Lutes shared his experiences with a wind power development near **Leopold WMD** and how wind power impacts wildlife. Dan Sobieck provided us with information on how stations can increase their chances of receiving funding, as well as reviewing the Student Career Experience Program in Region 3. Several stations coordinating on HMP development updated us on their progress. Pat Heglund suggested some training opportunities for biologists and will look into having them presented in the region.

Most important was the opportunity to network and share experiences with others facing some of the same challenges. Thanks to all who attended and contributed by presenting and participating in the discussion.

Prairie and Savanna LMRD: Midwest Region
By Pauline Drobney, LMRD Biologist

Research projects occurring as a part of the LMRD program at **Neal Smith NWR** include:

Thistle suppression research (located at **Fergus Falls, Litchfield, Morris WMDs, and at Neal Smith NWR**): to understand if seed mix, season of planting, planting equipment or soil characteristics can result in suppression of Canada thistles.

Spatial distribution of prairie plant species relative to exotic species success or suppression: to understand if local arrangements of plants influence ability of exotic species to invade and thrive.

Carbon sequestration research: to understand if there are differences in carbon accrual in a chronosequence of prairie plantings. Study is in year 10.

Ecology of a prairie planting: to understand the relationships between development of the plant community and changes in soil and water conditions and to understand rates of carbon accrual as a prairie planting matures

Hydrology research: to understand relationships between ecological restoration and hydrology and water quality.

Thistle control in native grasslands: to understand ways to maximize control of Canada thistle, minimize impact on native species, and reduce time and cost of management using various Milestone and Transline treatments.

The relationship of bird use to changes in the landscape in an ecological restoration: to discover what changes in bird use occur through time as a formerly farmed landscape is restored to a more natural condition.

Sedge meadow reconstruction: to discover if a reed canary grass dominated area can be successfully converted to a diverse sedge meadow with treatment of glyphosate, seeding, transplants, and burning.

Agro-ecosystem research: to understand if an investment in small amounts of land planted with diverse prairie mix within a cropped field provides disproportionate benefit in terms of ecosystem services and in economic return.

On **September 19**, the first-ever **Research Field Day** will be held at **Neal Smith NWR**. On this day, visitors will be greeted at the Prairie Learning Center by biologists and volunteers who will provide information on how to visit several field sites. Researchers will be available in the field to explain and demonstrate the purpose of and techniques used in their research, as well as discuss insights gained thus far. We will exchange ideas with researchers striving to understand best management practices for tallgrass prairie ecological restoration, and ways that prairie relates to important issues of our times. Don't miss this exciting LMRD event!

Clustered Poppy Mallow (*Callirhoe triangulata*), dry sand prairie. Photo by Melinda Knutson

https://intranet.fws.gov/region9/refuges/biologywebsite/

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Refuge Biology Bulletin

This site is meant to be the **first point of inquiry** for individuals seeking information related to the work and professional development of NWRS biologists. When it doesn't provide the information you seek, we hope it points you quickly in the right direction.

We tried to address most concerns and needs of field biological personnel, regardless of job series. Whether you are a wildlife biologist, ecologist, botanist, or similar professional - or anyone needing information about refuge biological programs - we want to provide tools and knowledge to meet your professional needs.

The objectives of the site are:

*Provide ready access to relevant policies, technical documents, personnel, and databases

*Provide tools and information.

*Promote a sense of community among field biologists.

We need help maintaining and upgrading the content for the site. If anyone has an interest in assisting with content, please contact Melinda Knutson.

Resources, websites, publications of interest...

Websites:

Applied Environmental Decision Analysis.

http://www.aeda.edu.au/aeda-research-themes

This Australia-based research group focuses on monitoring, landscape planning, and environmental decision making. They provide several thought-provoking fact sheets.

Publications:

Allan, C., and A. Curtis. 2005. Nipped in the bud: why regional scale adaptive management is not blooming. Environmental Management 36:414-25.

Conway, C. J., C. P. Nadeau, R. J. Steidl, and A. R. Litt. 2008. Relative abundance, detection probability, and power to detect population trends. Wildlife Research Report #2008-02. U. S. Geological Survey, Arizona Cooperative Fish and Wildlife Research Unit, Tucson, AZ. 74 pp.

Corace, I., R. G., K. P. Leister, and E. Brosnan. 2008. Restoration Notes: Efficacy of different glyphosate concentrations in managing glossy buckthorn (Frangula alnus) resprouts (Michigan). Ecological Restoration 26:111-113.

Corace, R. G., D. J. Flaspohler, and L. M. Shartell. 2009. Geographical patterns in openland cover and hayfield mowing in the Upper Great Lakes region: implications for grassland bird conservation. Landscape Ecology 24:309-323.

Drobyshev, I., P. C. Goebel, D. M. Hix, R. G. Corace, III, and M. E. Semko-Duncan. 2008. Pre- and post-European settlement fire history of red pine dominated forest ecosystems of Seney National Wildlife Refuge, Upper Michigan. Canadian Journal of Forest Research 38:2497-2514.

Drobyshev, I., P. C. Goebel, D. M. Hix, I. Corace, R. G., and M. E. Semko-Duncan. 2008. Interactions among forest composition, structure, fuel loadings and fire history: A case study of red pine-dominated forests of Seney National Wildlife Refuge, Upper Michigan. Forest Ecology and Management [For. Ecol. Manage.] 256:1723-1733.

Durbian, F. E., R. S. King, T. Crabill, H. Lambert-Doherty, and R. A. Seigel. 2008. Massasauga home range patterns in the Midwest. Journal of Wildlife Management 72:754-759.

Hunt, P. D. 2009. Monitoring nightjar and shrub-scrub bird response to habitat condition and management. New Hampshire Audubon report to the American Bird Conservancy, Concord, NH.

Meier, M. S. 2008. Summary Report on Integrated Waterbird Database for Monitoring Status and Trends on the Upper Mississippi River. Contract Report in Fulfillment of Additional Program Element 2007APE4b, LTRMP. U.S. Geological Survey, Upper Midwest Environmental Sciences Center, La Crosse, WI. 43 pp.

Nagel, L. M., I. Corace, R. G., and A. J. Storer. 2008. An experimental approach to testing the efficacy of management treatments for glossy buckthorn at Seney National Wildlife Refuge, Upper Michigan. Ecological Restoration 26:136-142.

Stem, C., R. Margoluis, N. Salafsky, and M. Brown. 2005. Monitoring and Evaluation in Conservation: a Review of Trends and Approaches. Conservation Biology 19:295-309.

Thogmartin, W. E., M. Gallagher, N. Young, J. J. Rohweder, and M. G. Knutson. 2009. Factors associated with succession of abandoned agricultural lands along the Lower Missouri River, U.S.A. Restoration Ecology 17:290-296.

Van Meter, R., L. L. Bailey, and E. H. C. Grant. 2008. Methods for estimating the amount of vernal pool habitat in the northeastern United States. Wetlands 28:585-593.

Northeast Regional

National Wildlife Refuge Project Leader & Biologist Conference

March 3-6, 2009

Poster Session Abstracts

Freshwater Wetland Restoration Potential at Canaan Valley

Jennifer Stucker[1], Greg Breese[2], Adam Green[3], Craig Snyder[4], Jan Taylor[5], Elizabeth Byers[6], Leah Ceperley[7], Norma Kline[8], Than Hitt[4], Andy Hofmann[7], Tom Roster[9], Ken Sturm[7], John Young, Michael C. Runge[10] and Donna Brewer[11]
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[2]USFWS Delaware Bay Estuary Project, Smyrna, DE, USA
[3]IAP World Services, c/o Patuxent Wildlife Research Center, Laurel, MD, USA
[4]USGS Leetown Science Center, Kearneysville, WV USA
[5]USFWS Great Bay National Wildlife Refuge, Newington NH, USA
[6]WV DNR, WVDNR, Elkins, WV, USA
[7]USFWS Canaan Valley NWR, Davis, WV, USA
[8]USFWS Erie National Wildlife Refuge, Guys Mills, PA, USA
[9]USFWS Iroquois NWR, Basom, NY, USA
[10]USGS Patuxent Wildlife Research Center, Laurel, MD, USA
[11]USFWS National Conservation Training Center, Shepherdstown, WV, USA

National Wildlife Refuges (NWRs) make annual refuge specific and multi-year planning decisions with regard to the protection, management, and restoration of freshwater ecosystems. To identify the most valuable avenues of management and restoration, a multi-objective decision framework was developed to evaluate management objectives while acknowledging the uncertainty about the effects of management actions. This effort seeks to identify strategies to evaluate the range of decisions related to restoration, management, and maintenance of stream, wetland and riparian hydrology and management effects on biological integrity, biological diversity, environmental health (BIDEH). While this process was undertaken at both Erie NWR in Pennsylvania, and at Canaan Valley NWR in West Virginia, the following discussion focuses only on Canaan Valley. Canaan Valley NWR supports rare high elevation wetland communities and species, many of which are of state and regional concern. Historically, the Valley was logged and abandoned logging railroad grades remain today impeding the natural flow of water thus affecting rare and sensitive plant communities. To address this issue Canaan Valley developed the following problem statement: How do we manage embankments to achieve natural flow regimes (i.e. surrogates for biological integrity, diversity and environmental health) within wetland habitats of Canaan Valley NWR while not exceeding budgetary, political and/or legal constraints? Exploration of potential management actions was limited to two embankment types and sites: 1) an embankment on the valley floor perpendicular to water flow; and 2) an embankment on a toe slope parallel to water flow. A consequences table was developed to evaluate the following six potential alternatives: 1) maintain status quo, 2) total embankment removal with recontouring and ditch filling, 3) partial embankment removal with ditch filling, 4) use permeable fill replacement and ditch filling, 5) maintain embankment with ditch filling, and 6) alternative 1 and replace with a boardwalk for public use. Through this process, Canaan Valley NWR recognized that the valley floor embankment had the greatest uncertainty relative to potential management actions. Additional hydrological research and modeling or a careful adaptive management approach will be required prior to management action. In contrast, management decisions for the remaining embankments had less uncertainty and could proceed with less upfront research.

Adaptive Management of Shrubland Habitats to Benefit Migratory Songbirds and New England Cottontail

Kate O'Brien[1], Stephanie Koch[2], Nancy Pau[3], Suzanne Paton[4], Kelly Boland[1], Jason St. Sauver[2], Sarah Janson[3], Erin King[4]
[1]Rachel Carson National Wildlife Refuge, 321 Port Road, Wells, Maine 04090
[2]Eastern Massachusetts National Wildlife Refuge Complex, 73 Weir Hill Road, Sudbury, Massachusetts 01776
3Parker River National Wildlife Refuge, 6 Plum Island Turnpike, Newburyport, Massachusetts 01950
4Rhode Island National Wildlife Refuge Complex, 50 Bend Road, Charlestown, Rhode Island 02813

Shrub communities provide critical habitat for regionally declining Neotropical migrant landbirds and New England cottontail, a Candidate Species for listing under the federal endangered species act with very limited distribution. However, the ability of non-native invasive plant species to quickly colonize these habitats, and their tenacious character once established, have hampered our ability to meet habitat objectives for these trust resources and preserve biological integrity and ecological diversity. To address these issues, four national wildlife refuges in New England are evaluating two competing models to determine if low frequency or medium frequency management treatments are necessary for establishing and maintaining native shrubland habitats. Using an adaptive management approach we hope to 1) identify the best methods for converting old fields to native shrubland and non-native shrubland to native shrubland, 2) identify species / habitat relationships and ecological variables that will influence successful implementation of management practices and 3) identify monitoring metrics and develop standardized protocols to evaluate success of management alternatives. We are using habitat-based metrics as well as presence / absence data for evaluating success of management for migrating landbirds and New England cottontail, and quantifying the percentage of native and non-native species at each site to evaluate biological diversity and integrity.

Management of Powerline Rights-of-Way for Botanical and Wildlife Value in Metropolitan Areas

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Powerline rights-of-ways (ROWs) are common features of metropolitan landscapes. These ROWs are often >76 m wide and extend for many km through urban environments. They include thousands of ha in population centers where the demand for land is high and costs for acquiring new conservation areas often are prohibitive. Cooperative ventures between power companies and state, federal, and private conservation groups can yield unique plant communities and wildlife habitats in these urban ROW properties.

In 1960, the U.S. Fish and Wildlife Service entered into a partnership with the Potomac Electric Power Company (PEPCO) to manage vegetation on a newly constructed ROW transecting the Patuxent Research Refuge, Laurel, MD. To minimize arching potential, it was agreed that vegetation was to be limited to <3.5 m in height. The vegetation was to be managed in a fashion consistent with the mission of the refuge. Native vegetation was allowed to revegetate the soils that were denuded of plants during the construction phase. The vegetation was then managed by periodic removal of all tall-growing tree species. This was accomplished by selectively applying a small amount of herbicide to the basal stems of each unwanted species. The herbicide mix contained 17% Garlon 4 (Triclopyr), 2% Stalker (Imazapyr), 1% Bas-Oil Red (colorant), and 80% HY-Grade EC (emulsified mineral oil, carrier). There was no mowing or indiscriminate use of herbicides. Now, nearly 50 years after the powerline was constructed, the ROW is dominated by an artificially maintained shrub community that is rich in botanical diversity and is heavily used by wildlife, especially neotropical landbirds. The success of this pilot study has led PEPCO to adopt this vegetation management system on selected portions of ROW that they own in the Washington, D.C. metropolitan area. Techniques and results of vegetation management on the ROW at the Patuxent Research Refuge and their application to the creation of conservation habitats along urban powerline ROWs were described.

An Adaptive Approach for Seabird Islands Vegetation Management

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Over the past 20 years, Maine Coastal Islands National Wildlife Refuge has experimented with a variety of techniques to create and maintain the low sparse vegetation preferred by common and Arctic terns. Management successes were often limited in size and restricted to a single growing year. Due to the complexities of monitoring the effect of treatments on habitats, decades of successes and failures were only captured in subjective observation.
An adaptive management study has been initiated to:

- Determine the most effective treatments (mowing, grazing, and/or prescribed fire) for creating and maintaining tern habitat and test predictions of habitat response to treatments.
- Develop a predictive model for island vegetation management that includes new data, scientific research, and the Refuge's historical observations.

The model will include vegetation data, soils, bird distribution, weather events, and costs. Vegetation will be surveyed 3 times/year for 3 years using a stratified random sampling approach, with eight 1m² subplot in each 10m² plot. In order to minimize bird disturbance, a rapid sampling approach will include height and % canopy cover of dominant vegetation and photographs (30m² subplots per island, 5 minute sampling time/m²). Study results will be available at the end of the three year study time frame (2011).

Loggerhead Sea Turtle (*Caretta caretta*) Adaptive Management at Chincoteague National Wildlife Refuge…40 Years and Counting!

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From 1969 to 1979 Chincoteague NWR (CNWR) engaged in an experimental loggerhead sea turtle egg translocation program. Eggs from nests laid in Cape Island of Cape Romain NWR, Charleston County, SC were moved to Assateague Island, CNWR in Accomack County, Virginia. The goal was to extend the Atlantic loggerhead's breeding range by translocating eggs to protected beaches physically and ecologically similar to southern sites with nesting populations. CNWR monitored shorelines for nesting activity since translocation efforts began. Comparing the period of 1970-1999 to the period of 2000-2008, false crawls and nests have increased significantly. Prior to 2000, staff recorded 6 sea turtle false crawls and 10 nests. Between 2000 and 2008, staff observed 36 false crawls 16 nests. Loggerhead sea turtles reach maturity at 30 years. Hatchlings resulting from the transplant project may be returning to their hatch and release sites, one possible explanation for the increased crawl activity. Adaptive Management, an iterative process to improve resource management over time by learning from management outcomes, has been in the spotlight in recent years. Sea turtle management at the northern extent of the loggerhead's nesting range for this long-lived, slow-reproducing species must qualify as one of the more long-term adaptive management experiments.

Seabird Restoration Efforts at Maine Coastal Islands National Wildlife Refuge

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Arctic tern (*Sterna paradisaea*), common tern (*S. hirundo*), and roseate tern (*S. dougallii*) populations were decimated in the Gulf of Maine in the late 1800's due to a combination of shooting and egging for use as food and bait. Thousands of terns were also harvested to provide feathers for the growing millinery trade. For the past 25 years, Maine Coastal Islands National Wildlife Refuge has been working to restore tern and Atlantic puffin (*Fratercula arctica*) colonies to the coast of Maine. The initial step in the restoration effort involves removing the nesting population of great black-backed gulls (*Larus marinus*) and herring gulls (*L. argentatus*) from former tern and alcid nesting islands. Gulls prey on the eggs and young of numerous seabird species, and compete with the terns for preferred breeding sites. After gulls have been removed from the island, the Refuge has utilized social attraction techniques (i.e. decoys and sound recordings) to encourage terns and puffins to nest on the islands. All three species of terns have experienced significant population growth as a result of the combined efforts of Maine Coastal Islands NWR and our conservation partners in the Gulf of Maine Seabird Working Group. Research efforts on the restoration islands have focused on diet composition, productivity rates, interactions among the seabirds, alcid foraging ecology, movement among the colonies, and habitat

management. Razorbills (*Alca torda*), laughing gulls (*L. atricilla*), and common eider (*Somateria mollissima*) have taken advantage of the gull-free environment on these restoration islands, resulting in diverse and highly productive seabird colonies scattered along the Maine coast.

American Oystercatcher Monitoring on Fisherman Island National Wildlife Refuge

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The American Oystercatcher (*Haematopus palliatus*) has been designated as a species of high conservation concern in the U.S. Shorebird Conservation Plan with concerns related to low population size, habitat loss, human disturbance, and nest predation. Number of nesting American Oystercatcher pairs, their distribution, hatch success and breeding productivity (chicks fledged per pair) were investigated on Fisherman Island National Wildlife Refuge (FINWR) located near Cape Charles, Virginia. Factors affecting oystercatcher productivity on FINWR were also examined. Breeding season monitoring was conducted by the College of William and Mary in 2002 and 2003 and was continued by the Refuge from 2004-2008. Remote cameras were placed on 25 nests in 2005 and 6 nests in 2006 to examine factors affecting nest success. Forty to 50 nesting pairs were monitored annually on FINWR and productivity ranged from 0.10-0.50. Breeding distribution was widespread on beaches and also occurred on marsh flats and washovers with some pairs nesting as close as 15 m of each other. Remote cameras identified Fish Crow (*Corvus ossifragus*) predation and storm washouts as primary factors limiting hatch success on FINWR. Storm overwash likely will increase with climate change which may also have impacts on available habitat and food resources. FINWR currently supports approximately 10% of the American Oystercatchers nesting on barrier islands in Virginia. American Oystercatcher chick loss remains unknown and needs more study.

Habitat Restoration for the Piping Plover at Cape May National Wildlife Refuge

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The Cape May National Wildlife Refuge improved nesting habitat for beach nesting birds, such as the federally threatened piping plover, on the Two Mile Beach Unit in Wildwood Crest, New Jersey. While plovers have historically nested within adjacent property, they were not nesting on the Refuge. The nearby jetty at the Cold Spring Inlet impacts the Refuge beach by continually accumulating sand creating a foredune which continually creeps toward the ocean, leaving very little unvegetated beach and nesting habitat. Partnering with the US Army Corps of Engineers, USFWS NJ Field Office, and the NJ Department of Environmental Protection, in January 2007, approximately 1 acre of nesting habitat was created. The habitat was created by scraping sand from the upper beach and relocating the material to the landward toe of the existing dune system. A gentle slope was created to allow occasional high tide and storm wave action to wash over this habitat creating an "overwash" and reduce vegetation. Habitat islands remain in the overwash to create a more natural beach configuration. Crushed shell was scattered throughout two sections of the overwash habitat. Within weeks of this habitat creation, piping plovers arrived and nested in the overwash. The habitat needs annual maintenance to clear accreting sand and reduce vegetation. The Refuge would like to partner with the US Army Corps of Engineers again to move the excess sand each year onto other local nesting beaches in need of sand, aiding in the recovery of piping plover at various locations in southern NJ.

Seabird colony effects on piping plover (*Charadrius melodus*) fledging success and brood home range at Chincoteague National Wildlife Refuge, Virginia

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The behavior of nesting terns and skimmers has the potential to affect breeding piping plovers on Chincoteague NWR, VA. The study investigated the effects of common tern, least tern, and black skimmer colonies on piping plover fledging success and brood home range at CNWR, Virginia. I compared piping plover fledging rate and brood home range to the number of seabird colonies in a breeding site, seabird colony proximity, and colony species composition from March to September 2004 and 2005. Piping plover fledging rate and home range was greater in study areas with one nesting colony than areas with multiple colonies ($P < 0.01$). Plover fledging rate increased with distance from a colony ($P < 0.05$). Broods less than 2,000 m away from a colony had smaller home ranges than broods over 2,000 m away from the closest colony ($P < 0.01$). Plover fledging rates and brood home ranges did not differ between tern-only colonies and colonies with terns and skimmers ($P > 0.05$). Results suggest the anti-predator behavior of colonial nesting seabirds affected plover fledging success and brood home range. Minimizing situations, which provoke seabird colony anti-predator behavior, could reduce the negative effects seabirds have on piping plovers.

Seaside Sparrow Nest Success in Relation to Prescribed Fire Frequencies at Blackwater NWR and Fishing Bay WMA

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In 2007, the Chesapeake Marshlands National Wildlife Refuge (NWR) Complex and conservation partners initiated a project to evaluate the effects of prescribed winter burning on the secretive marsh bird community at Blackwater NWR and nearby Fishing Bay WMA in Dorchester County, Maryland. Target species, many of which are of conservation concern, include tidal marsh breeding sparrows, rails, bitterns and moorhen. Objectives of the project are to: 1) compare various fire return intervals for differences in the presence, distribution, and density of breeding secretive marsh birds; and 2) compare nest site selection and nesting success of secretive marsh birds among various fire return intervals. During two breeding seasons (May – August, 2007 – 2008), we surveyed 60 hectares of tidal marsh (20 plots) stratified into four burn treatments (annual, 3-5 years, 7-10 years, and greater than 10 years). We detected and monitored 245 nests from seven species. Seaside Sparrow (*Ammodramus maritimus* maritimus) nests were the most abundant (n=215). Seaside Sparrow territory density and productivity per ha were greatest on annual burns and lowest on 7-10 and >10 year burns. Analysis of Seaside Sparrow nest success by the Mayfield Method indicated lower daily survival probability on annually-burned marsh (0.936 ±0.0091) compared to marsh with longer fire-return intervals (3-5 years – 0.952 ±0.0085; 7-10 years – 0.954 ±0.0151; >10 years – 0.938 ±0.0167). Differences between daily survival probabilities

were not significant (all P-values >0.05).

Saltmarsh Sharp-tailed Sparrow (*Ammodramus caudacutus*) occupancy and nest success at the Rhode Island National Wildlife Refuge Complex

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We initiated an investigation of Saltmarsh Sharp-tailed Sparrows (SSTS) to estimate detection probabilities, site occupancy, and nest success on two national wildlife refuges in Rhode Island during the 2008 field season. Detection probabilities varied by survey window, ranging from 0.48-0.70, with the greatest detection probability occurring during the last of three survey windows (July 10-17). Naïve occupancy estimates (59%) were slightly lower than the modeled occupancy estimates of 63%. Occupancy estimates exhibited a strong positive relationship with the presence of Spartina patens; between 63% (Sachuest Point) and 71% (John H. Chafee) of all SSTS observations were recorded in 19% of the existing salt marsh habitat. We color-banded 118 SSTS and monitored 43 active nests 3-4 times per week from June – August. Mayfield estimates of nest success were much lower at both sites than apparent nest success, with Mayfield estimates much higher at Chafee (51%) than Sachuest (12%) due to extreme flooding during summer rain events and poor marsh drainage. We will monitor these same sites during 2009 to estimate site fidelity and apparent annual survival. This research will help refuges in Rhode Island make informed management decisions to benefit SSTS and other species dependent on salt marsh.

Repatriation of Blanding's Turtles (*Emydoidea blandingii*) to Assabet River National Wildlife Refuge

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The Blanding's turtle (*Emydoidea blandingii*) is a medium-sized, semi-aquatic freshwater turtle that inhabits wetlands throughout the upper Midwest and New England. It occurs in 15 US states and 3 Canadian provinces, and has protected status in most of them. Blanding's turtles require large landscapes and a variety of wetland habitats, and make frequent seasonal overland movements between them. Two of the three largest populations of Blanding's turtles in New England occur on National Wildlife Refuges and the goal of this project is to establish another robust population at Assabet River Refuge. Decades of monitoring and nest protection have boosted recruitment and supported growth of the Blanding's turtle population at one of the Refuges, which is now serving as the donor population for Assabet River Refuge. Since 2007, we have annually collected a portion of hatchlings from nests at the donor site. We notch the hatchlings to allow for future identification and either release them at Assabet River Refuge immediately, or raise them in captivity for one winter prior to release. Life-history models provide estimates of target release numbers to establish a population in approximately 30 years. In 2008, we also trapped six juvenile turtles from the donor site and relocated them to Assabet River Refuge with radio transmitters. We used telemetry to track the juveniles regularly and document movement patterns and habitat selection. Habitat fidelity of juveniles will help us evaluate suitable habitat for future releases and determine whether the juvenile age group is appropriate for reintroduction efforts.

Chronology of Shorebird Migration at Monomoy National Wildlife Refuge

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Monomoy National Wildlife Refuge (Refuge), Cape Cod, Massachusetts is recognized as one of the most important stopover sites in North America for migratory shorebirds east of the Rocky Mountains. International Shorebird Surveys conducted since 1975 support the designation of Monomoy Refuge as a Western Hemisphere Shorebird Reserve Network site of Regional Importance. However, researchers have not quantified seasonal variation in species composition or abundance of shorebirds at this critical stopover site. We conducted weekly surveys on permanent plots throughout intertidal mudflat and saltmarsh habitats from April through October (2006) or November (2007). We detected 22 species and observed highest species richness in August and September in both years. For all shorebird species combined, peak mean use was higher during southward migration than northward migration with the highest use occurring in the last two weeks of July during 2006 and the first two weeks of August during 2007. Six species accounted for 87% of birds detected; Semipalmated Sandpiper (*Calidris pusilla*), Sanderling (*Calidris alba*), Black-bellied Plover (*Pluvialis squatarola*), Dunlin (*Calidris alpina*), Short-billed Dowitcher (*Limnodromus griseus*), and Semipalmated Plover (*Calidris semipalmatus*). Mean peak abundance for most species occurred between mid July and early September. Monomoy Refuge is a popular destination for people, and understanding seasonality of shorebird use is critical to implementing an effective management strategy to minimize impacts from human disturbance.

Historical Populations of Waterfowl, Fish and Threatened/Endangered Species within Back Bay and Currituck Sound

Back Bay, Mackay Island, and Currituck National Wildlife Refuges - Consolidated Report for the
Fisheries, Shellfish, SAV (Submerged Aquatic Vegetation), and Waterfowl Working Group with the U.S. Army Corps of Engineers, Wilmington, NC.
Researched and Authored by Michelle Baker[1] and Sterling Valentine[2]
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Recent concern over declining SAV (Submerged Aquatic Vegetation) growth in Back Bay and Currituck Sound has led to a desire to determine if this decrease has affected wildlife populations in the area. Data from state and federal agencies, as well as from hunt clubs, were obtained and compiled over a three month period in 2006. Waterfowl data was analyzed for total waterfowl numbers

per year, diversity of individual duck species per year, and harvest rate per hunting days per year. Fish data was analyzed based on fish harvest, fish per acre, and presence/absence. Threatened and endangered species within the study area were assessed through natural history narratives and presence/absence. In general, it was found that all species of waterfowl and fish have decreased over time. The findings suggest that the changes in the physical and biological landscape of the Back Bay-Currituck Sound area have negatively impacted the populations of waterfowl, fish, and several threatened and endangered species that historically utilized these areas.

Breeding Bird Response To Early Successional Management In The Nulhegan Basin Division

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The effect of silviculture on bird populations and communities has been studied extensively in the United States (e.g., Vitz and Rodewald 2006,Titterington et al. 1979, Hobson and Schiek 1999). However, while generalizations are excellent starting points, managers find local information is often the best information for adaptive ecosystem management (Holling 1978, Grumbine 1994, Johnson 1999). The response of breeding songbird populations to early successional habitat management was measured on two management areas (Management Units 1 and 2) and a control site located within the Nulhegan Basin Division of the Silvio O. Conte National Fish and Wildlife Refuge in 2008. Each site was spot mapped for breeding birds and vegetation data was collected. Ovenbird (*Seiurus aurocapillus*), chestnut-sided warbler (*Dendroica pensylvanica*) and hermit thrush (*Catarus guttatus*) detections and number of estimated territories were greater on treated plots than the control. Blowdowns increased the number of detections and territories of the Canada warbler (*Wilsonia canadensis*), black-throated blue warbler (*Dendroica caerulescens*), and Nashville warbler (*Vermivora ruficapilla*). Treatments did not seem to affect area-sensitive species such as ovenbirds and red-eyed vireos (*Vireo olivaceus*). While these findings are preliminary during the first season of a long-term monitoring program, the results of small-scale harvest relative to a large forested landscape reveal positive responses by early successional species, including species of conservation concern, while simultaneously maintaining populations of species that require mature closed canopy forest.

The Relevance of Squaw Creek National Wildlife Refuge to Migrating Shorebirds and Waterfowl from Fall 2008 – Spring 2009
By Frank Durbian

Introduction

The purpose of this report is to provide a brief glimpse into and sense of the relative importance of Squaw Creek NWR as it pertained to migrating waterfowl and shorebirds during 2008 – 2009. Although similar annual data could be provided for Squaw Creek NWR for the previous ten year period, this was simply an exploratory attempt to begin placing the Refuge into a landscape based context. Additionally, managers, biologists and other staff members at individual stations typically want to know what their contribution is towards wildlife populations and habitat resources on a larger scale.

Methods

Shorebird Population Estimates – I used the computer program Migratory Bird Survey Manger 1.0.0 (Farmer 2009) to calculate Refuge shorebird use days and population estimates, during the fall of 2008 and the spring of 2009, based on previous research conducted by Farmer and Durbian (2006). I used the Refuge's spring shorebird population estimates to calculate a percentage of the estimated population of each species using the Refuge based on the population estimates listed in the Upper Mississippi River and Great Lakes Region Joint Venture Shorebird Habitat Conservation Strategy (JVSHCS) (Potter et al. 2007).

Waterfowl Use days – Initially I attempted to calculate waterfowl population estimates similar to the shorebird population estimates. However exploratory analyses of the Refuge's waterfowl count data, using the lengths of stay (LOS) reported in the Upper Mississippi River and Great Lakes Region Joint Venture Waterfowl Habitat Conservation Strategy (JVWHCS) (Soulliere et al. 2007) revealed that the proposed LOS data was not similar to actual LOS for waterfowl using Squaw Creek NWR and resulted in extremely inaccurate population estimates. As a surrogate for actual population estimates I used waterfowl use days to describe duck usage of the Refuge during the fall and spring migration periods. Duck use days were calculated using the computer program Migratory Bird Survey Manger 1.0.0 (Farmer 2009). I used the Refuge's spring duck use day estimates to calculate a percentage of the estimated duck use days needed to support the current population of ducks listed in the JVWHCS (Soulliere et al. 2007). For snow geese and white-fronted geese I compared the peak spring high count, which represents a minimum population that used the Refuge, to the flyway population estimates for 2008 (U.S. Fish and Wildlife Service 2008) to calculate the percent of the total population that used the Refuge. Since Canada goose counts on the Refuge do not delineate among subspecies I simply reported the use days for the Refuge.

Results

Table 1 displays the results of the shorebird population estimates and the proportion of the JVSHCS population that used the refuge during spring migration. Table 2 displays the results of the waterfowl use day estimates and the proportion of the JVSHCS use day estimates that occurred on the refuge, for ducks and swans, during spring migration. Table 3 displays the high spring count for goose numbers and the proportion of the estimated flyway population for 2008.

Discussion

Shorebirds – During the spring migration of 2009 the Refuge hosted seven shorebird species with population estimates that constituted at least one percent of the JVSHCS population estimates (Table 1). Although the Refuge only supplies a fraction (~3%) of the estimated total acres (53,345) of spring migration habitat needed to support the current population of shorebirds in the JVSHCS it is very important to note that it harbored from 1.0 - 19.5% of the total populations of these seven species during spring migration (Table 1). The discrepancy between the habitat supplied and the proportion of these populations using the area should emphasize the relative importance of the Refuge to migrating shorebirds. Future emphasis should be placed on expanding, where possible, shorebird habitat on the Refuge.

Waterfowl – Similar to shorebirds, during the spring migration of 2009 the Refuge hosted five species with use day estimates that constituted at least one percent of the JVWHCS use day estimates (Table 2). Although the Refuge only supplies a fraction (~0.2%) of the estimated total acres (1,979,686) of spring migration habitat needed to support the current population of waterfowl in the JVWHCS it is very important to note that it harbored from 1.0 - 17.3% of the total use days for these five species during spring migration (Table 2). Additionally, although Squaw Creek NWR is not specifically managed for the deep water and extensive open water guilds it did provide 2.3% of the ring-neck duck spring use days for the JVWHCS. The discrepancy between the habitat supplied and the relative proportion of the waterfowl use days being provided by the area should emphasize the relative importance of the Refuge to migrating waterfowl.

Although it was not possible to estimate the Refuge's proportion of JVWHCS spring Canada goose use days it is important to note that the Refuge harbored, at a minimum, 10,100 Canada geese and greater than 250,000 use days during both the fall and spring migration periods. Even more notable is that the Refuge hosted, based on the 2008 population estimates, approximately 65.2% of the mid-continent population of snow geese and approximately 1.8% of the mid-continent population of greater white-fronted geese during the 2009 spring migration. Due to the current debate over just how many snow geese make up the mid-continent population this number maybe somewhat smaller, but is still significant.

Although this report was simply based on one year of data it would be useful to conduct similar analyses of past information to evaluate the contribution of Squaw Creek NWR, and possibly nearby state wetland areas, within a larger landscape context on a temporal scale. Equally interesting would be research resulting in accurate waterfowl LOS data that could be used to calculate the actual proportion of species specific populations that are using the Refuge each year.

Table 1. Fall 2008 and Spring 2009 shorebird population estimates with 95% upper and lower confidence limits for Squaw Creek NWR. % Spring JV Pop. refers to the Refuges spring 2009 proportion of the JVSHCS spring population estimates. Red highlights indicate a % JV Pop. equal to or greater than one percent. Population estimates without corresponding confidence limits are equal to the peak count for that time period as limited data and/or incorrect length of stay information prevented calculating confidence intervals for these species.

	Fall LCL	Fall	Fall UCL	Spring LCL	Spring	Spring UCL	% Spring JV Pop.
Golden Plover		0		530	673	948	0.7
Black-bellied Plover		0			3		0.0
Semipalmated Plover	10	13	17		214		1.0
Killdeer	615	784	1012	819	1040	1464	0.6
Black-necked Stilt		0			1		0.0
American Avocet		0		7	9	13	0.9
Greater Yellowlegs	52	66	85	2585	3282	4623	19.5
Lesser Yellowlegs	851	1084	1399	13028	16546	23304	8.3
Solitary Sandpiper	49	62	80	1	1	1	0.0
Willet		0			2		0.0
Spotted Sandpiper		4		265	336	474	1.4
Hudsonian Godwit		0		63	80	113	0.5
Semipalmated Sandpiper	56	71	92	1585	2012	2834	0.5
Least Sandpiper	216	276	356	3041	3862	5440	3.0
White-rumped Sandpiper		0		1331	1691	2382	0.6
Baird's Sandpiper		3			16		0
Pectoral Sandpiper	1422	1814	2340	8901	11305	15922	13.4
Dunlin		0			769		0.3
Stilt Sandpiper		0			14		0
Buff-breasted Sandpiper		0			3		0
Long-billed Dowitcher	20	26	33	791	1005	1415	1.7
Short-billed Dowitcher		0			22		0.0
Common Snipe		0		198	252	355	0.0
Wilson's Phalarope		0		187	237	334	0.1
Total	**3291**	**4203**	**5414**	**33332**	**43684**	**59622**	

Table 2. Fall 2008 and Spring 2009 waterfowl use day estimates for Squaw Creek NWR. % Spring JV Pop. refers to the Refuges spring 2009 proportion of the JVWHCS spring use day estimates. Red highlights indicate a % JV Pop. equal to or greater than one percent.

	Fall Use Days	Spring Use Days	% Spring JV Use Days
Wet Mudflat/Moist Soil Guild			
Blue-winged Teal	198028	821661	1.9
Northern Shoveler	231093	1321946	17.3
Northern Pintail	1707062	413855	4.0
Green-winged Teal	794146	396290	0.2
Shallow Semipermenant Marsh Guild			
Wood Duck	38276	2235	0.0
Gadwall	771167	1348167	12.1
American Widgeon	107707	21469	0.2
Mallard	5045247	1300293	1.0
Deep Water Marsh Guild			
Trumpeter Swan	1414	1797	0.8
Ring-neck Duck	240768	452409	2.3
Hooded Merganser	1145	12994	0.2
Ruddy Duck	4410	50863	0.8
Extensive Open Water Guild			
Canvasback	805	5404	0.1
Redhead	589	24	0.0
Lesser Scaup	123	51810	0.1
Bufflehead	668	86846	0.4
Common Goldeneye	613	67133	0.3
Common Merganser	0	12401	0.1
Geese			
Canada Geese	271503	316071	NA
White-fronted Geese	466505	423335	NA
Snow Geese	4799993	42313037	NA
Totals	**14681262**	**49420040**	NA

Table 3. The high 2009 spring count for goose numbers on Squaw Creek NWR and the proportion of the estimated flyway population for 2008. Canada goose counts on the Refuge do not delineate among subspecies so no proportions could be calculated. Red highlights indicate a proportion of the 2008 population greater than one percent.

Geese	High Count	Population (2008)	% 2008 Population
Canada Goose	10100	NA	NA
Greater White-fronted Goose (MCP)	13700	764300	1.8
Lesser Snow Goose (MCP)	1600000	2455100	65.2

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