Minnesota State Wildlife Grant (SWG) Projects

SWG funds support projects that further the implementation of MN State Wildlife Action Plan, *Tomorrow's Habitat for the Wild and Rare*. **The Nongame Wildlife Funds and other partner contributions matched federal funds on these projects.**

Land Acquisition

Mikkelson Addition

The Mikkelson Wildlife Management Area (WMA) and the 160 acre Mikkelson Addition are part of a 2,100 acre site Minnesota County Biological Survey (MCBS) designated as possessing high biodiversity significance. Adding this land to the WMA protects a significant natural area and help preserve habitat for a number of wildlife species identified as species in greatest conservation need (SGCN) in the MN State Wildlife Action Plan (SWAP), *Tomorrow's Habitat for the Wild and Rare*. Among these species are at least 15 bird species, one of which is the red-shouldered hawk, a State special concern species. Blanding's turtles, listed as threatened in Minnesota, have been documented within one mile of the site and are likely to use the habitat in this site too. In addition to protecting lands of high biodiversity significance, benefits include public access for wildlife watching and hunting.

Red-shoulder Hawk

Beaver Valley – Whitewater WMA

The acquisition of this 60-acre tract in Beaver Valley protects an area identified as a High Biodiversity site by the Minnesota County Biological Survey and helps to connect a disjunct section of the Whitewater Wildlife Management Area (WMA) to the main unit. Numerous rare species can be found in the area as well as a rare algific talus slope community adjacent to Beaver Creek. The acquisition and provides opportunities of bird watching, hunting, hiking and other compatible uses.

Habitat Management

Benson Farm Grassland Restoration

Habitat for grassland birds, such as Bobolinks, Meadowlarks, Savanna and Grasshopper Sparrows, is declining rapidly in the state, especially in the Twin Cities metro area. Benson Farm is a 48-acre short-grass prairie adjacent to a 50-acre wetland in northeastern Ramsey County. The site is currently an old field that is changing to shrubs and trees. Restoration of Benson Farm will benefit the grassland nesting birds by providing high quality nesting habitat of a size adequate for successful nesting. The habitat will also be used by other grassland-dependent wildlife. The removal of the woody vegetation by cutting or burning will reduce the perching sites for brown-headed cowbirds, which lay their eggs in the songbird nests. The restoration project will also provide public access to the prairie through a series of trails and fire breaks for bird watching and nature study.


Eastern Meadowlark

Project Results

- The 48 acre Benson Farm prairie site was prepared for seeding in 2004.

- Seeding was completed in 2005 and initial establishment of forbs and grasses appeared to be good.
- Bird survey points were established and surveys began in 2006.

Final Report PDF (1535 KB)
Moriarty, J. 2005. Bald Eagle Otter Lake Regional Park - Benson Farm prairie restoration. 9 pp.
Full document (1535 KB)

Lake Christina Reclamation

A Black Tern incubating eggs at Lake Christina

Lake Christina, a 3949-acre shallow lake in Douglas County in west-central Minnesota, is nationally recognized as a critical staging area for migrating canvasbacks, and also is a breeding location for a number of Species of Greatest Conservation Need (SGCN) including Western Grebe, Red-necked Grebe and Forster's Tern. Currently, water clarity, distribution of submerged plants, and fall use by migrating ducks all indicate that the lake has stabilized in a deteriorated condition characterized by poor water quality, a sparse community of submerged plants, and limited suitability for diving ducks and other wildlife species. In an attempt to stimulate a shift to more favorable habitat conditions, a rotenone application was applied in 2003 to eliminate all fish from Lake Christina. This whole-lake manipulation presented a unique opportunity for data gathering and research. The objective of this project was to monitor and/or assess fish population characteristics, water quality, abundance of aquatic invertebrates and selected wildlife populations in the two years after the rotenone treatment.

Project Results

- During 2004, following the 2003 rotenone treatment, adult Western Grebes returned to Lake Christina, but abandoned traditional nesting areas and left the lake, presumably due to absence of suitable prey fish. In 2005, 300 Western Grebe nests were identified at Lake Christina.
- Limnological signals were identified that may be useful for anticipating periods of rapid change, especially when the lake is entering transition to the turbid water state. Monitoring for these signals may allow managers to employ less drastic measures to maintain a clear water state.
- Project data will enhance our understanding of ecological characteristics and management potential for shallow lakes and will address statewide habitat needs of a diverse group of waterfowl and nongame species.

Final Report PDF (3368 KB)
Hanson, M.A., J. Allen, D. Buitron, M.G. Butler, T. Call, T. Carlson, N. Hansel-Welch, K. Haws, M. Konsti, D. McEwen, G. Nuechterlein, and K.D. Zimmer. 2006. Lake Christina reclamation: ecosystem consequences of biomanipulation. 97 pp.

State Wildlife Grant Final Report, Bluff Corridor Restoration

The timber rattlesnake is a state threatened species occurring exclusively in the southeastern Minnesota counties of Goodhue, Fillmore, Houston, Olmsted, Wabasha, and Winona. Since den sites are a critical habitat component for timber rattlesnakes, protecting dens and enhancing surrounding habitat is critical to conserving this species. This project, conducted in partnership with the National Wild Turkey Federation, contributed to the

restoration and maintenance of timber rattlesnake habitat on 95 bluff prairie acres by reducing the amount of canopy cover around dens on six state forest sites in close proximity to several Landowner Incentive Program (LIP) Blufflands projects. This project will complement similar bluff work occurring in several state parks and other sites in the region, making for a landscape-level approach to Timber rattlesnake and bluff prairie conservation in southeastern Minnesota.

Bluff prairie restoration

Project Results

- A multiple treatment approach was applied on 41.5 acres of state forest land resulting in 95 acres of bluff prairie habitat enhancement. The approach included hand cutting of red cedars and invasive brush species, prescribed fire, and exotic species control. The amount of canopy cover reduction on each site varied from 60 percent to 95 percent depending on the site.

Partner: National Wild Turkey Federation
Edwards J. 2009. Bluff corridor restoration.

Scientific and Natural Area (SNA) Prairie Habitat Management and Restoration

SWG funds restored or enhance approximately 2,400 acres of native prairie and restored prairie grassland habitats on SNA lands through prescribed burning, restoration, woody encroachment removal and eradication of noxious species. Minnesota's State Wildlife Action Plan identified prairie as a key habitat for rare wildlife in the state. Species in Greatest Conservation Need (SGCN) that will benefit from the habitat management include Bobolink, Western Grebe, Short-eared Owl, American Bittern, Swainson's Hawk, Northern Harrier, Loggerhead Shrike, western hog-nose snake, five-lined skink, Franklin's ground squirrel, regal fritillary, Dakota skipper and phlox moth.

Birds

Minnesota Important Bird Areas

BirdLife International conceived and initiated the IBA project in Europe in 1981. Since then, more than 7,500 sites, in 170 countries, have been identified as IBAs. The National Audubon Society, in 1995, became the officially designated U.S. partner of Birdlife International for the purpose of implementing the IBA program. Audubon Minnesota, in partnership with the Minnesota Department of Natural Resources Nongame Program, and other conservation organizations and agencies, began implementing the Important Bird Area (IBA) program in Minnesota in February 2003. The goal of this program is to identify the most critical sites for the protection of birds in Minnesota, and to take coordinated action to promote conservation of these sites. Site criteria and a nomination process have been developed and efforts to nominate sites continues. Conservation and monitoring strategies are being developed for individual sites.

Thirty-five Important Bird Areas (IBAs) have been identified to date. Information on Minnesota's important bird areas can be found at: http://mn.audubon.org/birds-science-education/important-bird-areas

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A Landscape Approach to Grassland Bird Conservation in Minnesota

Prairies are among the most altered habitats in Minnesota and grassland birds have experienced steeper and more consistent declines than any other group of birds in North America. This project developed breeding bird models and maps that link bird population density to local and landscape habitat features. Conservation planning maps will serve as tools for prioritization of grassland landscapes for focusing conservation and restoration actions. This work is part of a larger, multi-state effort to conserve grassland birds throughout the Prairie Pothole Region of the U.S. and followed the North American Waterfowl Management Plan template for comprehensive planning and delivery of habitat objectives critical to meeting population goals.

Project Results

- Habitat models were developed for nine species of grassland birds 5 of which are SGCN (LeConte's Sparrow, Grasshopper Sparrow, Bobolink, Dickcissel, and Sedge Wren).
- At the landscape scale the models indicate that conserving and creating grasslands, removing trees from the landscape, or a combination of both, will increase songbird density.
- At the local scales managing for a mosaic of vegetation that varies in structure and composition will increase songbird diversity.
- Planning maps identified five landscapes (four in MN and one in northwest Iowa) capable of attracting the highest densities of songbirds and showed that most of the habitats in these landscapes remain unprotected and, thus, vulnerable to conversion to other land uses. The MN landscapes are: Inner Coteau and Coteau Moraine, Minnesota River Valley, Aspen Parklands and the Northern Minnesota River Prairie.

Final Report PDF (4745KB)
Quamen, F.R. 2007. A landscape approach to grassland bird conservation in the Prairie Pothole Region of the northern Great Plains. 150pp.

The Double-crested Cormorant and American White Pelican in Minnesota: A Statewide Status Assessment

In many portions of North America, American White Pelican and Double-crested Cormorant numbers increased dramatically from 1970 – 2000, Minnesota was no exception; data from survey efforts in the 1960s to 2000 indicate both species increased in the state during this period. As these species became more abundant in Minnesota, both were perceived to affect recreation opportunities and local business economies because they consume fish.

Concern over cormorant increases in eastern North America led to the establishment of the Public Resource Depredation Order (PRDO) for cormorants in 2003. This order authorizes federal, state and tribal agencies to "take" (kill) Double-crested Cormorants believed to be impacting public resources on public and private (with owner permission) lands without acquiring a permit.

Data on distribution and abundance of these fish-eating species are important for several reasons. American White Pelicans are a State-listed Special Concern Species also classified as a species of greatest conservation need (SGCN) in Minnesota's State Wildlife Action Plan (MN DNR 2006). Cormorants and pelicans are sensitive to environmental contaminants and human disturbance. Both cormorant and pelican numbers have increased and their range has expanded in the Great Lakes region in the past several decades. These changes have led to concern about their potential impacts to sport fishing, aquaculture and other natural resources. Most pelican breeding sites in Minnesota are shared with cormorants, thus pelicans could be significantly impacted by disturbance created during cormorant control efforts, which can include oiling eggs, killing nestlings, shooting adults, and destroying nests. Similarly, data are needed on SGCN species of colonial waterbirds (e.g., black-

crowned night-heron and common terns) and other species of colonial waterbirds that nest with cormorants at their breeding colonies because these species may also be impacted by cormorant population reduction efforts or increased cormorant presence in shared habitat.

A statewide survey of nesting pelican and cormorant was conducted in 2004-05 to obtain baseline population levels. This survey will be conducted again in 2010.

Project Results

- Cormorants were found nesting at 39 of 142 sites surveyed. Four new nesting sites were found. Estimated number of nests was 16,000; the largest colony had 2,524 nests.
- Sixteen White Pelican nesting sites were documented, three of which were new records. The estimated number of nests in 2004 was 15,284. The Marsh Lake complex in Big Stone and Lac Qui Parle Counties contained 85 percent of the nests. This is a significant increase from the period 1878 and 1968.

Final Report PDF (640 KB)
Wires, L.R., K.V. Haws, and F.J. Cuthbert. 2005. The double-crested cormorant and American white pelican in Minnesota: a statewide status assessment. 28 pp.

Henslow's Sparrow Monitoring and Habitat Management at Great River Bluffs State Park

Henslow's sparrow

The Henslow's Sparrow, a species in greatest conservation need (SGCN) is listed as a Minnesota state endangered species. Great River Bluffs State Park currently supports a returning population of Henslow's Sparrows that utilize several old fields for nesting. The park has purchased additional property directly adjacent to this population. This new area is not being utilized by the sparrows because the vegetation is composed largely of cool season wheatgrass and annual/perennial weeds, which do not form the dense vegetative cover preferred by Henslow's Sparrow. This project utilized native plant materials to create and expand Henslow's Sparrow habitat on this new property. The addition of approximately 65 acres of suitable habitat will help the population expand into new territories.

Project Results

- Two years of singing male data was collected.
- Vegetation structural data was used to develop and restore 60 acres of prairie vegetation.
- No nests were found despite over 100 hours of searching.

Final Report PDF (523 KB)
Fritcher, S. 2005. Henslow's Sparrow habitat management and monitoring at Great River Bluffs State Park. Final report submitted to the State Wildlife Grants Program. 7 pp.

Assessment of an Urban Population of Herons & Egrets and Restoration of the Peltier Lake Heronry


Great Blue Heron

Nesting Great Blue Herons first occupied the Peltier Lake site in the Twin Cities in 1989. The colony expanded to 1,137 nests of Great Blue Herons, Great Egrets and Black-crowned Night-Herons by l996. It was the second largest heronry in the metro area and probably one of the half dozen largest mixed species heronries in the state. Reproductive failure was first noted in 2000 and a task force of resource

managers and concerned citizens was formed to identify and resolve possible causes of colony failure. A consultant and a seasonal biologist supplemented existing staff in designing the monitoring project and in conducting mid-winter nest counts, breeding season ground census and nest monitoring, predator monitoring, and aerial census at five colonies. Understanding the cause of nest failure at the Peltier colony will help managers sustain this and other heronries in the face of continuing urbanization.

Project Results

- Cameras were placed in nest trees at Peltier Lake heron colony and a control colony to determine the reason for four years of nest abandonment by herons at Peltier Lake.
- Video documentation of raccoon predation was obtained at Peltier Lake, however, no raccoon predation was documented at the control site despite evidence that raccoons were in the area.
- Metal flashing around nest trees the following year seemed to result in a small degree of success. Four chicks fledged which marks the first documented recruitment from the Peltier colony since 1999.
- Raccoon predation at Peltier appears to be significant and this behavior may be transmitted from generation to generation among a relatively few individuals. With this in mind, a small-scale focused nuisance trapping effort is being conducted in an attempt to remove this component of the local raccoon population.

Final Report PDF (1197 KB)
Von Duyke, A. 2006. Summary report: Monitoring, research, and management activities at the Peltier Island heronry during 2004 & 2005 field season. 19 pp.

Goshawk Surveys, Monitoring and Habitat Assessments 2002-2009

Goshawk Surveys, Monitoring and Habitat Assessments 2002-2009
State Wildlife Grant funds supported:

- surveys in landscapes where northern goshawk had not been documented (2003-2005),
- monitoring of nesting activity and productivity in northern goshawk territories (2002 -2009), and
- habitat assessments within known territories (2005-2008).


Northern Goshawk

By 2008, there was sufficient information on the species to experiment with modeling habitat suitability across the northern goshawk's distributional range. The types of activities supported by state wildlife grants and accomplishments are briefly summarized below.

Northern Goshawk was surveyed for three years (2003-2005) in upland boreal forest located within state forests in northern Minnesota where there was no knowledge of the presence of northern goshawk. A methodology was developed to efficiently survey northern goshawk across large areas. Nine new territories were discovered, establishing that the species was more widely distributed than previously thought.

The monitoring of nesting activity and productivity has been ongoing since 2002. A methodology to monitor territories was initially developed through collaboration with the University of Minnesota Wildlife Cooperative Unit and subsequently refined in following years. Monitoring of territories involves cooperation among several land management agencies and nongovernment organizations. The number of known territories increased from 49 in 2002 to 121 territories in 2009, due in part to new surveys, but primarily because of increased reporting and subsequent nest checks. The database housing information on territory occupancy, nesting activity and productivity is updated on a yearly basis. Pertinent information from the northern goshawk territory database

was integrated into the Minnesota Natural Heritage database. Many land management agencies have access to the Heritage database, and thus, have an opportunity to consider northern goshawk habitat needs when planning their management activities. Between 60 -85 territories have been monitored cooperatively every year since 2005. These include approximately 30 territories primarily on state lands that are monitored by MNDNR.

Land cover assessments were undertaken for 25 territories. The assessments describe current habitat availability, habitat disturbance that has occurred within the past decade, and provide management suggestions for habitat protection within the territory. The territory is considered to be an area comprised of a 3-mile radius around the active nest. Habitat assessments have quantified the extent to which the early succession forest is providing the mature/old forest habitat that northern goshawk requires, and the minimum amount of habitat needed within a territory to support nest productivity. The assessments have also quantified forest disturbance and loss of old forest component within territories and established that this is occurring primarily in the early succession forest.

In 2008, a habitat availability modeling pilot was undertaken primarily to identify the location of potentially available habitat, and therefore, identify areas to survey for new territories. Another aspect of the modeling pilot is testing the feasibility of assessing the conservation of northern goshawk with a more strategic approach than our current approach of individual territory documentation. The modeling suggested how the current monitoring of northern goshawk territories could be elevated to inform the effectiveness of forest management in sustaining northern goshawk habitat.

Hamady, M. 2009. MNDNR, Nongame Specialist

An Assessment of Birds' Use of Scientific and Natural Areas in Minnesota

Prairies are some of Minnesota's rarest habitats. With less than 1% of our native prairies remaining, these prairie parcels are often the last refuge for rare animals and plants. The Eastern Broadleaf Forest is also becoming very fragmented and degraded with few areas remaining in an undisturbed state and the value of those that are, is magnified due to the continuing rapid urbanization of this province.

One of MNDNR's strategies for protecting these habitats is to acquire high quality sites to be designated as Scientific and Natural Areas (SNAs). Resource inventories were completed for some SNAs in the early 1980s; however, others have never been inventoried. There is a need to determine whether rare animal species are indeed provided habitat by the creation and maintenance of SNAs and to have baseline information that can be use to develop management plans and to monitor the effects of future management efforts.

This project compiled historical data and gathered baseline data on year-round bird use of Scientific and Natural Areas (SNAs). This information has been compiled in a database, and summarized into bird "checklists" for the SNAs which are available at http://www.dnr.state.mn.us/snas/birdchecklists.html

From 2003-2009, bird surveys were completed on 78 SNAs in the following subsections: Aspen Parkland, Anoka Sand Plain, Red River Prairie, Hardwood Hills, Mille Lacs Uplands, Big Woods, Minnesota River Prairie, Coteau Moraines, Mille Lacs Uplands, and Inner Coteau subsections. Seventy-eight SNAs have been surveyed and checklists developed.

Project Results

- Seventy-eight SNAs were surveyed for bird use throughout the year using both point-count methodology and "casual" surveys.
- New and existing data were compiled and formatted into checklists.

- Documentation reports were submitted for inclusion in the Natural Heritage Program database. The survey information will be useful in assessing the importance of land set-aside for targeted wildlife species as well as providing important information for SNA management and monitoring.
- Bird checklists were developed for each of the SNAs surveyed. The checklists will inform the birding public as to the bird species they might expect at each unit. Information on the accessibility of the SNA sites is also provided.

Final Report PDF (202 KB)
Haws, K.V., B. Djupstrom, and M. Driscoll. 2006. An assessment of birds of Scientific and Natural Areas and Prairie Bank Parcels, located within the Red River Prairie and Tallgrass Aspen Parkland provinces of Northwest Minnesota. 16 pp.

Final Report PDF (185 KB)
Haws, K., and P Booth. 2009. An assessment of birds of Scientific and Natural Areas located within the Minnesota River Prairie, Mille Lacs Upland, Hardwood Hills, Anoka Sand Plain, Big Woods and St. Paul Baldwin Plains Subsections of Minnesota. 9pp.

Ecological Survey of Bird Populations and Floodplain Forest in the Vermillion/Cannon River Bottoms Important Bird Area

In 2005 the MNDNR, in partnership with the U.S. Fish and Wildlife Service, U.S. Geological Survey, and non-governmental organizations finalized the Vermillion Bottoms Lower Cannon River Plan to implement restoration, monitoring and ecological research on the Vermillion Bottoms and Lower Cannon River (VCRB) areas of the Upper Mississippi River (UMR). The VCRB area contains one of the largest expanses of native floodplain plant communities in southeastern Minnesota and harbors diverse bird and plant communities unique to the UMR. The UMR is recognized as a Globally Important Bird Area by the American Bird Conservancy and the Vermillion/Cannon River Bottoms area has been designated an Important Bird Area (IBA) by the Audubon Minnesota. One of the main goals of the VCRB River Plan is to restore and maintain forest for interior forest birds and species of conservation concern.


Cerulean warbler

Altered hydrology and encroachment by invasive plant species are affecting forest regeneration and species diversity—conditions that could affect the diversity and abundance of the bird communities. To better understand how these changes could affect bird communities the study gathered data on bird communities, including species of greatest conservation need (SGCN), during the spring migration and breeding seasons. The study also gathered detailed habitat information and investigated bird presence in relation to forest composition and structure, particularly forest interior and edge.

Project Results

- Study findings indicate a robust VCRB bird community, but SGCNs were not abundant. Of the SGCN, Cerulean Warblers and Prothonotary Warblers were the most often detected species in both migration and breeding seasons. Only three other SGCNs, Golden-wing Warbler, Canada Warbler, and Wood Thrush, were detected and these were detected during the spring migration.
- Tests for interior or edge habitat relations could not be validated for the Prothonotary Warbler and Cerulean Warbler because detection and site occupancy probabilities were too low. Prothonotary Warblers seemed to favor sites with little ground cover, while Cerulean Warblers were found at sites that had ground cover and that did not have much reed canary grass.

Reed canary grass was the most notable invasive species in the study area. It was widespread in the Cannon River Bottoms, absent on the Vermillion River sites (although some patches were observed in other areas along the Vermillion) and patchily distributed on UMR sites.

- Analysis of habitat relations for individual bird species was possible for only three common species: Common Yellowthroat, Yellow Warbler and Baltimore Oriole. Common Yellowthroat was strongly associated with increased reed canary grass cover. Yellow Warbler was strongly associated with lower tree height and somewhat associated with greater ground cover. Baltimore Oriole was somewhat associated with greater ground cover. Ground cover may be a surrogate for mature forest in the study area where wood nettle dominates under a closed canopy; however, Baltimore Orioles are not adverse to open canopy or forest edges.
- Bird assemblage composition was primarily influenced by a lack of ground cover and high cover of reed canary grass and low basal area. This provides some indication of how bird assemblages may shift as reed canary grass coverage expands and dominates the ground cover. In general species associated with more open forest and shrubs will be favored and some common UMR forest birds will decline. Because reed canary grass can dominate the ground cover on sites with a partially open canopy (Cannon river sites) the study recommends that control measures be planned when management activities result in any degree of canopy opening. The study also recommends implementing a monitoring program for garlic mustard which, while currently not widespread, can rapidly proliferate.
- Tree species composition and size/age composition did not vary much throughout the study area. Therefore, no correlation of bird assemblages to these features could be discerned.
- On a landscape scale, bird assemblages in the study area may respond to forest width, more than to edge versus interior, or to the size of the forest patch.

Final Report PDF (1752 KB)

Kirsch, E. M. 2009. Ecological survey of bird populations and floodplain forest in the Vermillion/Cannon River. 102pp.

Avian Habitat Use of Upland Forests in Southeast Minnesota's Blufflands

This project examined the relationship between forest conditions and habitat use by birds in the Blufflands of southeast MN. Fifty-four percent of the avian species identified in MN State Wildlife Action Plan as species in greatest conservation need (SGCN) occur in the Blufflands Subsection. Habitat degradation is the primary threat to SGCNs in this subsection. Presettlement oak-dominated forests have become highly fragmented and the vegetation composition and forest structure have shifted dramatically. The trend is likely to continue and be exacerbated by increases in invasive plants, cessation of fire, and changing patterns of land use. A decline in oak and a shift toward more closed canopy stands and a higher proportion of climax species such as sugar maple and basswood is a particular concern in forest remnants. This research provides monitoring data and habitat assessments that will inform forest management activities on both public and private land in the Blufflands and elsewhere.

Project Results

- Seventy-two point count stations were established on wooded sites in state parks, forests, and wildlife management areas in Goodhue, Wabasha, Winona, Fillmore, and Houston counties. These 72 stations had previously been surveyed in 1997-1998 by Niemi et al.

- The survey detected 3,373 individual birds and 40 species, including nine species in greatest conservation need. The SGCNs were: Acadian Flycatcher, Blue-winged Warbler, Cerulean Warbler, Eastern Wood-pewee, Least Flycatcher, Ovenbird, Veery, Wood Thrush, and Yellow-bellied Sapsucker.
- Survey results were compared to the results of the 1997-1998 Niemi survey**.**
  One SGCN, the Winter Wren, observed during the Niemi survey, was not observed during this survey. Three non-SGCN observed during the Niemi study that were not observed in this study were the Warbling Vireo, Cedar Waxwing and Baltimore Oriole.

  In addition to the Winter Wren, three SGCNs were detected at fewer stations in 2007. These were the Cerulean Warbler, Least Flycatcher, and Yellow-bellied Sapsucker.

  Five SGCNs were detected at more points in this survey, compared to the 1997-1998 Niemi survey. These were the Acadian Flycatcher, Blue-winged Warbler, Eastern
  Wood-pewee, Ovenbird and Wood Thrush. The increase was substantial for the Acadian Flycatcher, Blue-winged Warbler (a species associated with open habitats and dense understories) and the Wood Thrush (a ground forager that is typically found in areas with dense shrubs and moderate sub-canopy). The number of points at which the Acadian Flycatcher was detected more than doubled, although the number of points was still relatively low.
- Woodpeckers and species that glean insects from bark, foliage, or on the ground are thought to be most sensitive to the shifts in tree composition that were observed during the survey. Species that nest low in vegetation or on the ground could be expected to respond adversely to declines in understory species and increases in 'disturbance' species. Yet, comparisons of the data from this survey with the 1997-1998 survey failed to support these contentions and for many species trends were just the opposite. Only one species (the Downy Woodpecker) a non-SGCN exhibited a substantial decline, and yet, two other woodpeckers, the Pileated and Red-bellied, increased dramatically.
- There are several possible explanations for the survey results. Surveys conducted by Niemi in 1997-1998 were conducted once per year, whereas surveys in 2007 were conducted twice during the breeding season. It is possible that some species were missed in the earlier surveys because they were not present or were not singing at that time. Findings from this survey underscored the need to repeat surveys of short duration at regular intervals whenever possible.

Partner: Iowa State University
Final Report PDF (242 KB)
Miller, J. R., and J. J. LeBrun. 2008. Avian habitat use of upland forests in southeast Minnesota's blufflands. 30pp.

Fish

East Grand Forks Dam Modification

This project provides fish passage for lake sturgeon and other riverine fish species through reconnecting the lower 53 miles of the Red Lake River with the Red River through modification of the dam at East Grand Forks. The Red Lake River is Minnesota's largest tributary to the Red River of the North. Lake sturgeon was abundant in the Red Lake and Red Rivers prior to European settlement. However, lake sturgeon populations were heavily exploited and populations began to crash in the 1900. Poor water quality and the construction of dams on the main stem of the Red River and its tributaries isolated the sturgeon from their spawning sites on the beach ridge areas of the basin. Lake sturgeon are considered extirpated from the Red River of the North and in 1997-1998 MN DNR stocked 3,800 sub-adult lake sturgeon in the headwaters of the Red River of the North to reestablish self-sustaining populations.

The project was a cooperative effort involving the DNR and the cities of Grand Forks and East Grand Forks. In addition to improving fish habitat the project also removed the dangerous hydraulic currents that posed a risk to citizens utilizing this popular fishing site.

Analysis of the Relationship Between Flow and Aquatic Fish Communities on Two Minnesota Rivers

Today, many river organisms are endangered by manipulation of stream flow for human purposes. Threats to stream ecosystems on a watershed or microhabitat level are intensifying. Since 1987, data has been collected on fish habitat on two Minnesota rivers, the Yellow Medicine and the Otter Tail. The project involved a review of the fish community changes related to varying water flow in two different Minnesota watersheds. Understanding of the mechanisms at work in stream ecosystems, especially as they relate to lesser known nongame species and the aquatic community as a whole, are necessary for long-term stewardship of river ecosystems.

Project Results

- Flood control does not necessarily lead to a stable or diverse fish community.
- Dams and control of discharge can have paradoxical results. When serious floods occur, the high discharge and concomitant floods downstream last longer and may be more severe than in watersheds with fewer dams and less flood control.
- The two rivers differ mainly in the statistical properties of discharge extreme values.

Final Report

Cohen, Y, D. O'Shea, L. Aadland and I. Chisholm. 2006. Flows, climate and the fish assemblages in two Minnesota rivers. 293pp.

Status and Critical Habitat of Threatened, Special Concern, and Rare Fish Species in the non-wadeable portions of the St. Croix basin and the Minnesota River

Many small nongame fish like darters and shiners are indicators of excellent water quality and habitat. However, we have limited information on their status and many standard sampling techniques have limitations that decrease the likelihood of sampling rare fish. This project documented the status of seven nongame fish species in the St. Croix River basin. Survey sites were selected based on habitat characteristics associated with the selected species. Survey methods included photographic and/or video documentation of critical habitat where selected fish species were collected. By identifying river segments where these species thrive, resource managers can make informed decisions and the environmental review process can protect these critical habitats and species.

Project Results

- Associated species lists were prepared for five of the targeted species. These lists can assist with evaluating potential rare fish habitat based on other fish community survey information.
- Twelve of 36 targeted fish were sampled using all gear types.
- Compared to surveys conducted in the early 1980s, the total number of fish captured increased and the distribution expanded.
- The IBI scores indicate a separation between the lower and upper Minnesota with the scores being much higher in the lower portion of the river.

Final Report PDF (2327 KB)
Proulx, N. 2005. Status and critical habitat of threatened, special concern, and rare fish species in non-wadeable portions of the Minnesota River. Final report submitted to the State Wildlife Grants Program. 18 pp.

Final Report PDF (1474 KB)
Proulx, N. 2005. Status and critical habitat of threatened, special concern, and rare fish species in non-wadeable portions of the St. Croix River basin. Final report submitted to the State Wildlife Grants Program. 20 pp.

Establishing Conservation Units and Populations Genetic Parameters of Fishes of Greatest Conservation Need Distributed in Southeast Minnesota

Three North American minnows in the family Cyprinidae, *Clinostomus elongatus* (redside dace), *Lythrurus umbratilis* (redfin shiner), and *Notropis nubilus* (Ozark minnow), have restricted distributions in the drainages of southeastern Minnesota and have been identified as species in greatest conservation need (SGCN) in Minnesota's State Wildlife Action Plan. This project examined genetic variation within these species of fishes for the purpose of establishing baseline population data, increasing understanding of the diversity of fishes of special concern, assisting in the establishment of conservation units and helping to establish a framework for better management.

Top photo: Redside dace
Bottom photo: Ozark minnow

Project Results

- Specimens of red dace were collected from six localities, redfin shiner from four localities and Ozark minnow from eight localities from all drainages in which they occur in southeastern Minnesota. The occurrence of these fishes in southeastern Minnesota is likely the result of relict populations that survived the last glacial episode.
- The results revealed different patterns and scales of genetic variation for each species within southeastern Minnesota. Microsatellite data in redside dace genetic units can be defined by drainage. Project results indicate that conservation efforts directed towards maintaining the genetic diversity of this species focus on each drainage (Zumbro, Cannon and Root rivers) separately.
- Research revealed no evidence of genetic distinctiveness for redfin shiner within southeastern Minnesota. Project results indicate that conservation efforts directed towards maintaining the genetic diversity within this species treat all populations as a single genetic unit and focus collectively on all of their native drainages in the state: Zumbro, Root, Upper Iowa and Cedar rivers.
- Within Ozark minnow there was no evidence of independent genetic units in southeastern Minnesota. The microsatellite data uncovered finer scale diversity within the group in the upper Mississippi River Basin. Analyses revealed a genetic distinction between individuals in drainages east and west of the Mississippi River in the upper Mississippi River Basin. This suggests that the Mississippi River is a barrier to gene flow. However, there was also some indication of genetic relatedness between individuals from the Zumbro River and populations east of the Mississippi River. Data needs to be further explored to estimate the amount and direction of gene flow. Project results indicate that conservation efforts directed towards maintaining the genetic diversity within this species treat all populations as a single genetic unit and focus collectively on all of their native drainages in the state: Zumbro, Root and Cedar rivers.
- A single population of slender madtom occurs in Minnesota but researchers were unable to collect specimens. Therefore, this species was not included in this project.

Partner: University of Northern Iowa
Final Report PDF (8366 KB)
Berendzen P.B., J. F. Dugan, and J.J. Feltz. 2008. Establishing conservation units and population genetic parameters of fishes of greatest conservation need distributed in southeast Minnesota. 44pp.

Distribution, Abundance and Genetic Diversity of the Longear Sunfish (Lepomis megalotis) in Minnesota, with Determination of Important Populations


longear sunfish

The northern longear sunfish (*Lepomis megalotis peltastes*), the subspecies of longear sunfish that is found in the upper Midwest, is identified as a species in greatest conservation need (SGCN) due to its spotty distribution in Minnesota and its threatened status in Wisconsin. Current populations of *L. m. peltastes* have been found in only four of the ten major watersheds of Minnesota (Rainy River, Upper Mississippi, and one isolated record each from the Minnesota and Red River watersheds). Within these watersheds the species is limited to only a few clusters of highly disjunct populations in 29 lakes. This project implemented more extensive and thorough surveys for northern longear sunfish, documented habitat type and condition, and utilized population genetic analysis to characterize the amount and geographic distribution of genetic diversity within and among Minnesota *L. m. peltastes* populations.

Project Results

- Longear sunfish were found in 23 bodies of water (includes lakes, rivers, and significant bays of large border lakes). Longears were found in all three of the historic Basins, and eight of the nine Major Watersheds. They were found in 11 of the 18 historic waters that were sampled and in 12 bodies of water that represent new distributional records for Minnesota. The seven lakes with historic records of longear sunfish, but in which longear sunfish were not found, need to be resampled to determine if longear sunfish maintain breeding colonies in those lakes.
- Longear sunfishes are restricted in their habitat use to high-quality waters with shorelines that have relatively undisturbed stretches of emergent aquatic plants, extensive shallows and a firm substrate, thus, changes in longear populations within a given water body could inform managers of a change in water/habitat quality. The project contributed significantly to our understanding of the species' habitat requirements as well as the species population status, both of which will be valuable in the development and implementation of management strategies.
- A primary goal of the project was to determine if Minnesota populations of longear sunfish are native to the state, or have been introduced from other regions of the country. After examination of all captured specimens, the professional judgment of P. Ceas was that the populations found in MN are native to MN.
- Genetics results to date suggest that any genetic differentiation occurring is largely at the watershed level, so maintaining watershed fidelity when moving longear sunfish among populations should be sufficient.
- The report recommends that the species remain as a SGCN and that all 37 populations should be considered as important in terms of management decisions. The report provides subdividing/ranking of the populations into "Most Secure", "Uncertain", "Concern" and "Most at Risk" based on the current and perceived threats to the lakes/habitats

Partner: St. Olaf's College

Final Report (4552 KB)
Porterfield, J., and P.Ceas. 2008. Distribution, abundance and genetic diversity of the longear sunfish (Lepomis megalotis) in Minnesota, with determination of important populations. 25 pp.

Status and Critical Habitat of Rare Fish Species in the Mississippi River from the Coon Rapids Dam to the Iowa Border

The Mississippi River contains some of the most diverse fish assemblages and aquatic habitats in Minnesota. According to the MN State Wildlife Action Plan, *Tomorrow's Habitat for the Wild and Rare,* the Mississippi is home to 21 fish species identified as species in great conservation need (SGCN), which is the highest number of SGCN fishes for all aquatic habitats. The Mississippi's expansive backwater, side channels, and deep holes are one reason for the diverse fish assemblages. Many of these SGCN are indicators of excellent water quality and habitat. However, current information on their status is limited. This project documented the presence of these species and their associated habitats within the study area.

Greater Redhorse (*Moxostoma valenciennesi*)

Project Results:

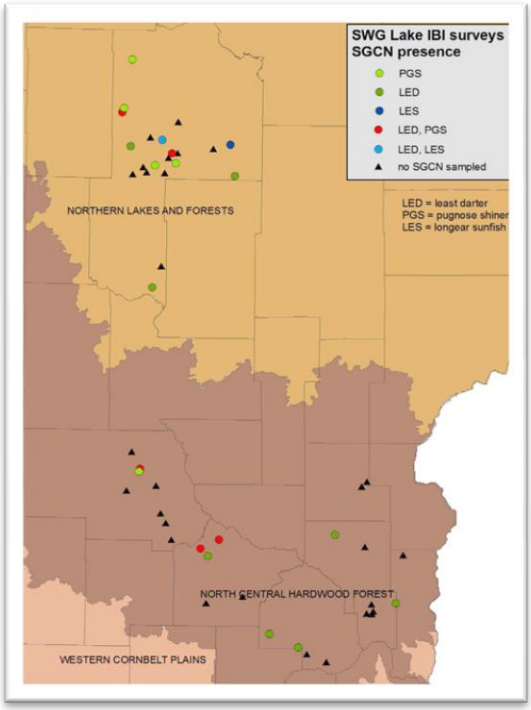
- From 2006 through 2008, the Mississippi River was surveyed from the Coon Rapids Dam (Pool A) to the Iowa border (Pool 9). Habitats surveyed included main and side channels, backwaters, tributary mouths and tailwater zones of dams. The three year study found 16 of 22 species in greatest conservation need (SGCN) within the Minnesota reach of the Mississippi River. The six absent SGCNs include: American brook lamprey, skipjack herring, pallid shiner, suckermouth minnow, yellow bass and bluntnose darter. However in 2008, the Lake City Area Fisheries Office forwarded specimens to the J F Bell Museum fish collection of a skipjack herring from a commercial harvester in Lake Pepin (Pool 4) and a yellow bass sampled during a fish survey of Pool 9.

  The most widespread species were river redhorse, black buffalo and mud darter that were found in 8, 7 and 7 of the 12 pools, respectively. The most restricted species were paddlefish and crystal darter that were sampled only in Pools 4 and 5, respectively. The most abundant were shoal chub, western sand darter and mud darter. And the rarest were paddlefish, American eel, Mississippi silvery minnow and crystal darter. The pugnose minnow, warmouth and mud darter were most often found in backwaters. However, the mud darter was also sampled at about half the frequency in side channels. Shoal chubs and western sand darters preferred the main channel, but the latter also exhibited a secondary preference for tailwater zones downstream of locks and dams.

- Based on recent trends in occurrences some SGCN fishes can be confidently grouped as recovering, stable or critically imperiled. However, the status of many cannot be assessed. Future survey efforts should focus on SGCNs critically imperiled and of uncertain status. Species summaries developed through this survey project may aid in ranking and guiding subsequent studies. In addition, when surveys similar to these are repeated, changes in distribution can be tracked. Accurate information on distribution is one indicator of how management efforts, land use, and many other variables are affecting the environment as a whole.

Final Report (2421 KB)
Schmidt, K., and N. Proulx. 2009. Status and critical habitat of rare fish species in the Mississippi River from the Coon Rapids Dam to the Iowa border. 29pp.

Status and Critical Habitat of Special Concern and Rare Fish Species in Lakes within the Seven Counties in Minnesota



MN lakes are a valued natural resource and as Minnesota's human population has increased, so has the amount and intensity of development in the vicinity of lakes and on lakeshores. One of the major impacts of lakeshore development is the eventual decrease of near-shore aquatic vegetation and, in turn, its impact on the numerous fish species that depend on near-shore vegetation at some point in their life history. These include three species identified in MN State Wildlife Action Plan, "Tomorrow's Habitat for the Wild and Rare" as species in greatest conservation need (SGCN): least darters, pugnose shiners and longear sunfish. The presence of these species indicates a healthy plant community and excellent water quality. By identifying lakes where these species thrive, resource managers can make informed decisions and the environmental review process can protect these critical habitats and species. However, current sampling efforts for nongame fish within lakes are limited and sporadic and there is a need for a more quantifiably measure of the relationship between fish community makeup and the health of a lake. The Index of Biotic Integrity or IBI can be such a tool. This project surveyed 125 lakes from 2006-2008, targeting the three species and their habitats. Surveys utilized the standardized Index of Biotic Integrity (IBI) protocols and non-standardized surveys.

Project Results

- The IBI surveys sampled 48 lakes and found least darters in 16 lakes (11 new localities), pugnose in 14 lakes (six new localities) and longear sunfish in two lakes.

  The non-standardized surveys sampled 77 lakes and found least darters in 33 lakes (23 new localities) and pugnose shiners in 16 lakes (14 new localities).

  New occurrences found during these surveys have been used to update the distributional data on the three species. Noteworthy results include least darters in Lake Minnewashta (Carver County) where the species was last reported in 1962 and the first record of the species from the St. Croix River Drainage in Forest Lake (Washington County). Pugnose shiners were found in Thompson Lake (Sherburne County) where they have not been reported since 1959 and in Clearwater Lake (Wright County) where they were last reported in 1946.

- Lakes in the Avon Hills area of Stearns County had the greatest frequency of occurrences at 13 percent, followed by Cass (8 percent) and Wright (6 percent) counties. Typical characteristics of these lakes were crystal clear water transparencies that promoted robust growth of submergent vegetation and minimally developed shorelines or lots concentrated in clusters leaving expansive and uninterrupted vegetation zones. In contrast, lakes ringed with development, even with good to excellent transparencies, cannot support either of the two species recorded if vegetation is eliminated or reduced to small isolated patches

- The survey provides valuable information for assessing habitat quality and management strategies for these species including: habitat suitability, reintroduction potential for the pugnose shiner in lakes where the species historically occurred, and future research needs.

Final Report PDF (1433KB)
Schmidt, K., and N. Proulx. 2009. Status and critical habitat of special concern and rare fish species in lakes within seven counties in Minnesota. 16pp.

Freshwater mussels

Mussel surveys on the Minnesota, Red and Lower Mississippi River basins

Freshwater mussels are important components of aquatic ecosystems. Mussels provide food for fish, birds and mammals, and are valuable indicators of the health of our waterways. Forty-nine mussel species have been found in Minnesota, two of which are believed to be extirpated, and 25 are state listed as either endangered, threatened or of special concern. Dam construction, stream channelization, water pollution and sedimentation, and the introduction of the exotic zebra mussel all pose threats to the abundance and diversity of Minnesota's mussel communities. Yet, we know the status of mussels in relatively few of Minnesota's waterways. This project improves information about the distribution and abundance of Minnesota's freshwater mussels.

Project Results

- Surveys for freshwater mussel were completed at 174 sites within the Minnesota, Red, and Root River drainages from May 2002 through June 2003. The primary focus of the sampling was on streams and rivers, but some sampling was also done in ponds and lakes within each drainage basin. Within the three drainages, 25 of the state's 49 mussel species were found, including 9 state-listed species.
- Additional sampling took place at 95 sites within the Lake Superior, Lower Mississippi (outside of the Root River drainage), Upper Mississippi, and St. Croix Drainages. At these sites, 41 mussel species were found, including 23 of the 25 state-listed species.
- Overall within the seven drainage basins sampled, 79% of the sites had live mussel species present, while 13% had only dead mussels present, and 8% had no mussels. Species diversity varied among sites by drainage, with the Lake Superior Drainage generally showing the lowest mussel diversity (maximum of 5 species per site), and the Minnesota River Drainage exhibiting the highest (maximum of 12 species per site).
- In addition to improved information about the distribution and abundance of Minnesota's freshwater mussels, a field guide to Minnesota mussels was produced as part of this project. This guide will serve as a tool for resource managers, biologists, and others interested in the identification of freshwater mussels in Minnesota. Pocket sized and printed on waterproof paper, the guide is designed for easy transport and use in the field. It contains color photographs, descriptions of shell characteristics, general habitat associations, distribution and abundance information, distribution maps, and status classifications for the 48 native freshwater mussel species and two exotic bivalves known to occur in Minnesota. The guide also contains general information about mussel biology, the importance of mussels, threats to mussels, collection methods, and collection regulations.

Minnesota Statewide Mussel (Bivalvia: Unionidae) Survey and Long – Term Monitoring Design 2005 – 2009

In August 1999, the Minnesota Department of Natural Resources' (MNDNR) Division of Ecological Services (currently Division of Ecological Resources) began a freshwater mussel survey to determine the distribution and abundance and status of unionid mussels in Minnesota. Between August 1999 and October 2004, 1,673 sites were sampled in various river systems, primarily in the southern and eastern portion of the state. More limited surveys were done in the Red River of the North and Rainy (Lake of the Woods) drainages, and mainstem Mississippi and Minnesota rivers. Completing surveys in these remaining areas was a high priority based on expected species richness of mussels and presence of state listed species. As a continuation of the previous mussel survey project the objectives of this project were to 1) complete the Minnesota statewide mussel survey begun in 1999, of which approximately 30% remained, and 2) initiate long-term monitoring sites to detect potential changes in mussel populations.

Project results

- Freshwater mussels were surveyed at 534 river and lake sites in six of Minnesota's major riverdrainages, effectively completing an initial survey of the state.
- A total of 83,868 live mussels of 35 species were collected, as well as an additional nine species as dead specimens only. Populations of 10 Endangered or Threatened, and five Special Concern species were found, including new populations for the Federally endangered Higgins' eye (*Lampsilis higginsii*) and Federal candidate sheepnose (*Plethobasus cyphyus*). New additions to Minnesota's mussel fauna included the "rediscovery" of the lake floater (*Pyganodon lacustris*), and an as of yet unconfirmed, but probable *Quadrula* species from the lower Minnesota River. The first records of live flat floater (*Anodonta suborbiculata*) were also found.
- Areas of special or regional significance for their mussel assemblages included the Chippewa and Pomme de Terre rivers of the Minnesota River Drainage, and West Newton Chute of the Mississippi River.
- Monitoring methodology was developed and three long-term monitoring sites were established, one each on the Cannon and Chippewa rivers, and Newton Chute of the Mississippi River.

Insects

Karner Blue Butterfly Habitat Restoration

Whitewater Wildlife Management Area (WMA) currently supports populations of the federal threatened Karner blue butterfly in three of the 12 to 15 valleys that serve as potential habitat. Dramatic population declines during 2003 indicate an immediate need for accelerating the rate of dry oak savanna habitat restoration at strategic locations, and where possible, connecting narrowly isolated habitats. Dry savanna restoration will be accomplished through the use of brush clearing, on-site seed collection and subsequent seeding of native larval host plants and adult nectar plant species, and the application of prescribed fire.

Project Results

- Forty acres of brushwork was completed in two valleys.
- Five acres of black locust that had invaded a prairie planting were cut and treated.
- Hand harvest and cleaning of lupine seed was completed and will be seeded on Whitewater WMA to increase plant host abundance.

Final Report PDF (329 KB)
Lundquist, R. 2006. Karner blue butterfly habitat restoration at Whitewater Wildlife Management Area. 5 pp.

Please note that all location information has been removed from this document to protect the Karner blue butterfly populations

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A Report on Surveys for the Karner Blue Butterfly and Other Rare Insects at Whitewater Wildlife Management Area, with an Assessment of Habitat Quality and Recommendations for Management and Monitoring

Minnesota's only surviving occurrence of the Karner Blue butterfly is in a mosaic of oak savanna and sand barrens habitats in the Whitewater Wildlife Management Area (WMA) in southeast MN, where wild lupine is found. Wild lupine is the only known food source for the larval stage of the Karner blue. In addition to wild lupine, the adult Karner blues require flower nectar from a diversity of flowering plants that are associated with oak savanna and sand barrens. Research indicates that the Karner blue and lupine prefer recently burned habitat, where lupine and nectar sources tend to be more vigorous and produce greater biomass. The species was originally listed as threatened in MN in 1984, but due to its extreme rarity in the state was reclassified as endangered in 1996. The species was federally listed as endangered by the U.S Fish and Wildlife Service in 1992. The Minnesota population underwent a population crash around 2003 and is now known to occur at only a single site within the WMA. This study surveyed the known Karner blue habitat areas and reported on the status of the species and its habitat. The study also surveyed and reported on other rare butterflies and moths occurring on the study sites.

Project Results

- Sixty-eight butterflies or moths representing over fifty species rare or uncommon to the area were identified in the study area including two SGCN, Persius Duskywing *and* Leonard's skipper.
- Karner blue surveys produced a low number of observations making formal population estimates impossible. A very rough estimate places the population at 80 to 400 individuals. Low numbers of observations were true even for high quality oak barren sites. On one site containing extensive patches of lupine on south and west facing slopes, and what looked like ideal Karner blue habitat, only a single male was found during the summer brood period. Nearly all observations of larval feeding signs were in recently restored areas. Unseasonably cool weather and localized droughty conditions created difficult survey conditions.
- Much of the oak savanna and sand barrens habitat is suffering from either fire suppression or invasion by non-native grasses. The majority of the oak barrens in the study area had unnaturally dense canopies of young trees and shrubs, with a dense layer of leafy detritus on the ground. The herbaceous layer in these sites was non-existent. In most of the few remaining open areas, non-native plant species like smooth brome and blue grasses, have invaded previously grazed areas. Some Karner blue habitat areas are almost completely covered with a woody canopy of oaks, cherries and, locally, jackpine. In some areas canopy cover may need to be reduced by 30 percent to 50 percent of its current level.
- Sites currently being managed as Karner blue butterfly habitat were the only high quality barren remnants observed in the study area. However, these sites are small and isolated, which limits their ability to support Karner blue butterfly populations over the long-term.
- Project results indicate that the goal of the restoration effort should be the creation of a Karner blue metapopulation management area within the Whitewater Management Areas. Global climate change could place additional stress on this population requiring that Karner blue butterfly habitat be expanded in the more cool and humid portions of the Whitewater valley.

Final Report PDF (4659KB)
Bess, J. 2009. A report on surveys for the Karner Blue butterfly and other rare insects at Whitewater Wildlife Management Area, with an assessment of habitat quality and recommendations for management and monitoring. 44 pp.

Please note that all location information has been removed from this document to protect the Karner blue butterfly populations

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A Survey of Lepidoptera in Three Priority Areas of the Minnesota State Parks System

Regal fritillary

The Lepidoptera order includes butterflies and moths. Butterflies have been comparatively well documented in Minnesota. In contrast, records for moth species in Minnesota are almost non-existent. Recent work in Minnesota State Parks has shown that there can be as many as 800 species found in a single park. There is a profound need for information about this under-documented Order in the state.

This project conducted baseline Lepidoptera inventories on approximately fifteen units (state parks, state recreation areas) in eight Ecological Classification System (ECS) Subsections: Agassiz Lowlands, Aspen Parklands, Blufflands, Border Lakes, Hardwood Hills, North Shore Highlands, Red River Prairie and Rochester Plateau. In these subsections, about 15 percent of the Species of Greatest Conservation Need (SGCN) identified by MN State Wildlife Action Plan (SWAP), *Tomorrow's Habitat for the Wild and Rare*, are insects. The project documented new locations for one state-listed and one other species in greatest conservation need on state park administered lands within these ECS Subsections.

Project Results

- A total of eight 840 species were documented during the survey of which 72 were butterflies and 768 were moths. The parks in northeastern MN which appeared to contain the greatest diversity of Lepidoptera were George Crosby Manitou and Tettegouche, with 405 and 431 species respectively. In southeast MN, the park containing the greatest diversity was Great River Bluffs with 322 species.

  The researcher identified 113 of the species documented during the survey as rare and possibly requiring special management consideration. Rarity was based on the researchers sampling experience in this project and his knowledge and experience in other parts of the Midwest and species found at only one park.

- Two SGCNs were documented: the regal fritillary was the only state-listed (Special concern) species documented during the survey. It was observed at Frontenac state park. The Tawny crescent, a non-listed species of greatest conservation need, was found at both George Crosby Manitou and Temperance River state parks.
- In 2009, in response to increased gypsy moth numbers in the North Shore region of MN, the USDA Forest Service and MN Dept. of Agriculture recommended a Btk treatment for a portion of the North Shore, including a portion of Cascade River State Park. As a result of this survey, 24 species of "conservation concern" were identified within the proposed spray block, some of which would be at particular risk because they are feeding at the same time as the gypsy moth larva. Negotiations with MN Dept. of Agriculture culminated in moving the Btk treatment elsewhere and allowing only a mating disruption treatment to be applied over park lands.

Rare, listed and SGCN Lepidoptera species will receive greater protection because locations and other information will be available in DNR databases. Procedures for implementing resource management actions, such as prescribed burning, may be revised based on greater knowledge of species' abundances and locations.

Final Report PDF (6222 KB)
Quinn, E. M., and R. Danielson. 2009. A survey of lepidoptera in three priority areas of the Minnesota state parks system. 49 pp.

Mammals

Timing and Pattern of Bat Activity at Soudan Underground Mine


Soudan Underground Mine, hibernaculum

Soudan Underground Mine supports the largest total number of over-wintering bats in the state. An estimated 8,000 bats use Soudan Underground Mine as a winter hibernaculum, including two species in greatest conservation need (SGCN): the Northern myotis and the Eastern pipistrelle, both state special concern species. This is the largest hibernating colony of Northern myotis in Minnesota with at least 2,000 bats. In addition, the Eastern pipistrelle occasionally hibernates here. This is the northern-most record of this species known for Minnesota. Activities that impact the survival of this over-wintering colony will have far reaching impacts on the health of native bat populations in the Upper Midwest. This project documented the timing of spring emergence of bats from winter hibernation in the mine, to evaluate the importance of the open pits and mine shafts as exits locations; and recorded the timing of bats returning to the mine in the fall. Changes in seasonal activity of bats within the mine and at the surface were correlated with changes in surface and subterranean environmental conditions.

Project Results

- An unexpected level of bat activity at Soudan was detected, both underground and in the pits.
- Bats continue to be active in the pits and underground well into the hibernating period.
- A late summer die-off of bats at one of the lower levels of the mine is being investigated.

Final Report PDF (4298 KB)
Nordquist, G.E., K.A. Lynch, and C.A. Spak. 2006. Timing and pattern of bat activity at Soudan underground mine. 86 pp.

Reptiles

Studying Habitat Use, Improving Reproductive Success, and Managing Three populations of Blanding's Turtles within a Suburban Regional Park System


Blanding's turtle

Three Rivers Park District surveys documented that Crow-Hassan, Elm Creek, and Murphy-Hanrehan Park Reserves support populations of Blanding's turtles, a state threatened species. Intensive monitoring by Three Rivers Park staff and volunteers have shown Blanding's turtles frequently leave Park property for nesting and feeding and are at risk on roads as they move in and out of the Park Reserves. Many of the nesting females appear to be attracted

to road shoulders, park trails, and power line openings. There has been little evidence of recruitment into these populations in the past 20 years. Expanded efforts are needed to determine the boundaries utilized by the turtles, protect nests from predation, protect breeding adults from road traffic, and document and enhance recruitment. Without active management, the Park Reserves will not provide suitable turtle habitat to entice the turtles to stay within the Park Reserve boundaries. Without intervention, remaining Blanding's populations in the Turtle Priority Areas will decline to remnant population status and eventually disappear from the metro area.

Project Results

- Twenty-eight nests at three different parks were protected and/or salvaged. Eggs from 14 salvaged nests were incubated at different temperature regimes to ensure a mix of males and females, resulting in 265 hatchlings (88.7 percent hatching success)
- Of the 28 nests located in 2005 only five were located in the parks. The others were found in roads and farm fields, pastures and yards near the parks.
- Fifteen hatchlings were tracked during 2005.

Final Report

Three Rivers Park District. 2006. Three Rivers Park District summary of Blanding's turtle study 2004-2006.

Recovery of State Threatened Timber Rattlesnake Populations in Minnesota's Blufflands State Parks and Scientific and Natural Areas

The timber rattlesnake is currently classified as a threatened species in Minnesota. Unlike many other species of concern that are declining largely due to habitat loss, timber rattlesnakes are primarily being impacted by intentional human actions such as den site vandalism, snake poaching, and habitat loss. This project helped protect and restore populations of timber rattlesnakes on DNR lands by providing updated information on the location and status of various populations, reducing/preventing poaching and den site vandalism, and improving habitat associated with wintering hibernacula and basking areas by removal of encroaching woody vegetation.

Timber rattlesnakes basking in the sun within the project area

Project Results

- Results from spring emergence survey indicate a significant and alarming decrease in population size since 1990-91.
- Habitat management - removal of woody vegetation and or burning was conducted on several hundred acres.
- As a result of increased patrol and protection efforts, a significant decline in human activity in restricted areas of Great River Bluffs State Park was noted between 2004-05.

Final Report PDF (679 KB)

Fritcher, S., and E. Quinn. 2005. Recovery of state threatened timber rattlesnake (Crotalus horridus) populations in Minnesota's blufflands state parks and Scientific and Natural Areas. 5 pp.

Please note that all location information has been removed from this document to protect the timber rattlesnake populations

Habitat Management and Protection of State Threatened Timber Rattlesnake (Crotalus horridus) Populations in Minnesota's Blufflands State Parks and Scientific and Natural Areas

The timber rattlesnake is designated a state-threatened species in MN and is considered imperiled or vulnerable over nearly 70 percent of its North American range. Intentional human persecution of the species through vandalism of den sites and basking areas, as well as poaching, makes this species particularly susceptible to declines even in protected areas such as state parks and scientific and natural areas. Furthermore, the bluff prairies habitat used for birthing and denning is rare and declining in quality. A low reproductive rate, an extended maturation period, and minimal survival of translocated animals are some of the characteristics that make timber rattlesnake populations more vulnerable to negative impacts and also very slow to recover once declines have occurred.

This project helped to protect and restore timber rattlesnake populations on six state parks and two scientific and natural areas (SNA) by restoring and maintaining potential and current rattlesnake habitat, protecting rattlesnake populations from human persecution, and surveying selected sites to identify denning activities, reproduction, habitat quality, and presence/absence of timber rattlesnakes. The project is largely a continuation of a previous State Wildlife Grant project from 2003-2005, with some modifications given the information learned from the earlier project.

Project Results

- Habitat management that included removal of woody vegetation and or prescribed fire was implemented on over 900 acres.
- As a result of increased patrol and protection efforts in previous years, declines in human activity within the restricted areas of Great River Bluffs State Park continued.
- A total of 19 rattlesnakes were observed as part of the survey efforts. Rattlesnakes were present at the five known den sites surveyed.
- Timber rattlesnakes are a difficult species to survey making failure to detect difficult to interpret. Use of cameras located at den sites and near rocks that snakes use for thermoregulation is one possible technique for supplementing survey data. Three Deer Cams captured photos of rattlesnakes at two known den sites and provided staff with valuable lessons as to the potential of this minimally intrusive technique for monitoring den sites.

Final Report PDF (1116 KB)
Fritcher, S., and E. M. Quinn. 2008. Habitat management and protection of state threatened timber rattlesnake (Crotalus horridus) populations in Minnesota's Blufflands State Parks and Scientific and Natural Areas. 7pp.

Please note that all location information has been removed from this document to protect the timber rattlesnake populations

Biological Surveys

Rare Animals in the Hardwood Hills, Pine Moraines and Outwash Plains Ecological Subsections of West-central Minnesota

This Minnesota County Biological Survey (MCBS) project collected and interpreted data on the distribution and ecology of rare animals in the Hardwood Hills and Pine Moraines and Outwash Plains ecological subsections of

Otter Tail, Douglas, and Todd counties. The data was compiled, entered into databases, and made available as maps and summaries to be used in ecoregional planning and the identification of important habitats or sites for rare animals.

Project Results

- MCBS documented a total of 282 animal species in Todd, Otter Tail and Douglas Counties, including more than 230 new records for 30 rare animals and animals of regional interest.
- Seventy-three new county records for animals were collected.
- Important areas for rare animals in these counties were identified.

Final Report PDF (2976 KB)
Harper, E., G. Nordquist, S. Stucker, and C. Hall. 2006. Rare animals in the hardwood hills and pine moraines and outwash plains ecological subsections of west-central Minnesota. Minnesota County Biological Survey, Minnesota Department of Natural Resources. 69 pp.

Rare Animals in the Glacial Lakes and Moraines Landscape of Central Minnesota

This Minnesota County Biological Survey project collected and interpreted data on the distribution and ecology of rare animals in the Glacial Lakes and Moraines Landscapes in Central Minnesota. This landscape includes the counties of Pope, Kandiyohi, southwestern Stearns and eastern Swift. The steep sided hills retain large areas of native prairies and smaller areas of forests that provide for a high diversity of native plants and habitat for rare animal species such as the Dakota skipper (*Hesperia dacotae),* arogos skipper *(Atrytone arogos),* poweshiek skipper *(Oarisma poweshiek),* Marbled Godwit *(Limosa fedoa*), Wilson's Phalarope *(Phalaropus tricolor*), Loggerhead Shrike *(Lanius ludovicianus),* Cerulean Warbler *(Dendroica cerulea) and* Henlow's Sparrow *(Ammodramus henslowii)* As a result, there are tremendous opportunities to maintain significant sites of relatively undisturbed land in the region and many opportunities to add to the already protected land in the area.

A compact disk entitled *Survey of Biological Features in the Glacial Lakes and Moraines Landscape of West-Central Minnesota* containing a report, data files, maps in pdf format, element occurrence database entries, animal and plant checklists, a series of digitized and other information was provided to The Nature Conservancy for use in their ecoregional planning process.

This project was a partnership with The Nature Conservancy, which provided matching funds for the project.