



facilitating partnerships in the conservation of birds and their habitats

BIRD CONSERVATION MINNESOTA

Minnesota Breeding Birds Inventory and Monitoring Programs

**Compiled for the Minnesota Breeding Birds
Inventory and Monitoring Programs Workshop**

**February 14th – 15th 2007
Natural Resources Research Institute
Duluth, Minnesota**

Presented by Bird Conservation Minnesota with support from the Natural
Resources Research Institute and Hawk Ridge Bird Observatory



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**Prairie Enhancement: woody vegetation management
US Fish and Wildlife Service, HAPET**

Program Contact(s)

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<http://www.fws.gov/midwest/hapet/BiologicalFieldActivities.htm#TreeRemovalandGrasslandBirds>

Program Purpose

To track expected changes in the breeding bird community following woody vegetation removal Waterfowl Production Areas.

List Bird Species Covered

All species seen or heard

Temporal and Spatial Extent (counties preferred)

June 2005 (pre-treatment), June 2006 (post-treatment), planned for 2007 and plan to continue for at least a couple more years

Big Stone, Stevens, Pope, and Kandiyohi

Type of Data Collected

Avian point counts, GPS, vegetation characteristics: floristics, herbaceous structure, distance to woody vegetation

Field Methodology

10 minute point count, divided into 4 distance categories (0-25, 25-50, 50-100, >100 m) and 3 time periods (0-3, 3-5, 5-10 min).

Location Scale (point, twp/range, management unit, etc.)

Points within WPAs

Data Management System

MS Excel, SAS, and ArcGIS

Accessibility of Data and Reports

Will be available after analyses are completed and may be uploaded to USFWS point count database

Program Strengths and Weaknesses

Strengths: Have pre-, post-, control study design on 6 treatment sites and 6 control sites; data recording allows for 2 measures of detectability; have had same observers each year

Weakness: Would have liked to have >1 year pre-treatment; treatment and control sites are extremely varied in amount and type of woody cover



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**Four Square Mile Waterfowl Survey
US Fish and Wildlife Service, HAPET**

Program Contact(s)

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<http://www.fws.gov/midwest/hapet/BiologicalFieldActivities.htm>

Program Purpose

The annual Waterfowl Breeding Population and Production Estimates Survey was launched in 1987 as a means of assessing contributions of National Wildlife Refuge System lands in the Prairie Pothole Region to continental waterfowl populations.

List Bird Species Covered

Breeding population estimates for 13 species of ducks.
Breeding population estimates for Mallard, Blue-winged Teal,
Combined breeding population estimates for above and Gadwall, Northern Shoveler, Northern Pintail, American Wigeon, Green-winged-Teal, Wood Duck, Redhead, Canvasback, Lesser Scaup, Ring-necked Duck, Ruddy Duck
Production estimates for 5 species of ducks: Mallard, Blue-winged Teal (separate), Gadwall, Northern Shoveler, Northern Pintail (combined with BWTE and MALL).
Presence of other waterbirds in wetlands also is recorded.

Temporal and Spatial Extent

Prairie Pothole Region of Minnesota, Iowa, North and South Dakota, and eastern Montana.

Type of Data Collected

Visual observation of species observed and wetland condition of sample ponds. Annual aerial photography of sample plots.

Field Methodology

Data are collected by using ground counts in Minnesota, and the Dakotas and a by helicopter in Iowa. In each 4-square mile plot, waterfowl and other wetland birds are counted on selected wetlands. Color infrared aerial photos of these plots are acquired annually to assess habitat condition.

Location Scale

Prairie Pothole Region of Minnesota, Iowa, North and South Dakota, and eastern Montana.

Data Management System

TNTMIPS, SAS, MS Excel, ARCGIS

Accessibility of Data and Reports

Annual reports can be viewed online.
<http://www.fws.gov/midwest/hapet/BiologicalFieldActivities.htm>



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**Four Square Mile Waterfowl Survey
US Fish and Wildlife Service, HAPET**

Program Strengths and Weaknesses

Strengths: Long term annual monitoring survey using standardized techniques over a broad spatial area. It's the only waterfowl survey that ties species observations to a specific wetland. Data from this survey is the foundation for a suite of management tools.

Weaknesses: Data collection requires strong commitment from partners. Turnover of observers can affect the data collected. Some data collected on wetland condition is subjective.

Ideas for Future Improvements

Expansion of the survey into the prairie – hardwoods transition area of Minnesota.

Publications (most recent)

Annual report 2006 which can be seen online at:

<http://www.fws.gov/midwest/hapet/BiologicalFieldActivities.htm>



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Secretive Marsh Bird Monitoring Surveys

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<http://www.fws.gov/midwest/hapet/BiologicalFieldActivities.htm#MarshBirdMonitoringSurveys>

Program Purpose

Determine population trends and habitat use at local and landscape scale

List Bird Species Covered

Primary: American Bittern, Least Bittern, Virginia Rail, Yellow Rail, Pied-billed Grebe, Red-necked Grebe, Black Tern, American Coot, Common Moorhen

Secondary (varies with observer): non-waterfowl wetland birds e.g., herons, gulls, egrets, snipe, marsh and sedge wren, Le Conte's Sparrow, Nelson's Sharp-tailed Sparrow, Marbled Godwit, etc.

Temporal and Spatial Extent (Counties)

2002 – Marshall

2003 – 2004 Otter Tail, Wilkin, Becker, Mahnomen, Norman, Polk, Marshall

2005 – 2006 above plus Douglas and Grant

Surveys are also conducted at the following National Wildlife Refuges (years of participation varied between 2000-2006):

Agassiz (Marshall), Hamden Slough (Becker), Rice Lake (Aitkin), Morris Wetland Management District (Traverse, Stevens, Big Stone), Sherburne (Benton), Crane meadows (Morrison), Minnesota Valley (Ramsey), Upper Mississippi (Wabasha, Winona, Houston), Big Stone (Lac Qui Parle), Rydell (Polk), Litchfield WMD (Meeker, Kandiyohi)

Type of Data Collected

GPS location, aural and visual detection of birds, date and time of detection, weather, local habitat (varied: extent and type of wetland vegetation, water conditions, surrounding landuse)

Field Methodology

Follows protocol in:

Conway, C. J. 2005. Standardized North American Marsh Bird Monitoring Protocols. Wildlife Research Report #2005-04. U.S. Geological Survey, Arizona Cooperative Fish and Wildlife Research Unit, Tucson, AZ.

www.ag.arizona.edu/snr/research/coop/azfwru/NationalMarshBird/

Above surveys listed by county for 2003-2006 are conducted from roadsides.

Location Scale

Northwest Minnesota, prairie region for roadside surveys; refuges and WMDs listed above.

Data Management System

MS Excel, ArcGIS, MS Access

Accessibility of Data and Reports

Data have been sent to Courtney Conway to help evaluate the protocol, soon to be converted into national database with web access. At this time data are not generally available to non-participants.



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Secretive Marsh Bird Monitoring Surveys

Program Strengths and Weaknesses

Strengths: A team of USFWS biologists are in the process of developing a standard protocol for National Wildlife Refuges, which will be accessible to other agencies and organizations that wish to monitor marshbirds. Availability of web based data entry assures uniformity across the country and some built-in QA/QC. The protocol has been tested for approximately 6 years, and is still undergoing evaluation. Incorporates several means to estimate detectability.

Weaknesses: Secretive marsh birds are notoriously finicky about calling, which can lead to inconsistencies in the data. The use of call broadcast has been criticized by some. The timing of the survey (conducted 3 times in spring) may include some migrants when ideally we'd like to monitor breeding birds only. At this time there is still some debate about the value of surveys conducted only on managed lands without a landscape context, i.e., population trends on the surrounding lands.

Ideas for Future Improvements

At this time we are planning to implement a study to evaluate roadside bias.

Publications (most recent)

None from Minnesota data. Please see Courtney Conway's web site for national pubs
www.ag.arizona.edu/smr/research/coop/azfwru/NationalMarshBird/



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**Breeding Shorebird Response to Prairie Wetland Restoration
US Fish and Wildlife Service**

Program Contact(s)

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Program Purpose

To track changes in breeding shorebird numbers in response to prairie wetland restoration on the Glacial Ridge NWR and surrounding project area.

List Bird Species Covered

Marbled Godwit, Upland Sandpiper, Wilson's Phalarope

Temporal and Spatial Extent

Started May 2006, hope to continue on an annual basis
Polk County - Glacial Ridge NWR and associated TNC and DNR lands

Type of Data Collected

Location of all shorebirds seen and heard while walking transects spaced every 0.5 miles

Field Methodology

Volunteer observers are provided with maps, compasses, and binoculars and asked to record all shorebirds seen and heard while walking their transect, and to describe bird behavior. Observers are given a brief training session the morning of the survey.

Location Scale

Glacial Ridge NWR and associated TNC and DNR lands

Data Management System

MS Excel and ArcGIS

Accessibility of Data and Reports

2006 report provided to Glacial Ridge Refuge Manager

Program Strengths and Weaknesses

Strengths: use of volunteers lowers costs and is good PR, allows extensive and intensive coverage of 30+ thousand acre project area, able to complete survey in one day

Weaknesses: use of volunteers may compromise data quality (e.g., mapping locations on aerial photos); may be difficult to optimize timing of survey for all 3 breeding shorebird species

Ideas for Future Improvements

May want to provide more markers along transect routes to aid observers, provide GPS units to all observers if possible

Publications (most recent)

None



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Monitoring Avian Productivity and Survivorship (MAPS)

Program Contact(s)

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Program Purpose

Assess and monitor vital rates, population trends, and dynamics of ~120 species of North American landbirds. MAPS is a comprehensive monitoring program aimed at identifying proximate (demographic) and ultimate (environmental) causes of population changes and formulating management strategies to reverse population declines.

List Bird Species Covered

To date, no comprehensive analysis has been undertaken at the MN-state level. MAPS currently provides estimates of annual adult apparent survival rates and indices of productivity for 60 landbird species in the North-central MAPS Region. Power analyses of the ability to detect differences or trends in survival at this spatial scale (see http://www.birdpop.net/publications/MAPS_CBM%20Report.pdf for detail) suggest that with the number of stations that operated in the region through 2001 (N = 32 stations), 25 of these species (most of which breed regularly in MN) would be effectively monitored. These include:

“Traill's” Flycatcher, Least Flycatcher, Red-eyed Vireo, Black-capped Chickadee, Tufted Titmouse, House Wren, Veery, Wood Thrush, American Robin, Gray Catbird, Yellow Warbler, Chestnut-sided Warbler, American Redstart, Kentucky Warbler, Mourning Warbler, Common Yellowthroat, Field Sparrow, Song Sparrow, Swamp Sparrow, White-throated Sparrow, Northern Cardinal, Indigo Bunting, Brown-headed Cowbird, Baltimore Oriole, American Goldfinch

We estimate that if the size of the MAPS program were doubled over year 2001 levels, such that 64 stations could be operated, the number of effectively monitored species would also be doubled.

Temporal and Spatial Extent (counties preferred)

Eleven stations have been established and operated in eight MN counties: Anoka, Clay, Crow Wing, Dakota, Lake, Pine, Ramsey, and Washington. Of these stations, two have operated for 12 yrs, six have operated for 6-9 yrs, and three have operated for 1-2 yrs. Only 4 of the 11 stations were operated in 2006.



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Monitoring Avian Productivity and Survivorship (MAPS)

Type of Data Collected

The principal data collected are constant-effort mist netting data and capture-recapture data. Detailed breeding status lists (including all species detected at the MAPS station; i.e., not just mist-net captures) are also recorded. Habitat structure and floristics are also measured at the station at least once every 5 yrs.

Field Methodology

Mist netting and banding are conducted over the central ~ 8 ha of a 20 ha study site (the MAPS station) on 6-10 days during the breeding season. Banding days are separated by 6-10 days. At each station, approximately 10 permanent net sites are established. One 12-m 30-mm-mesh mist net is erected at each net site on mist-netting days and opened for 6 hrs. All unbanded birds captured during this time are banded, and all recaptures are recorded. All other bird species detected and their breeding behavior is also recorded during each site visit. The complete MAPS protocol can be downloaded at: www.birdpop.org/DownloadDocuments/manual/MAPSManual06.pdf.

Location Scale

The sampling scale of an individual MAPS station varies by species. Based on models of constant-effort captures as functions of landscape habitat variables, the area sampled appears to be within 1-6 km of the center of the MAPS station.

Data Management System

The continental scale MAPS database is managed by The Institute for Bird Populations in Point Reyes Station, CA. Before entering the final MAPS database all banding data undergoes careful proofing against original data sheets, and then are further verified to correct for within-year and between-year discrepancies.

Accessibility of Data and Reports

Annual reports of the MAPS Program are published in the journal *Bird Populations*, of which Volume 7 is now available online at www.birdpop.net/pubs/birdpopv7.php. Tabulated summary results (through 2003) can be queried at continental and regional scales through the NBII Bird Conservation Node web pages www.birdpop.org/NBIIHome.asp. Additional data and reports can be downloaded from www.birdpop.org/publications.htm, or can be requested from The Institute for Bird Populations.

Program Strengths and Weaknesses

The principal strength of MAPS is its ability to estimate or index many population parameters, including productivity, recruitment, survival, and population growth rate (or trend). Detailed information on individuals, such as breeding condition, body condition, and molt can also be obtained. Weaknesses include the need for skilled banders to conduct the field work (more training is needed to increase the pool of skilled banders), and the greater effort required to cover large spatial extents (compared to count-based monitoring programs).

Ideas for Future Improvements

We would like to undertake a detailed evaluation of MAPS in the North-central MAPS region. The purpose of this evaluation would be to (1) determine the efficacy of each currently active and discontinued MAPS station for monitoring species of conservation concern, (2) identify areas and partners for expanding MAPS in the region to better target species of conservation concern, and (3) develop a strategy for including MAPS in a larger scheme of Coordinated Bird Monitoring. Currently, we have only completed such an analysis for the Northwest MAPS Region (see www.birdpop.net/publications/BLMReport05.pdf), but we have recently submitted a proposal for undertaking a similar analysis for the Northeast Region.



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Monitoring Avian Productivity and Survivorship (MAPS)

Publications (most recent)

- DeSante, D. F., and D. R. Kaschube. 2006. The Monitoring Avian Productivity and Survivorship (MAPS) program 1999, 2000, and 2001 report. *Bird Populations* 7:23-89.
- DeSante, D. F., M. P. Nott, and D. R. Kaschube. 2005. Monitoring, modeling, and management: Why base avian monitoring on vital rates and how should it be done? Pp. 795-804 in C. J. Ralph and T. D. Rich, eds. *Bird Conservation Implementation and Integration in the Americas*. U.S. Forest Service General Technical Report PSW-GTR-191.
- DeSante, D. F., J. F. Saracco, D. R. O'Grady, K. M. Burton, and B. L. Walker. 2004. Some methodological considerations of the Monitoring Avian Productivity and Survivorship Program. *Studies in Avian Biology* 29:28-45.
- Nott, M. P., D. F. DeSante, R. B. Siegel, and P. Pyle. 2002. Influences of the El Niño/Southern Oscillation and the North Atlantic Oscillation on avian productivity in forests of the Pacific Northwest of North America. *Global Ecology and Biogeography* 11: 333-342.



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**Three Rivers Park District
Natural Resources Management, Wildlife Section**

Program Contact(s)

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Natural Resources Management
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Program Purpose or Objectives

Identify trends in bird abundance within the Park District

List Bird Species Covered

Primarily grassland, woodland, and edge species of passerine birds (some woodpeckers, raptors, wading birds, and waterfowl are recorded but the surveys are not designed to sample these species).

Temporal and Spatial Extent

All surveys are conducted during the breeding season between May 25th and June 15th within Park District properties. Park properties are located within the 8-county Metro Area and range in size from 300 acres to 4,000 acres.

Type of Data Collected

Bike Trail BBS: list of species per park – presence or absence only
Woodland Point Counts: species and numbers of birds seen or heard in 10 minute period within 100 m of sample point, and observations of the birds' activity (singing, calling, etc.).
Transects: species and numbers of birds seen or heard along a transect in a specific habitat.

Field Methodology

Bike Trail BBS – 3 minute point counts at designated stops along a bike trail, completed twice annually;

Woodland Point Counts – 10 minute counts (two 5 minute periods) of birds within 100 m of the sample point, indicating bird activity (singing, calling, etc), completed once each year;

Habitat Transects – walking a transect through a specific habitat type (grassland, woodland, mixed, or managed habitat) recording all birds within the habitat of interest, completed twice in a season, each habitat type once every 4 years.

Location Scale

Point and transect data within management units no larger than 40 acres.

Data Management System

Access Database, ArcGIS



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**Three Rivers Park District
Natural Resources Management, Wildlife Section**

Accessibility of Data and Reports

Available by request – contact Carol Carter

Program Strengths and Weaknesses

Our surveys suffer from the same weaknesses that many bird sampling programs do – variability in the skill of the observers, variability in weather, time of day and season, small sample size, using volunteers for some surveys. We try to compensate for these variables by requiring observers to pass a song test to ensure a certain level of competence in identifying the birds, we don't conduct surveys in bad weather, and we try to reverse the order of sampling when surveys are repeated.

Publications (most recent): N/A

[The surveys show that "edge species" becoming more common, while open site species are declining and woodland species show little change. This is expected since the parks are going through a period of rapid succession to forests, but the forests have not matured sufficiently yet to be suitable for woodland species of wildlife]



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Minnesota Cooperative Fish and Wildlife Research Unit

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Program Purpose

The Minnesota Cooperative Fish and Wildlife Research Unit's mission is to develop and conduct programs of research and education related to fish and wildlife resource conservation, and to provide technical expertise to resource management. Emphases for these programs include the impacts of human activities on aquatic and terrestrial ecosystems and human dimensions of natural resources conservation at the state, national, and international scales. These programs are to result in science that has both academic and practical impact, and graduates who are well trained as professionals.

List Bird Species Covered

Forest-nesting songbirds, forest-nesting raptors, American woodcock, Eastern Prairie Population Canada geese

Temporal and Spatial Extent

Project dependent

Type of Data Collected

Nesting success, presence, abundance

Field Methodology

Project dependent

Location Scale

Project dependent

Data Management System

Project dependent

Accessibility of Data and Reports

Project reports, manuscripts, these, and publications. Most data would be available upon request.

Program Strengths and Weaknesses

Research emphasis rather than operational monitoring for most activities



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Publications (most recent):

Theses

- Nack, R.R. 2003. Brood movements and distribution of Eastern Prairie Population (EPP) Canada geese (*Branta canadensis interior*) in northern Manitoba: potential influence of increased snow goose (*Chen caerulescens caerulescens*) abundance. M.S. Thesis, University of Minnesota, St. Paul, Minnesota. 66pp.
- Au, L. 2003. Patterns in bird community structure related to restoration of Minnesota dry oak savannas. M.S. Thesis, University of Minnesota, St. Paul, Minnesota. 84pp.
- Doherty, K.E. 2004. Fall movement patterns of adult female American woodcock (*Scolopax minor*) in the western Great Lakes region. M.S. Thesis, University of Minnesota, St. Paul, Minnesota. 59pp.
- Smithers, B.L. 2003. Northern goshawk food habits in Minnesota: an analysis using time-lapse recording systems. M.S. Thesis, Texas Tech University, Lubbock, Texas. 64pp.
- Henneman, C. 2006. Habitat associations of red-shouldered hawks in central Minnesota landscapes. M.S. Thesis, University of Minnesota, St. Paul, Minnesota. 56pp.
- Reiter, M.E. 2006. Historical trends in collared lemming (*Dicrostonyx richardsoni*) abundance and nest success of Eastern Prairie Population Canada geese (*Branta canadensis interior*) in northern Manitoba: evaluating the "bird-lemming" hypothesis. M.S. Thesis, University of Minnesota, St. Paul, Minnesota. 80pp.

Project Reports (2003 – 2006)

- Andersen, D.E., et al. 2006. Production of EPP Canada geese near Cape Churchill in 2006. Minnesota Cooperative Fish and Wildlife Research Unit, St. Paul, MN.
- Henneman, C. and D.E. Andersen. 2006. Habitat associations of red-shouldered hawks in central Minnesota: 2005 summary report. Minnesota Cooperative Fish and Wildlife Research Unit, St. Paul, MN.
- Reiter, M.E. and D.E. Andersen. 2006. Sympatric nesting Eastern Prairie Population (EPP) Canada geese and lesser snow geese on the Hudson Bay Lowlands: nest depredation and spatial distribution. Minnesota Cooperative Fish and Wildlife Research Unit, St. Paul, MN.
- Streby, H.M. and D.E. Andersen. 2006. Habitat use of post-fledging forest-nesting songbirds in northern hardwood-coniferous forests in northern Minnesota: 2006 summary report. Minnesota Cooperative Fish and Wildlife Research Unit, St. Paul, MN.
- Andersen, D.E., et al. 2005. Production of EPP Canada geese near Cape Churchill in 2005. Minnesota Cooperative Fish and Wildlife Research Unit, St. Paul, MN.
- Andersen, D.E. 2005. Habitat use of post-fledging forest-nesting songbirds in northern hardwood-coniferous forests in northern Minnesota: 2005 summary report. Minnesota Cooperative Fish and Wildlife Research Unit, St. Paul, MN.
- Andersen, D.E., J.G. Bruggink, K. Doherty, R.S. Lutz, J. Meunier, and E. Oppelt. 2005. Fall survival, movements, and habitat use of American woodcock in the western Great Lakes region: 2004 field season report. Minnesota Cooperative Fish and Wildlife Research Unit, St. Paul, MN.
- Reiter, M.E. and D.E. Andersen. 2005. Sympatric nesting Eastern Prairie Population (EPP) Canada geese and lesser snow geese on the Hudson Bay Lowlands: nest depredation and spatial distribution. Minnesota Cooperative Fish and Wildlife Research Unit, St. Paul, MN.



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- Reiter, M.E. and D.E. Andersen. 2005. Historical trends in lemming abundance and nest success of Canada geese: examining the "bird-lemming" hypothesis at Cape Churchill, Manitoba. Minnesota Cooperative Fish and Wildlife Research Unit, St. Paul, MN.
- Andersen, D.E., et al. 2004. Production of EPP Canada geese near Cape Churchill in 2004. Minnesota Cooperative Fish and Wildlife Research Unit, St. Paul, MN.
- Andersen, D.E., J.G. Bruggink, K. Doherty, R.S. Lutz, J. Meunier, and E. Oppelt. 2004. Fall survival, movements, and habitat use of American woodcock in the western Great Lakes region: 2002 field season report. Minnesota Cooperative Fish and Wildlife Research Unit, St. Paul, MN.
- Roberson, A.M., D.E. Andersen, and P.L. Kennedy. 2003. The northern goshawk (*Accipiter gentilis atricapillus*) in the Western Great Lakes region: a technical conservation assessment. Minnesota Cooperative Fish and Wildlife Research Unit, St. Paul, Minnesota.
- Andersen, D.E., et al. 2003. Production of EPP Canada geese near Cape Churchill in 2003. Minnesota Cooperative Fish and Wildlife Research Unit, St. Paul, MN.
- Andersen, D.E., C.W. Boal, and M. J. Solensky. 2003. Northern goshawk nesting survey in northern Minnesota. Minnesota Cooperative Fish and Wildlife Research Unit, St. Paul, MN.
- Andersen, D.E., J.G. Bruggink, K. Doherty, R.S. Lutz, J. Meunier, and E. Oppelt. 2003. Fall survival, movements, and habitat use of American woodcock in the western Great Lakes region: 2002 field season report. Minnesota Cooperative Fish and Wildlife Research Unit, St. Paul, MN.
- Roberson, A.M., D.E. Andersen, and P.L. Kennedy. 2003. The northern goshawk (*Accipiter gentilis atricapillus*) in the western Great Lakes region: a technical conservation assessment. Minnesota Cooperative Fish and Wildlife Research Unit, St. Paul, MN.
- Smithers, B.L., C.W. Boal, and D.E. Andersen. 2003. Composition, diversity and spatial analysis of northern goshawk foraging areas using GIS and thematic mapper (TM) and Common Forest Inventory (CSA) data. Minnesota Cooperative Fish and Wildlife Research Unit, St. Paul, MN.

Peer-reviewed Publications (2000 – In Press)

- Manolis, J.C., D.E. Andersen, and F.J. Cuthbert. 2000a. Patterns in clearcut edge and fragmentation studies in northern hardwood-conifer landscapes: retrospective power analyses and Minnesota results. *Wildlife Society Bulletin* 28:1088-1101.
- McLeod, M.A., B.A. Belleman, D.E. Andersen, and G. Oehlert. 2000. Red-shouldered hawk nest site selection in north-central Minnesota. *Wilson Bulletin* 112:203-213.
- Manolis, J.C., D.E. Andersen, and F.J. Cuthbert. 2000b. Uncertain nest fates in songbird studies and variation in Mayfield estimation. *Auk* 117:615-626.
- Lane, W.H., D.E. Andersen, and T.H. Nicholls. 2001. Distribution, abundance, and habitat use of singing male boreal owls in northeast Minnesota. *Journal of Raptor Research* 35:130-140.
- Warnke, D.K., D.E. Andersen, C.R. Dykstra, M.W. Meyer, and W.H. Karasov. 2002. Provisioning rates and time budgets of adult and nestling bald eagles at inland Wisconsin nests. *Journal of Raptor Research* 36:121-127.
- Manolis, J.C., D.E. Andersen, and F.J. Cuthbert. 2002. Edge effect on nesting success of ground nesting birds near regenerating clearcuts in a forest-dominated landscape. *Auk* 119:955-970.



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Minnesota Cooperative Fish and Wildlife Research Unit

- Boal, C.W., D.E. Andersen, and P.L. Kennedy. 2003. Home range and residency status of northern goshawks breeding in Minnesota. *Condor* 105:811-816.
- Perry, E.F. and D.E. Andersen. 2003. Advantages of clustered nesting for least flycatchers in north-central Minnesota. *Condor* 105:756-770.
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- Andersen, D.E., S. DeStefano, M.I. Goldstein, K. Titus, C. Crocker-Bedford, J.J. Keane, R.G. Anthony, and R.N. Rosenfield. 2004. The status of northern goshawks in the western United States. Wildlife Society Technical Review 04-1. The Wildlife Society, Bethesda, Maryland, USA. 24pp.
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- Henneman, C., M.A. McLeod, and D.E. Andersen. *In Press*. Red-shouldered hawk occupancy surveys in central Minnesota, USA. *Journal of Wildlife Management*.
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Western Great Lakes Region Owl Monitoring Survey

Program Contact(s)

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www.HawkRidge.org

Program Purpose or Objectives

The objectives of the survey are to: 1) understand the distribution and abundance of owl species in the region, 2) determine trends in the relative abundance of owls in the region, 3) determine if trends are comparable in surrounding areas and analyze whether these trends could be scaled up or down on the landscape, and 4) determine if there are habitat associations of owl species in the region.

List Bird Species Covered

Northern Saw-whet Owl, Barred Owl, Great Horned Owl, Long-eared Owl, Great Gray Owl, E. Screech Owl, Boreal Owl, N. Hawk Owl, Short-eared Owl; additionally, we keep track of Wilson's Snipe, American Woodcock and Ruffed Grouse.

Temporal and Spatial Extent (counties preferred)

Surveys conducted between early March and the end of April. Surveys are conducted throughout Minnesota and Wisconsin in all counties.

Type of Data Collected

Roadside point count survey.

Field Methodology

Each survey route consists of 10 survey stations spaced ~1.6 km (1 mile) apart. A 2 minute "passive" listening period, documenting all owl species heard, is done at each designated survey station along the route. Playbacks are not used given the logistical and standardization concerns with broadcast equipment. At the start and finish of an owl survey route, the temperature, cloud cover, precipitation level and type, and snow cover and depth is recorded. At each survey station, the time, wind speed, and noise level is recorded.

To test the seasonal variation in calling activity, volunteers are asked to survey their route once during three different survey periods (Period 1 = 11 March to 19 March, Period 2 = 20 March to 9 April, Period 3 = 10 April to 23 April). If a volunteer is unable to conduct a survey in each of the three periods, the volunteer is requested to conduct a survey in Period 2. Surveys start at least one half-hour after sunset and finish when the volunteer completed the route(s).

Location Scale

Surveys are done at each of 10 points along a roadside survey route. There are ~168 routes in Minnesota and ~90 routes in Wisconsin.

Data Management System

Data is entered into Excel. We also have GPS locations of each survey route and station in Minnesota.



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Accessibility of Data and Reports

Raw data is not currently placed within the public domain, but the data could be obtained by contacting Hawk Ridge Bird Observatory personnel. The 2006 annual report can be found at the Hawk Ridge Bird Observatory website (www.HawkRidge.org).

Program Strengths and Weaknesses

Strengths: use of a standardized protocol, which is comparable to other surveys done in N. America; region-wide survey; good survey for understanding distribution and abundance of owls; collaboration with several natural resource organizations; volunteer-based survey.

Weaknesses: reliable trend data, presumably, limited to 3-4 species; difficult to assess the reliability of observer or test detectability; limited to roads.

Ideas for Future Improvements

Add more routes in Minnesota and Wisconsin. Have on-line data entry system for volunteers. Identify species specific survey protocols. Provide on-line training and protocol/identification quiz. Test detectability of observers.

Publications

Grosshuesch, D. A. 2006. 2005: Western Great Lakes Region Owl Monitoring. Passenger pigeon 68(1): 35-46.



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Camp Ripley Military Training Site Environmental Office

Program Contact(s)

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Program Purpose or Objectives

Monitor 90 plots to determine effects of military training on bird species.

List Bird Species Covered

Breeding birds in forest, wetlands and grasslands.

Temporal and Spatial Extent

1992-present
Morrison County

Type of Data Collected

Transect data – abundance 1991-1999
Point count (100 meters) data – abundance 1997-2006
Did not sample for distance or nesting success.

Field Methodology

From 30 to 90 permanent plots have been counted since 1991. Initially, 20 minute transects were used, but were phased out around 1997 and replaced by point counts. Ten-minute point counts are conducted once during the breeding season (June), from the hours of 0530-0900. Surveyors are generally consistent from year to year. Surveys are not conducted during heavy rains or moderate-strong winds. Every bird heard or observed within 100 meters of the counting point is documented.

Location Scale

90 Permanent sites counted within Camp Ripley Military Training Site (53,000 acres) near Little Falls, MN.

Data Management System

Access, Excel and GIS

Accessibility of Data and Reports

Data is open to the public, but is not readily available. Statistical analysis is in progress.

Program Strengths and Weaknesses

Strengths: 15 years of data. Allows a broad look at the general bird use of Camp Ripley.

Weaknesses: Monitoring 90 plots, which consist of a variety of habitat types, does not allow statistical analysis for individual species or habitats, since sample size is so small, and generally 1-2 birds of each species are observed on a plot in a given year.



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Camp Ripley Military Training Site Environmental Office

Ideas for Future Improvements

We are thinking of focusing our efforts on a few target species, such as the several forest species and one or two grassland species. We would also narrow our focus to only a few habitats, with the goal of targeting and comparing high/low military use areas. We believe this will allow us to monitor more closely the effects of military training on target species, and make the data more statistically significant.

Publications

Dirks, B. and J. DeJong. Animal Surveys at the Camp Ripley and Arden Hills Minnesota Army National Guard Training Sites: 2005 Annual Report. 2006. Minnesota Department of Natural Resources Camp Ripley Series Report No.15.

Dirks, B. and J. DeJong. Animal Surveys at the Camp Ripley and Arden Hills Minnesota Army National Guard Training Sites: 2004 Annual Report. 2005. Minnesota Department of Natural Resources Camp Ripley Series Report No.14.

Dirks, B. and J. DeJong. Animal Surveys at the Camp Ripley and Arden Hills Minnesota Army National Guard Training Sites: 2003 Annual Report. 2004. Minnesota Department of Natural Resources Camp Ripley Series Report No.13.

Dirks, B. and J. DeJong. Animal Surveys at the Camp Ripley and Arden Hills Minnesota Army National Guard Training Sites: 2002 Annual Report. 2003. Minnesota Department of Natural Resources Camp Ripley Series Report No.12.

Dirks, B. Animal Surveys at the Camp Ripley and Arden Hills Minnesota Army National Guard Training Sites: 2001 Annual Report. 2002. Minnesota Department of Natural Resources Camp Ripley Series Report No.11.



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**USGS Northern Prairie Wildlife Research Center
Various Studies**

Program Contact(s)

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Saint Paul MN 55108
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612-624-4716

Program Purpose

A variety of studies investigating breeding birds have been conducted in western Minnesota.

List Bird Species Covered

All breeding birds encountered, mostly grassland species

Temporal and Spatial Extent

1990-2003; mostly native grasslands or CRP fields in western Minnesota

Type of Data Collected

Densities of breeding birds, some habitat information. One study involved nest monitoring and banding.

Field Methodology

Variable

Publications (most recent)

- Winter, M., J. A. Shaffer, D. H. Johnson, T. M. Donovan, W. D. Svedarsky, P. W. Jones, and B. R. Euliss. 2005. Habitat and nesting of Le Conte's Sparrows in the northern tallgrass prairie. *Journal of Field Ornithology* 76:61-71.
- Winter, M., D. H. Johnson, J. A. Shaffer, T. M. Donovan, and W. D. Svedarsky. 2006. Patch size and landscape effects on density and nesting success of grassland birds. *Journal of Wildlife Management* 70:158-172.
- Winter, M., D. H. Johnson, J. A. Shaffer, and W. D. Svedarsky. 2004. Nesting biology of three grassland passerines in the northern tallgrass prairie. *Wilson Bulletin* 116:211-223.
- Winter, M., D. H. Johnson, and J. A. Shaffer. 2004. Variability in vegetation effects on density and nesting success of grassland birds. *Journal of Wildlife Management* 69:185-197.
- Johnson, D. H., and M. Winter. 2005. Planning for bird conservation: a tale of two models. Pages 1205-1212 in C. J. Ralph and T. D. Rich, editors. *Bird Conservation Implementation and Integration in the Americas: Proceedings of the Third International Partners in Flight Conference 2002*. U.S.D.A. Forest Service, GTR-PSW-191, Albany, CA.



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North American Breeding Bird Survey

Program Contact(s)

Minnesota

Minnesota Coordinator: Robert Janssen, email: rbjanssen@aol.com

United States

U.S. Department of the Interior
U.S. Geological Survey
Patuxent Wildlife Research Center
Laurel, MD, USA 20708-4038

Operations Contact: Keith Pardieck, email: Keith_Pardieck@usgs.gov
Analyses Contact: John Sauer, email: John_Sauer@usgs.gov
<http://www.mbr-pwrc.usgs.gov/bbs>

Canada

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Canadian Wildlife Service
Environment Canada
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<http://www.cws-scf.ec.gc.ca/nwrc-nrf/default.asp?lang=en&n=416B57CA>

More contact information (US and Canada, including States and Provinces) can be found at:
<http://www.pwrc.usgs.gov/bbs/contactus/index.html>

Program Purpose

"To provide a continent-wide perspective of population change" (Sauer et al. 1997)

The above statement of objectives is taken from: Sauer, J. R., J. E. Hines, G. Gough, I. Thomas, and B. G. Peterjohn. 1997. *The North American Breeding Bird Survey Results and Analysis. Version 96.4. Patuxent Wildlife Research Center, Laurel, MD*

The full introductory section from the above citation can be found at:
<http://www.mbr-pwrc.usgs.gov/bbs/genintro.html>

List Bird Species Covered

Very long. Generally any North American bird, though some species (e.g. territorial landbirds with a wide North American distribution) will be better represented than others and some will be missing entirely. To get a better sense for species representation I recommend looking at this list:

<http://www.mbr-pwrc.usgs.gov/bbs/spec105.html>

Note, however, that this list is minimal, in that it does not include species that are occasionally detected, but that do not meet minimum number of detections required for analysis. Details on the minimum data requirements can be found at:

<http://www.mbr-pwrc.usgs.gov/bbs/trend/regchg.html>

A full list of species can be found here:

<http://www.pwrc.usgs.gov/bbs/specieslist.html>



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North American Breeding Bird Survey

Temporal and Spatial Extent

See Map 1. Distribution of BBS routes in Minnesota.

Type of Data Collected

Counts of birds detected.

Field Methodology

"Each survey route is 24.5 miles long with stops at 0.5-mile intervals. At each stop, a 3-minute point count is conducted. During the count, every bird seen within a 0.25-mile radius or heard is recorded. Surveys start one-half hour before local sunrise and take about 5 hours to complete. Over 4100 survey routes are located across the continental U.S. and Canada."

Above description of methodology taken from: <http://www.pwrc.usgs.gov/bbs/about/>

Location Scale

Many routes cross administrative and management boundaries. See maps.

Accessibility of Data and Reports

Data are stored and analyzed at respective National Wildlife Research Centers (see contact information above). All data are in the public domain and may be downloaded free from the appropriate websites.

For interactive analysis of US data using BBS statistical methods try:

<http://www.mbr-pwrc.usgs.gov/bbs/bbs.html>

Raw data for US is available at:

<http://www.pwrc.usgs.gov/bbs/retrieval/disclaim.cfm>

For Canadian data start at:

<http://www.cws-scf.ec.gc.ca/nwrc-nrf/default.asp?lang=en&n=416B57CA>

Various reports are available on the websites. There is an extensive bibliography available on the US website (see below).

Canada - the following report is easy to locate on the Canadian BBS website:

Downes, C.M., and B.T. Collins. 2003. The Canadian Breeding Bird Survey, 1967-2000. Canadian Wildlife Service Progress Note No. 219. Environment Canada.



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North American Breeding Bird Survey

Program Strengths and Weaknesses

Strengths:

- all volunteer participants
- consistent methodology across a huge spatial extent
- time series now reaching 40 years

Weaknesses:

- all volunteer participants
- currently there is no way to control for many sources of detection heterogeneity due to observer differences, changes in observer ability over time, habitats, time of day, weather, distance effects, etc.
 - roadside habitats may not be representative of those for which inference is desired (e.g., a protected area)

Ideas for Future Improvements

Below is an abstract of a presentation by John Sauer at the North American Ornithological Congress in Veracruz, Mexico. 3-7 October, 2006. Underlined portion (my emphasis) describes future improvements as envisioned by Drs. Sauer and Robbins. This is *not* a citable document, but should provide an indicator of priorities for future improvements as seen by BBS coordinators and analysts. For further information I suggest contacting Dr. Sauer.

Sauer, J, R, USGS Patuxent Wildlife Research Center, Laurel, MD, United States, jrsauer@usgs.gov

Robbins, C, S, USGS Patuxent Wildlife Research Center, Laurel, MD, United States, csrobbins@usgs.gov

THE NORTH AMERICAN BREEDING BIRD SURVEY: ORIGINAL GOALS, PRESENT APPLICATIONS, AND FUTURE VALUE

The North American Breeding Bird Survey (BBS) was developed to provide quantitative information regarding population changes in bird species. BBS implementation was motivated by the need to better understand the consequences of activities such as pesticide use on bird populations. Throughout its 40 years the BBS has been used to estimate population change for >400 bird species and has provided essential information for a large variety of scientific studies. Present uses of the survey extend the original goals of the BBS from description of patterns of change to emphasis on increasing our understanding of factors influencing bird populations. Models based on the data inform conservation planning and increase our knowledge of influences of habitat and environmental change on bird populations. Future roles of the survey will involve evaluation of conservation activities and updating models used for conservation planning. Modifications of the analysis and design of the survey to better control for detectability and habitat differences on- vs off- roads will improve future analyses. Additional challenges include continued evaluation of the survey to ensure that reliable information is available at geographic scales needed for management. Continued research into survey design is also needed to address the many issues associated with maintaining and enhancing this unique resource for the scientific study of bird populations.



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North American Breeding Bird Survey

Publications (most recent)

Extremely numerous. There is a broken bibliography link on the BBS website:

<http://www.pwrc.usgs.gov/bbs/results/>

A courtesy link was provided to me by Keith Pardieck on 8 February 07. I don't know how long this link will be active:

<http://www.pwrc.usgs.gov/infobase/bbsbib/bbsbib.pdf>

Here are some papers from the *Loon* that use or cite BBS data:

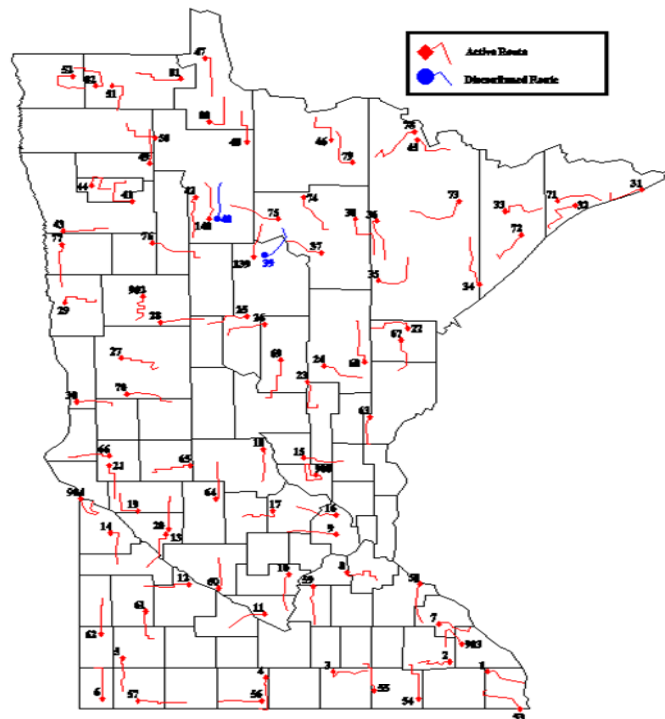
Henderson, C.L. 1981. Breeding birds in Minnesota, 1975-79: abundance, distribution, and diversity. *Loon* 53:11-49.

Janssen, R.B. 1979. Minnesota breeding bird surveys: a summary. *Loon* 51:64-70.

Janssen, R.B. 1991. Breeding bird survey trends in Minnesota--1966-1989. *Loon* 62:201.

Niemi, G., A. Lima, J. Hanowski, and L. Pfannmuller. 1996. Recent trends of breeding birds in Minnesota and Minnesota forested regions 1966-1993. *Loon* 67:191-201.

50 – Minnesota BREEDING BIRD SURVEY ROUTE LOCATIONS



Map 1. Distribution of BBS routes in Minnesota; <http://www.pwrc.usgs.gov/bbs/results/routemaps/>



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**Minnesota County Biological Survey
Division of Ecological Services
MN Department of Natural Resources**

Program Contact(s)

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website: www.dnr.state.mn.us/ecological_services/mcbs

Program Purpose or Objectives

The Minnesota County Biological Survey (MCBS) identifies significant natural areas and collects and interprets data on the distribution and ecology of native plant communities, rare plants, and rare animals.

List Bird Species Covered

MCBS targets rare bird species expected to occur within the survey area.

Temporal and Spatial Extent

Breeding season only. To date, MCBS has conducted bird surveys in portions of 69 of the 87 Minnesota counties. For MCBS survey status, refer to:
www.dnr.state.mn.us/ecological_services/mcbs/outcomes/map.html

Type of Data Collected

Species, breeding evidence, number of individuals, habitat.

Field Methodology

Surveys are conducted primarily from late May through early July, but may begin as early as April or extend through August. The primary survey method used by MCBS is a modified fixed-radius point count. Lists of species are recorded when weather conditions and/or times are not optimal for point counts. Playback of taped conspecific calls is used to locate species such as Red-shouldered Hawks and Louisiana Waterthrushes. Road surveys are conducted for species that regularly vocalize at night (e.g., Yellow Rail and Nelson's Sharp-tailed Sparrow), to supplement morning point counts, or to search for diurnal grassland species such as Upland Sandpipers and Loggerhead Shrikes. For additional details on methodology refer to:
www.dnr.state.mn.us/ecological_services/mcbs/procedures_birds.html



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Location Scale

Variable. Primarily point; sometimes section, twp/range, or management unit.

Data Management System

Biotics (NatureServe), ArcMap GIS, AniMap (DNR MIS).

Accessibility of Data and Reports

Natural Heritage Information System's Biotics, for rare species. For more information, refer to:
www.dnr.state.mn.us/ecological_services/nhrp/nhis.html

MCBS AniMap, for common species:

www.dnr.state.mn.us/maps/ani_map/index.html

Information on selected surveys available through the Biological Report series, Ecological Services, Minnesota Department of Natural Resources.

Publications (last 5 years)

A list of available MCBS maps (hard copy and electronic):

www.dnr.state.mn.us/ecological_services/mcbs/maps.html

Minnesota County Biological Survey. 2003. Survey of biological features in the Glacial Lakes and Moraines landscape of west-central Minnesota. MNDNR Biological Report No. 76.

Minnesota County Biological Survey. 2006. Rare animals in the Hardwood Hills and Pine Moraines and Outwash Plains Ecological subsections of west-central Minnesota. MNDNR Biological Report No. 86.

Stucker, S.P., P.S. Perry, and K.R. Woizeschke. 2004. Notes on the breeding distribution of Red shouldered Hawks in Minnesota. *The Loon* 76(1):3-8.



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MNDNR Sharp-tailed Grouse and Prairie-chicken Lek Surveys

Program Contact

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Program Purpose or Objectives

Monitor population trends and relative abundances of sharp-tailed grouse and prairie-chickens.

Bird Species Covered

(1) Sharp-tailed Grouse (*Tympanuchus phasianellus*), and (2) Greater Prairie-chicken (*T. cupido pinnatus*).

Temporal and Spatial Extent

Annual surveys during late-March to early-May. Throughout the range of both species in Minnesota.

Type of Data Collected

Counts of birds at leks and data about survey conditions.

Field Methodology

(1) *Sharp-tailed grouse* – DNR wildlife managers visit known lek locations within their work areas before 2.5 hours after sunrise on 1 or 2 different days in spring. During each visit the observer counts the number of grouse at the lek. (2) *Prairie-chickens* – 17 survey blocks (4 miles x 4 miles) are searched in an attempt to locate all active leks within each block. Birds at located leks are counted near sunrise on 1 or 2 different mornings.

Location Scale

The data consist of all lek locations and bird counts. Data are organized by Public Land Survey (PLS) units (i.e., twp, range, section) and are summarized within 2 geographic regions for sharp-tailed grouse and range-wide for prairie-chickens. For more information, see Publications (below).

Data Management System

Survey data are maintained in an Access database. The locations of leks, sometimes only to section or quarter-section, are digitized in ArcView.

Accessibility of Data and Reports

Data are available by contacting the survey coordinator. Summary reports are written annually and are available in June or July from the survey coordinator and MNDNR's public website (see Publications, below).



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MNDNR Sharp-tailed Grouse and Prairie-chicken Lek Surveys

Program Strengths and Weaknesses

The program covers large geographic areas and has collected comparable data for many years (with thanks to and cooperation from the Minnesota Prairie Chicken Society). The spatial sampling design, however, limits the validity of making inferences about populations from the sample data. In particular, the prairie-chicken survey blocks were selected because they were expected to have the best habitat. Also, the surveys do not account for the probability of detection of either leks or birds being <1 , so the resulting index of bird densities are confounded by other factors that affect the detection of leks and birds (e.g., weather, observer ability).

Ideas for Future Improvements: Research is currently being conducted to evaluate alternative survey methods that allow estimation of detection probabilities and valid inferences about entire populations.

Publications (most recent): Larson, M. A. 2006. Grouse surveys in Minnesota during spring 2006. Unpublished report, Division of Fish and Wildlife, MNDNR, St. Paul, MN. Available online: http://files.dnr.state.mn.us/outdoor_activities/hunting/grouse/grousesurveyreport06.pdf .



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MNDNR Ruffed Grouse Drumming Survey

Program Contact

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Program Purpose or Objectives

Monitor population trends and relative abundance of ruffed grouse in 4 survey regions.

Bird Species Covered

Ruffed Grouse (*Bonasa umbellus*).

Temporal and Spatial Extent

Annual surveys during April and early-May. Throughout the range of ruffed grouse in Minnesota.

Type of Data Collected

Drumming counts and data on survey conditions.

Field Methodology

Observers drive along defined routes once near the peak of spring drumming activity. Observers stop at defined points, which occur at approximately 1-mile intervals along each route, and record the number of grouse drums heard during a 4-minute interval. Routes were not selected according to a statistically valid spatial sampling design, but same routes and points are used each year.

Location Scale

The data consist of counts at points (a.k.a., stops), but the sampling unit is the route (series of 10 points), not the individual points. Counts are summarized within 4 large physiographic regions. For more information, see Publications (below).

Data Management System

Survey data are maintained in Access databases. Locations of survey routes and points are digitized in ArcView.

Accessibility of Data and Reports

Data are available by contacting the survey coordinator. Summary reports are written annually and are available in June or July from the survey coordinator and MNDNR's public website (see Publications, below).

Program Strengths and Weaknesses

The program covers a large geographic area and has collected comparable data for many years. The spatial sampling design, however, limits the validity of making inferences about populations from the sample data. Also, the survey does not account for the probability of detection being <1, so the resulting index of ruffed grouse densities is confounded by other factors that affect the production and detection of drums (e.g., weather, observer ability).



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MNDNR Ruffed Grouse Drumming Survey

Ideas for Future Improvements

Methods for improving the spatial sampling design and accounting for variation in probabilities of detection are being evaluated.

Publications

Larson, M. A. 2006. Grouse surveys in Minnesota during spring 2006. Unpublished report, Division of Fish and Wildlife, MNDNR, St. Paul, MN. Available online:
http://files.dnr.state.mn.us/outdoor_activities/hunting/grouse/grousesurveyreport06.pdf.



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MNDNR August Roadside Survey

Program Contact

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Program Purpose or Objectives

(1) Monitor population trends and relative abundance of farmland wildlife species in Minnesota, and
(2) provide information on annual hunting prospects.

Bird Species Covered

(1) Ring-necked Pheasant (*Phasianus colchicus*), (2) Gray Partridge (*Perdix perdix*), and (3) Mourning Dove (*Zenaida macroura*).

Temporal and Spatial Extent

Annual survey (1955-present) is conducted during the first two weeks in August. Agricultural regions of MN (Prairie and Transition zones); includes 72 counties in 7 agricultural districts. For more information, including maps, see Publications (below).

Type of Data Collected

Population index = birds observed/100 miles driven.

Field Methodology

The roadside survey consists of 171 25-mile routes (1-4 routes/ county; mostly gravel roads). Observers (MNDNR enforcement and wildlife personnel) drive each route in the early morning at 15-20 miles/hr and record the number of pheasants, gray partridge, mourning doves, and other wildlife observed. Cool, clear, calm mornings with heavy dew yield the most consistent results.

Location Scale

Hierarchical: the route is the sampling unit, but 1-4 routes are located within each county. The same routes are surveyed each year (with some exceptions and modifications). Counts are summarized for MN's agricultural region and within 7 agricultural districts (groupings of 6-14 counties based on soil, topography, and cropping history).

Data Management System

Raw counts are maintained in an Access databases, and summary data are maintained in SAS datasets. Locations of survey routes are digitized in ArcView.

Accessibility of Data and Reports

Data are available by contacting the survey coordinator. Summary reports are written annually and are available in mid-September from the survey coordinator and the MNDNR's public website (see Publications, below).



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MNDNR August Roadside Survey

Program Strengths and Weaknesses

The MNDNR roadside survey provides good spatial coverage and has collected “standardized” index data since 1955. However, survey routes may not represent non-sampled areas because routes were selected non-randomly and only sample pheasants and habitats along roadways. Furthermore, the survey only provides indices of relative abundance, and the validity of comparisons (across space and time) is based on the assumption that the same proportion (θ) of the population is sampled at each occasion or site, or that $E(\theta)$ is constant.

Ideas for Future Improvements: Explore the use of model-based estimators (similar to BBS).

Publications (most recent)

Giudice, J. H. and K. J. Haroldson. 2007 (in press). Using regional wildlife surveys to assess the CRP: scale and data-quality issues. *Journal of Field Ornithology*.

Goetz, S. L. 2006. 2006 Minnesota August roadside survey. Unpublished report, Division of Fish and Wildlife, MNDNR, St. Paul, MN. Available online:
http://files.dnr.state.mn.us/outdoor_activities/hunting/pheasant/roadsidesurvey2006.pdf



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MNDNR Wild Turkey Population Survey

Program Contact

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Program Purpose or Objectives

Monitor the distribution and population trends of eastern wild turkeys.

Bird Species Covered

Eastern Wild Turkey (*Meleagris gallopavo*)

Temporal and Spatial Extent

Range-wide and in periphery. Planned survey frequency is every 2 years. Survey was initiated in 1987.

Type of Data Collected

(1) Location of turkey sightings, and (2) Population indices = (a) proportion of deer hunters (random sample) that saw wild turkeys while deer hunting, and (b) mean number of turkeys seen/hunter/day.

Field Methodology

A random sample of ~15,000 deer hunters (stratified by deer-hunting zones within the potential wild turkey range) are mailed a pre-hunt survey card. Hunters are asked to record the number of days they hunted deer, location hunted most often, and number and location of wild turkeys observed. Location is recorded as distance and direction from the nearest town. The survey is mailed 1 week before the opening of the deer hunting season. Three additional surveys were mailed to non-respondents at 2-week intervals after the deer hunting season.

Location Scale

Points: approximate location of wild turkey observations (x,y coordinates) based on distance and direction from nearest town. Turkey permit areas (32): proportion of deer hunters (summarized by PA) that observed wild turkeys.

Data Management System

A data-entry screen (ArcView) and Avenue scripting are used to convert location and attribute information to a GIS point theme.

Accessibility of Data and Reports

Contact the survey coordinator.

Program Strengths and Weaknesses

A survey of wild turkey sightings by antlerless-deer hunters provides a cost-effective alternative to route-oriented survey methods for monitoring fluctuations in wild turkey numbers. But the indices cannot be used to predict actual turkey densities. More information is needed to determine the relationship between turkey density and the population indices.



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MNDNR Wild Turkey Population Survey

Publications (most recent): Welsh, R. J., and R. O. Kimmel. 1990. Turkey sightings by hunters of antlerless deer as an index to wild turkey abundance in Minnesota. *In* W. M. Healy and G. B. Healy, eds. Proceedings of the sixth national wild turkey symposium. National Wild Turkey Federation, Edgefield, SC. LCCCN: 90-61366.



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MNDNR Turkey Hunter Survey (harvest survey)

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Program Purpose or Objectives

Monitor wild turkey harvest and hunter success rates in Minnesota.

Bird Species Covered

Eastern Wild Turkey (*Meleagris gallopavo*)

Temporal and Spatial Extent

Range-wide by turkey-permit areas. Fall and spring of each year. For more information, including maps, see Publications (below).

Type of Data Collected

- (1) Hunter success rate = proportion of hunters that harvested a wild turkey.
- (2) Total harvest (range-wide and by permit area).

Field Methodology

Turkey hunters are required to register their bird at a designated registration station within 24 hours of harvest. Data include sex, age, and harvest date.

Location Scale

Permit area (there currently are 32 turkey-permit areas in MN). For more information, see Publications.

Data Management System

Electronic Licensing System (ELS) database. Data on total harvest and hunter success rates also summarized as attributes in ArcView polygon themes; end products are harvest and hunter-success maps (see Publications).

Accessibility of Data and Reports

Data are available by contacting the survey coordinator. Also see Publications (below).

Program Strengths and Weaknesses

The ELS has made data collection and summary very efficient.

Publications (most recent)

Dexter, M. H. 2006. 2006 fall wild turkey harvest report. Unpublished report, Division of Fish and Wildlife, MNDNR, St. Paul, MN. Available online: http://files.dnr.state.mn.us/outdoor_activities/hunting/turkey/fall_turkey_harvest_report2006.pdf



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MNDNR Waterfowl Breeding Population Survey

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Program Purpose or Objectives

(1) Monitor population trends of mallards, and to a lesser extent, other duck species breeding in Minnesota's Prairie and Transitions zones; and (2) provide public information on the annual status of local breeding ducks in Minnesota.

Bird Species Covered

Emphasis on Mallard (*Anas platyrhynchos*), Blue-winged Teal (*A. discors*), and Wood Duck (*Aix sponsa*), but data also collected on Canada Geese (*Branta canadensis*) and other duck species (*Anas spp.*, *Aythya spp.*).

Temporal and Spatial Extent

Current survey was designed and implemented in 1968. The sampling frame covers 39% of MN (mostly in the Prairie and Transition zones) and includes townships with ≥ 2 wetland or lake basins >10 ac. For more information, see Publications.

Type of Data Collected

(1) estimated total ducks by stratum and for the entire sampling frame; and (2) weather and habitat conditions (including estimated number of May ponds).

Field Methodology

The survey utilizes a stratified sampling design based on wetland density (1968 data). One-hundred-fifteen aerial transects (0.4-km wide) were randomly selected from the sampling frame (46-40 per stratum; sampling rate = 1.7%). The same transects are surveyed each year following "Standard Operating Procedures for Aerial Waterfowl Breeding Ground Populations and Habitat Surveys in North America" (USFWS and CWS 1987). Visibility correction factors are derived each year using intensive ground surveys (i.e., double sampling) on 14 route segments. The survey is conducted during 1-25 May; however, the survey does not begin until the majority of transient species have moved through the survey area and the majority of late-arriving species are occupying breeding territories.

Location Scale

Data are recorded by transect (sampling unit) and then summarized by species and stratum.

Data Management System

Raw counts are archived in Excel, Access, and Lotus databases. Summarized data are maintained in permanent SAS datasets.

Accessibility of Data and Reports

Contact the survey coordinator. Also see Publications (below).

Program Strengths and Weaknesses

Survey is sufficient for monitoring population trends, but estimates of abundance are imprecise for species other than the Mallard and, in some years, Blue-winged Teal. Accurately estimating visibility correction factors is one of the most important statistical issues influencing the bias and precision of the population estimates.



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MNDNR Waterfowl Breeding Population Survey

Ideas for Future Improvements

(1) Increase the number of air-ground transects for estimating visibility correction factors and/or explore alternative survey methods; (2) evaluate statistical methods to improve the reliability of visibility-correction estimates; (3) evaluate and possibly update the stratification scheme.

Publications (most recent)

Cordts, S. 2006. 2006 waterfowl breeding population survey for Minnesota. Unpublished report, Division of Fish and Wildlife, MNDNR, St. Paul, MN. Available online:
http://files.dnr.state.mn.us/outdoor_activities/hunting/waterfowl/waterfowl_survey2006.pdf.



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MNDNR Spring Aerial Goose Survey

Program Contact

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Program Purpose or Objectives

Monitor population trends and abundance of breeding Giant Canada Geese in Minnesota. Objective: produce a statewide population estimates having 95% confidence intervals with relative precision of $\pm 25\%$.

Bird Species Covered

Giant Canada Goose (*Branta canadensis maxima*)

Temporal and Spatial Extent

Annual spring survey was initiated in 2001. Statewide coverage except for the seven county Metro area, Lake and Cook Counties, and the Boundary Waters Canoe Area.

Type of Data Collected

(1) Counts of Giant Canada Geese observed on ~150 randomly selected PLS quarter-sections; and
(2) wetland conditions (qualitative data).

Field Methodology

The survey utilizes a stratified two-stage sampling design. In 2001 the state was divided into three ecoregions (Prairie, Transition, and Forest) and 900 quarter-sections were randomly selected from each ecoregion (phase-one sample). The 900 plots were classified based on habitat quality for resident geese (1 = no nesting habitat – expect no geese; 2 = limited nesting habitat – expect 1 or 2 pairs; 3 = prime nesting habitat – expect 3 or more pairs). Each year 30 plots are randomly selected in each of the 5 strata (plots in the “no geese” strata are not flown) and these 150 plots are surveyed at low level using a helicopter. The survey is conducted during mid-incubation (late April – early May). Canada geese seen within plot boundaries are recorded as singles, pairs, and groups, and whether singles and pairs are observed with a nest.

Location Scale

PLS quarter-sections.

Data Management System

The sampling frame and sample plots are digitized in ArcView. Raw counts are maintained in Excel tables. Summary data are maintained in permanent SAS datasets.

Accessibility of Data and Reports: Contact the survey coordinator.



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MNDNR Spring Aerial Goose Survey

Program Strengths and Weaknesses: Provides a reasonable accurate Statewide population estimate, but estimates for goose management zones are imprecise. Also some concern about variation in the timing of the surveys (i.e., potential for some undercounting bias).

Ideas for Future Improvements: Develop more ecologically meaningful goose-management zones and increase sampling effort in zones with management concerns (e.g., a rotating panel-sampling design).

Publications (most recent): Maxson, S. 2006. 2006 Minnesota spring Canada goose survey. Unpublished report, Division of Fish and Wildlife, MNDNR, St. Paul, MN.



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MNDNR Waterfowl Fall Migration Surveys

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Program Purpose or Objectives

Provide public information on relative duck and goose abundance, fall migration chronology, habitat conditions, and hunter success for major waterfowl-hunting and staging areas in Minnesota.

Bird Species Covered

Ducks and geese.

Temporal and Spatial Extent (counties preferred)

Major waterfowl staging, hunting, and management areas in Minnesota. See Publications (below).
Periodic (~weekly) report during Sep-Nov.

Type of Data Collected

Crude counts or qualitative descriptions.

Field Methodology

Aerial surveys of selected locations, and ground observations from other locations.

Location Scale

Major waterfowl areas, organized by geographic region (7).

Data Management System

Contact the survey coordinator.

Accessibility of Data and Reports

Contact the survey coordinator. Also see Publications (below).

Publications (most recent)

Migration reports are posted on the MNDNR public website <http://files.dnr.state.mn.us/outdoor_activities/hunting/waterfowl/index.html>.



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MNDNR Ring-necked Duck Surveys

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Program Purpose or Objectives

Monitor population trends, relative abundance, and distribution of breeding Ring-necked Ducks in Minnesota.

Bird Species Covered

Ring-necked Duck (*Aythya collaris*)

Temporal and Spatial Extent (counties preferred)

(1) A local survey has been conducted in the Bemidji vicinity since 1969 and includes 14 lakes that were some of the best ring-necked duck lakes in north-central Minnesota when the survey was designed. (2) A pilot aerial survey (2004-2006) of ~250 randomly selected PLS sections from within the primary breeding range of Ring-necked Ducks in MN (see Publications, below).

Type of Data Collected

(1) Counts of Ring-necked Ducks observed on 14 lakes and 250 randomly selected PLS sections; and (2) remote-sensing data (MNGAP and lake-attribute data) on Ring-necked Duck habitat in each PLS section (entire sampling frame).

Field Methodology

The aerial survey utilized a stratified sampling design (see Publications, below) with strata based ecological sections (ECS) and amount of nesting cover in each plot. Approximately 250 plots/year were surveyed with a helicopter in mid-June (peak breeding period for RNDU in Minnesota).

Location Scale

PLS sections and quarter-sections.

Data Management System

Raw counts are maintained in Excel and ArcView tables. Summarized data are maintained in permanent SAS datasets. Plot locations and attribute information are maintained in ArcView polygon themes.

Accessibility of Data and Reports

Contact the survey coordinator.

Program Strengths and Weaknesses

The local survey of 14 lakes is a long-term dataset, but the geographic extent of the survey is limited. In contrast, Minnesota's May Breeding Waterfowl Survey has a wider coverage but does not survey much of ring-neck breeding range and is too early to provide useful information because ring-necked ducks arrive and begin nesting considerably later than mallards. The 2004-2006 aerial survey was a pilot study designed to evaluate alternative sampling designs (and costs) for monitoring Ring-necked Duck abundance and distribution in Minnesota.



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MNDNR Ring-necked Duck Surveys

Publications (most recent)

- Zicus, M. C. et al. 2005. Minnesota's ring-necked ducks: a pilot breeding pair survey. Pages 85-99 in P. J. Wingate et al., editors. Summaries of wildlife research findings 2005. MNDNR, St. Paul, MN. Available online: <http://www.dnr.state.mn.us/publications/wildlife/index.html>.
- Zicus, M. C., et al. 2004. Bemidji area ring-necked duck survey. Pages 169-183 in M. W. DonCarlos, R. O. Kimmel, J. S. Lawrence, and M. S. Lenarz, editors. Summaries of wildlife research findings 2003. Minnesota Department of Natural Resources, St. Paul, Minnesota, USA.



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MNDNR Duck and Goose Banding Program

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Program Purpose or Objectives

Provide information on migration and wintering sites, post-breeding and fall dispersal, annual survival probabilities, and indices of annual productivity and abundance.

Bird Species Covered

Various duck species and Canada Geese.

Temporal and Spatial Extent

Banding data for some species extend back to 1963 (e.g., wood ducks). Summer banding of flightless young (ducks) is carried out by two or three crews in north central and west central Minnesota during late June, July and August. Pre-season banding of flying young and adults (ducks) is done in late summer with the most effort being made at the Roseau River and Thief Lake Wildlife Management Areas (emphasis on mallards and ring necked ducks), and at Talcot Lake Wildlife Management Area and selected other sites for wood ducks. Goose trapping and marking is usually done during late-June to early July throughout most areas of the state.

Type of Data Collected

Sex, age, date, locations (banding and recovery).

Field Methodology

Standard banding, capture (drive traps, bait traps, decoy traps, and night lighting), and sexing-aging procedures.

Location Scale

Points (10' blocks that describe banding and recovery locations) and polygons (Goose Management Blocks).

Data Management System

Standard USFWS banding datasets (Bird Banding Laboratory) and ArcView point and polygon themes.

Accessibility of Data and Reports

Contact the survey coordinator.

Program Strengths and Weaknesses

Contact the survey coordinator.

Ideas for Future Improvements

Contact the survey coordinator.

Publications (most recent)

Berdeen, J. B. 2007. Progress report: harvest characteristics of large Canada geese banded in Minnesota, 2002–2004. Unpublished report, Division of Fish and Wildlife, MNDNR, St. Paul, MN.



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MNDNR Small Game Harvest Survey

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Program Purpose or Objectives

Estimate total harvest, number of hunters, and hunter-success rates for small-game species in Minnesota.

Bird Species Covered

Ducks (all species combined), Canada Geese, other geese (mostly Snow Geese), Ruffed Grouse, Spruce Grouse, Sharp-tailed Grouse, Ring-necked Pheasant, Gray Partridge, Mourning Dove, American Coot, Common Snipe, American Woodcock, and American Crow.

Temporal and Spatial Extent

Statewide (1992-present). Also some historic data going back to 1921.

Type of Data Collected

For each species data include total number harvested, total days hunted, and primary county where individual hunted.

Field Methodology

Randomized mail survey of small game hunters was implemented in 1976. A random sample (usually ~6,000) is drawn from the license sales database (ELS since 2000) in February (several small-game hunting and trapping seasons are still open until the end of the license year). Between 1.3 and 2.0% of small-game hunters are sampled each year. Three mailings are used to reduce non-response bias (response rate = 66-87%); the first mailing occurs in early March.

Location Scale

Statewide and by county.

Data Management System

Raw data are maintained in Access databases (and other formats for older data) and ASCII files. Summary data are maintained in permanent SAS datasets.

Accessibility of Data and Reports

Data are available by contacting the survey coordinator. Also see Publications (below).

Program Strengths and Weaknesses

Reasonably precise (relative precision $\leq 25\%$) estimates of statewide harvest for ducks (all species combined), Canada Geese, Mourning Doves, Ring-necked Pheasant, and Ruffed Grouse. Conversely, reliability of county-level harvest estimates is questionable (and thus is not included in annual reports).



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MNDNR Small Game Harvest Survey

Ideas for Future Improvements

Estimate total harvest by ecological regions or management areas.

Publications (most recent): Dexter, M. H., editor. 2005. Hunting and trapping harvest statistics (1994–2004). *In* Status of wildlife populations, fall 2005. Unpublished report, Division of Fish and Wildlife, MNDNR, St. Paul, MN. Available online:

<http://www.dnr.state.mn.us/publications/wildlife/index.html>.



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MN State Park Avian Inventory Project

Program Contact(s)

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Program Purpose or Objectives

Establish baseline resource information concerning the Avian Species located at each Minnesota State Parks

List Bird Species Covered

All Minnesota species

Temporal and Spatial Extent (counties preferred)

Data is based on actual sightings within the designated area

Type of Data Collected

Sighting dates, numbers, and reference to document establishing the observation of an avian species by a knowledgeable observer.

Field Methodology

Source documents of species lists provided to the DNR. At those parks that didn't have sufficient information, actual inventory visits were conducted over a two year period, with 14 or more inventory trips to each of those parks that were deemed to need additional work.

Location Scale

Within the Boundaries of the State Park

Data Management System

MS Excel spreadsheets, MS ACCESS Database. Data can be tied to GIS coordinates.

Accessibility of Data and Reports

DNR ACCESS database maintained by the State Parks Division

Program Strengths and Weaknesses

Data is collected by knowledgeable observers and documented in a checklist or report. Data has been collected over several years and has been entered into a MS ACCESS Database.

Does not have LAT/LONG coordinates



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MN State Park Avian Inventory Project

Ideas for Future Improvements

There should be a program to continue the collection of data from the State Parks via actual inventory trips or voluntary sharing of observation data from the State Parks. There should be a cyclical schedule adopted to ensure all parks are surveyed at least once every 5 – 8 years.

Publications (most recent)

There is a standard Park Checklist of bird species that has been printed, and available online, for each of the MN State Parks. The checklists show seasonal occurrence information for each species.



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**Natural Heritage and Nongame Research Program (NHNRP)
Division of Ecological Services, Minnesota DNR**

Program Contact(s) (include email, phone, and address, website)

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Program Purpose or Objectives

The NHNRP collects, manages, and interprets information about nongame animals, native plants and plant communities to promote the wise stewardship of these resources. Natural Heritage Programs or their equivalents now exist in all 50 states as well as in a number of Canadian provinces and Latin American countries. All programs use similar methodologies to collect and manage information, allowing pooling of data for conservation planning across geopolitical boundaries. NHNRP activities relevant to breeding bird inventory and monitoring include:

1. Management of Minnesota's Natural Heritage Information System, which includes:
 - The Rare Features Dataset, the state's primary repository for statewide locational information on rare natural features, including 44 species of breeding bird species.
 - The Colonial Waterbirds Database, containing locational and historical information on colonies of 22 colonial waterbird species.
 - The Bald Eagle Historical Database, containing locational and historical information on bald eagle nest sites throughout the state.
 - The Peregrine Falcon Historical Database, containing locational and historical information on peregrine falcon nest sites throughout the state.
 - The Prairie Chicken containing locational and historical information on prairie chicken leks throughout the state.
2. Maintenance of Minnesota's List of Endangered, Threatened, and Special Concern Species, which currently includes 28 species of breeding birds. Six additional species are proposed for inclusion at this time.
3. Coordination of federal endangered species research and management activities for Minnesota, including the piping plover and bald eagle.
4. An active program of sponsored research, which in recent years has included:
 - 1990-1995 survey of Black Tern sightings in Minnesota
 - 1992 study of Incubation behavior and artificial nest structure usage in Black Terns
 - 1993 study of the genetic and demographic status of Peregrine Falcons in the upper Midwest
 - 1994 study of Forster's Tern feeding ecology and nest success
 - 1994 study of Henslow's Sparrow population status and breeding habitat
 - 1994-2007 studies of Northern Goshawk ecology, home range, food habits, and habitat use
 - 1995 study of the birds of large floodplain forests
 - 1995 survey for Loggerhead Shrikes
 - 1996 study of the nest habitat selection and nest success of Greater Sandhill Cranes in northwestern Minnesota
 - 1997 study of the distribution and ecology of Boreal Owls in Northeast Minnesota
 - 2000 study of avian diversity, abundance and conservation on a large prairie landscape reserve
 - 2000 study of relationships between trout habitat improvement practices, riparian communities, and the Louisiana Waterthrush
 - 2000 and 2005 Statewide Bald Eagle surveys (covered on separate booklet entry)



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**Natural Heritage and Nongame Research Program (NHGRP)
Division of Ecological Services, Minnesota DNR**

List Bird Species Covered

Focus is on Minnesota's endangered, threatened, and special concern birds, colonial waterbirds, and selected other species. (see <http://www.dnr.state.mn.us/ets/birds.html>)

Temporal and Spatial Extent (counties preferred)

State of Minnesota

Type of Data Collected

A wide variety of biological and locational data

Field Methodology

Various. Data are received from multiple research and monitoring sources. Minnesota County Biological Survey (Minnesota DNR) is a prominent source.

Location Scale (point, twp/range, management unit, etc.)

Statewide

Data Management System (GIS, etc.)

The Rare Features Database is a spatial, GIS-based system using ArcView and Oracle software.

Colonial Bird Database is a flatfile database using SAS software

Bald Eagle Database is a relational database using Dataflex software

Peregrine Falcon Database is a relational database using Dataflex software

The Prairie Chicken Historical Database is a relational database using Dataflex software

Accessibility of Data and Reports

Research reports are available online at:

http://www.dnr.state.mn.us/ecological_services/nongame/projects/research_reports/birds.html

NHIS data can be obtained by using the data request form available at:

http://www.dnr.state.mn.us/ecological_services/nhgrp/nhis.html#datarequest

Program Strengths and Weaknesses

As the only repository for statewide locational information on rare natural features, the Rare Features Database can be useful to many agencies and individuals.

Because our information is not based on a comprehensive inventory, there are rare or otherwise significant natural features in the state that are not represented in the database. A county-by-county survey of rare natural features is now underway, and has been completed for some counties.

Because survey work for birds is not exhaustive, and because there has not been an on-site survey of all areas of each county, bird locations may exist for which we have no records.

Ideas for Future Improvements

Publications (most recent)

Minnesota's List of Endangered, Threatened, and Special Concern



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Statewide Bald Eagle Surveys

Program Contact(s)

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Program Purpose or Objectives

The Bald Eagle (*Haliaeetus leucocephalus*), our national symbol, has long been a valued component of Minnesota's wildlife. The state's first bald eagle survey (1973), conducted while the species was in the midst of a severe population decline due to the effects of environmental contaminants, found 115 active nests. The DNR conducted statewide bald eagle surveys annually between 1973 and 1995. These surveys indicated that Minnesota's eagle population experienced a dramatic and ongoing recovery during that period, exceeding 600 nests by 1995.

In 1999, the U.S. Fish and Wildlife Service proposed to remove the bald eagle from protection under the federal Endangered Species Act. In preparation for this action, the DNR's Nongame Wildlife Program conducted statewide bald eagle surveys during the 2000 and 2005 nesting seasons. The surveys were designed to visit all known nests and estimate the number of nests missed, provide a baseline for monitoring the state's bald eagle population in the future, and clarify current habitat needs of the species. The 2005 survey also included a random plot survey to allow the estimation of the total number of nests in Minnesota.

List Bird Species Covered

Bald eagle (*Haliaeetus leucocephalus*)

Temporal and Spatial Extent (counties preferred)

Statewide surveys every five years

Type of Data Collected

Nesting data

Field Methodology

Known Nest Survey (2000 and 2005)

DNR staff distributed emails and press releases requesting bald eagle nest reports from the public and natural resource professionals throughout the state. Regional Nongame Wildlife Program staff combined these reports with historical nest data to create lists of known nests, which were assigned to one of 14 DNR, FWS, National Forest, or National Park Service survey teams. Surveyors in fixed-wing aircraft visited the nest locations between late March and early May to determine the status of each nest (i.e., active, empty, or unable to be found). At each nest, geographic coordinates and the activity of adults were noted on a touch-screen laptop computer displaying a map of the plot and synchronized with the aircraft's GPS unit.



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Statewide Bald Eagle Surveys

Random Plot Survey (2005 only)

A stratified random sample of sixty-one 100 km² survey plots was drawn from a 10 km by 10 km grid overlaying 3 of the state's 4 ecological provinces. Thirty-five plots were allocated to the Laurentian Mixed Forest Province (LMF), and 22 are allocated to the Eastern Broadleaf Forest Province (EBF). With the exception of 4 plots in its southeast corner, the Prairie Parkland Province (PP) was excluded because of the small number of eagle nests known from that region. Plots were assigned to one of two 3-person survey crews who were not familiar with eagle nests within the plots. Crews used aerial photos to identify all potential eagle habitat within each plot, and designed flight paths to cover those areas. Surveys to find all nests within each plot were conducted from fixed-wing aircraft between April 5th and 15th. Each survey crew included a pilot and two observers. To provide an estimate of detectability, each crew member recorded their observations independently, with observations compared only after a nest was passed. Observations were recorded on a touch-screen laptop as in the known nest survey.

Location Scale

Points (representing nests).

Data Management System

Natural Heritage Information System (GIS-based)

Accessibility of Data and Reports

Final Reports are available online at:

http://www.dnr.state.mn.us/ecological_services/nongame/projects/baldeagle_survey.html

Program Strengths and Weaknesses

Strengths: With the addition of the Random Plot Survey, the estimate of bald eagle nests is much more accurate than in older surveys of known nests.

Weaknesses: These surveys are very expensive.

Publications (most recent)

Baker, R., J. Galli, and S. Nelson. 2000. 2000 Minnesota **bald eagle survey**. Nongame Wildlife Program, Minnesota Department of Natural Resources report. 2 pp.

Baker, R.J., and Y.A. Monstad. 2005. 2005 Minnesota **bald eagle surveys**. Nongame Wildlife Program, Minnesota Department of Natural Resources Report. 4 pp.



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Minnesota Loon Monitoring Program (MLMP)

Program Contact(s)

NW (Becker and Otter Tail Counties):

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NE (Cook, Lake, and Itasca Counties)

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NE (Aitkin and Crow Wing Counties)

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S (Kandiyohi County)

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Website: http://www.dnr.state.mn.us/ecological_services/nongame/projects/mlmp_state.html

Program Purpose or Objectives

The MLMP was designed to detect changes both in our loon population and in the health of their lake habitats in Minnesota. With the help of over 1000 experienced volunteers, we have completed loon surveys in six 100-lake "Index Areas" annually since 1994. These Index Areas were chosen to represent the different factors which may affect loons and their habitat throughout the state, including: human population growth, acid rain sensitivity, densities of humans and roads, and predominantly public or private land ownership.

List Bird Species Covered

Common loon (*Gavia immer*)

Temporal and Spatial Extent (counties preferred)

Annual surveys in six contiguous 100-lake "Index Areas" within Aitkin, Becker, Cook, Crow Wing, Itasca, Kandiyohi, Otter Tail, and Lake Counties

Type of Data Collected

Number of adult and juvenile loons observed on an assigned lake, weather and shoreline conditions.



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Minnesota Loon Monitoring Program (MLMP)

Field Methodology

Our MLMP volunteers are assigned to survey a lake (or multiple lakes) during the morning hours (between 6 a.m. and 12 p.m) of one day within a 10-day period in July. Only lakes that are over 10 acres in size and deep enough to sustain loons are assigned within each Index Area. Depending on the size of the lake, the survey styles vary widely, with some volunteers using boats or canoes, and others surveying from the shore. Similarly, some use binoculars or spotting scopes, and others use naked eye. However, Nongame Wildlife Program staff standardizes methods by providing survey guidelines to all volunteers. Once the survey is completed, data forms are returned to the Nongame Wildlife Program for compilation and analysis.

Location Scale

Lake and Index Area.

Data Management System (GIS, etc.)

Access database, GIS coverage of index areas, GIS data of human population density around lakes surveyed.

Accessibility of Data and Reports

All final reports are available for download at:

http://www.dnr.state.mn.us/ecological_services/nongame/projects/mlmp_state.html

Program Strengths and Weaknesses

Strengths: Because this program is volunteer-based, staff and time commitment is limited to volunteer coordination. The clean and simple methodology does not require volunteer training. It is relatively easy to recruit volunteers because the species is so popular, the time commitment is small, and the activity has become a fun, family outing for many participants. The resulting data are widely cited as a valuable tool for monitoring the status of the state bird and its lake habitat.

Weaknesses: As a volunteer program, surveyors leave the program and must be replaced, which adds inconsistency to survey results. It is not possible to test the accuracy of individual surveyor's identification abilities.



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Minnesota Loon Monitoring Program (MLMP)

Publications (most recent)

- Baker, R.J. 1999. Minnesota Loon Monitoring Program: 1994-1999. *In: The Common Loon: population status and fall migration in Minnesota*, Svingen, P.H. and A.X. Hertzell (eds.). M.O.U. Occasional Papers: Number 3. 8 pp.
- Baker, R.J., Y.C. Anderson, L. Gelvin-Innvaer, M. Hamady, K. Haws, P.S. Perry. 2004. Tenth Anniversary Report - Minnesota Loon Monitoring Program 1994 - 2003. Nongame Wildlife Program, Minnesota Department of Natural Resources Report. 12 pp.
- Baker, R.J., Y.C. Anderson, L. Gelvin-Innvaer, M. Hamady, K. Haws, P.S. Perry. 2002. Results of the Minnesota Loon Monitoring Program (MLMP) 1994 - 2002. Nongame Wildlife Program, Minnesota Department of Natural Resources Report. Unpaged.
- Hanson, E.W. 1996. Monitoring the common loon population in Minnesota: assessment of the 1994 and 1995 survey results, the accuracy of volunteers and aerial surveys, and the power of detecting trends. M.S. Thesis, University of Minnesota. 160 pp.
- Monstad, Y.A. and R.J. Baker. 2005. Results of the Minnesota Loon Monitoring Program (MLMP), 1994-2005. Final report produced by the Nongame Wildlife Program, Minnesota Department of Natural Resources. 2 pp.
- Monstad, Y.A. and R.J. Baker. 2004. Results of the Minnesota Loon Monitoring Program (MLMP), 1994-2004. Final reports produced by the Nongame Wildlife Program, Minnesota Department of Natural Resources. 2 pp. for each of the six Index Areas.



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Binational Great Lakes Waterbird Survey

Program Contact(s)

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www.waterbirds.umn.edu

Program Purpose or Objectives

Purpose is to obtain estimates of breeding pairs of all colonial waterbirds nesting in the Great Lakes (once/10 years); these data are used to estimate population trends for all species and track changes in distribution; data are used for conservation planning

List Bird Species Covered

American White Pelican, Double-crested Cormorant, Great Blue Heron, Black-crowned Night-Heron, Great Egret, Snowy Egret, Little Blue Heron, Cattle Egret, Great Black-backed Gull, Herring Gull, Ring-billed Gull, Caspian Tern, Common Tern, Black Tern, Forster's Tern

Temporal and Spatial Extent

Great Lakes and their connecting channels (all colonies within 1 km of shoreline); Minnesota Lake Superior shoreline and St. Louis Harbor.

Type of Data Collected

Number of active nests; general habitat assessment; general threat assessment; UTM coordinates for all colony sites

Field Methodology

Number of breeding pairs is estimated from direct nest count on ground and aerial photos

Location Scale

Colony

Data Management System

GIS

Accessibility of Data and Reports

USFWS

Program Strengths and Weaknesses

Conducted 1/~10yr

Ideas for Future Improvements

Are currently testing new methods to increase detectability, convert to aerial photos when possible, increase census frequency

Publications (most recent)

- Wires, L.R. and F.J. Cuthbert. 2006. Historical populations of the Double-crested Cormorant: Implications for conservation and management in the 21st century. *Waterbirds* 29 (1): 9-37.
- Wires, L.R., K. Haws, F.J. Cuthbert, N. Drilling, and A.C. Smith. 2006. The Double-crested Cormorant and American White Pelican in Minnesota: First Statewide Census. *The Loon*: Fall 06.



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Minnesota National Forest Breeding Bird Monitoring Program

Program Contact

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NRRI/U of Minnesota-Duluth
5013 Miller Trunk Highway
Duluth, MN 55811 USA
<http://www.nrri.umn.edu/mnbirds>

Program Purpose

Annual monitoring program of breeding birds in two national forests in Minnesota –
Chippewa and Superior National Forests
Objective – to detect trends in breeding birds over time and to identify breeding habitats

List Bird Species Covered

All encountered – over 150 species have been identified – 1991 to 2006

Temporal and Spatial Extent (counties preferred)

Chippewa and Superior National Forests

Type of Data Collected

Point counts and selected vegetation measurements

Field Methodology

10 minute point counts; stratified random sampling design based on the proportion of
available habitat types within each national forest; three – 10 minutes points within each
stand (minimum stand size is 25 ha)

Location Scale

All points have been located with a geopositioning system.

Data Management System (GIS, etc.)

All data are entered into ACCESS database.

Accessibility of Data and Reports

Data are available by special request.

Publications (most recent)

See web site for full publications.

Lind, J., N. Danz, J.M. Hanowski, and G.J. Niemi. 2006. Breeding bird monitoring in
Great Lakes national forests:1991-2005. NRRI/TR-2006/04.



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LCMR – St. Croix Valley and SE Minnesota Monitoring

Program Contact(s)

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Program Purpose

Annual monitoring program of breeding birds along the St. Croix River Valley and in SE Minnesota

Objective – To detect trends in breeding birds over time and to identify breeding habitats

List Bird Species Covered

All encountered – primarily passerines

Temporal and Spatial Extent (counties preferred)

Carlton and Pine Counties; SE Minnesota

Type of Data Collected

Point counts and selected vegetation measurements

Field Methodology

10 minute point counts distributed throughout each of these 2 regions

Location Scale (point, twp/range, management unit, etc.)

All points have been located with a geopositioning system.

Data Management System (GIS, etc.)

All data are entered into ACCESS database.

Accessibility of Data and Reports

Data are available by special request.

Publications (most recent)

See web site for full publications.

Niemi, G.J., M.T. Jones, J. Hanowski. 2003. Forest bird diversity. LCMR. NRRI/TR-2003/11.



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Minnesota LCMR Forest Bird Biodiversity Study

Program Contact(s)

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5013 Miller Trunk Highway
Duluth, MN 55811 USA

Program Purpose

Landscape sampling of breeding birds on nine, one square mile research plots distributed throughout northeastern Minnesota.

Objective – to examine landscape distributions of forest birds over different forest landscape patterns.

List Bird Species Covered

All encountered – primarily passerines.

Temporal and Spatial Extent (counties preferred)

Cass, Pine, St. Louis, Lake, Koochiching, and Cook Counties.

Type of Data Collected

Distribution of breeding birds within 1 square mile research plots

Field Methodology

5 minute point counts gathered at 100 m intervals along 8 transects; each transect was 200 m apart; approximately 4 days are required to gather data for each plot

Location Scale (point, twp/range, management unit, etc.)

All points have been located with a geopositioning system.

Data Management System (GIS, etc.)

All data are entered and digitized into GIS databases.

Accessibility of Data and Reports

Data are available by special request.

Program Strengths and Weaknesses

This is not a complete inventory – a landscape sample replicated across 9 different forest landscape types.

Publications (most recent)

Niemi, G.J., M.T. Jones, J. Hanowski. 2003. Forest bird diversity. LCMR. NRRI/TR-2003/11.

Niemi, G., M.T. Jones, J. Hanowski. 2002. Minnesota Forest Bird Diversity Initiative: Final Report to LCMR. NRRI/TR-2002/10



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MN Scientific and Natural Areas (SNA) Avian Species Inventory

Program Contact(s)

Katie Haws
Minnesota Department of Natural Resources
Bemidji, MN
218-755-2976

Program Purpose

Inventory all avian species and develop a bird list for each Scientific and Natural Area

List Bird Species Covered

All species including breeding, migratory and permanent residents

Temporal and Spatial Extent

Counties where SNA's are located, currently working in Stearns, Anoka, Wright, Hennepin, Washington, Scott, Sherburne, Ramsey, Dakota, Redwood, Yellow Medicine, Big Stone, and Lac Qui Parle counties

Type of Data Collected

Species count and species numbers

Field Methodology

Four hour visits during March, April, May, June, August, September, October and November. Contract complete by January 2008

Accessibility of Data and Reports

Reports are in process and contained in computer files at rbjanssen@aol.com and are also on file at the DNR office of Katie Haws in Bemidji and rare species occurrence are on file in the Heritage database at the DNR in St. Paul, MN

Program Strengths and Weaknesses

This is new data for each area. Many areas are too large and inaccessible for a complete inventory.

Ideas for Future Improvements

Complete an inventory for each SNA in the state

Publications

Lists from northwestern and western Minnesota SNA's have been published and are available at the DNR office in St. Paul. As the surveys are completed lists will be published for each area.



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Minnesota Ornithologists' Union (MOU)

Program Contacts

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Peder Svingen (editor, Seasonal Reports)
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MOU website: www.moumn.org

Program Purpose

Survey and publish dates and locations of all significant sightings of all Minnesota bird species. These data cumulatively show the status of all species found in the state at all times of year, the only such collection of data to do so.

List Bird Species Covered

All 432 species recorded on the Minnesota state list, as recognized, edited, and classified by the MOU's Records Committee.

Temporal and Spatial Extent (counties preferred)

Season-by-season surveys statewide, including migration dates; data are typically referenced by counties (including all 87).

Type of Data Collected

Dates, locations, and numbers of all significant occurrences of all Minnesota species, as found by ~100 active field observers each season; unusual records are documented and reviewed by the MOU's Records Committee.

Field Methodology

Observers follow no consistent protocol as to where or when they are out in the field making observations; however, they comprise the most active and skilled group of field observers in the state.

Location Scale

Statewide.



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Minnesota Ornithologists' Union (MOU)

Data Management System (GIS, etc.)

At end of each season observers report the dates and locations of sightings to Seasonal Reports editors, mostly on-line via the MOU's website (moumn.org).

Accessibility of Data and Reports

Published quarterly in *The Loon*, journal of the MOU. MOU website (moumn.org) also includes range maps by county and charts with dates of occurrence as generated from Seasonal Reports data.

Program Strengths and Weaknesses

Seasonal Reports are unique: the only surveys which give data on all Minnesota bird species as they occur each season statewide; species-by-species reports in their present form have been continuous since 1961, longer than any other survey in the state.

Ideas for Future Improvements

Immediate goal is for all sightings data to be reported on-line by observers (as most already do), rather than on paper forms. Long-range goals include applying GIS and Cornell's e-bird systems to bird sightings.

Publications (most recent)

The Loon, quarterly journal of the MOU

Checklist of the Birds of Minnesota (*booklet with annotated list of all Minnesota birds, as recognized by the MOU's Records Committee, January 2004*)

High Counts of Birds in Minnesota (*booklet by Karl Bardon, published by the MOU, April 2002*)

County Nesting Records of Minnesota Birds (*booklet by Anthony Hertzell and Robert Janssen, published by the MOU, January 1998*)



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Minnesota Department of Natural Resources: Boreal Birds

Program Contact(s)

Maya.hamady@dnr.state.mn.us

Program Purpose or Objectives

Survey Boreal songbirds in Pine Island State Forest
tamarack and black spruce stands of different age classes
Document occurrence of boreal bird species in state forest for management purposes

List Bird Species Covered

Olive-sided flycatcher
Yellow-bellied flycatcher
Golden-winged warbler
Connecticut warbler
And other boreal species

Temporal and Spatial Extent

14 stands within Pine Island State Forest in Koochiching County
Surveyed for 2 years: 2005 -2006

Type of Data Collected

Presence /absence

Field Methodology

Used broadcast of con-specific song to illicit response and document presence
Stratified stands based on age-class

Location Scale

Management unit

Data Management System

Excel Table

Program Strengths and Weaknesses

- Provides documentation of occurrence of species and the biological significance of site-
Survey is a pilot survey
- A bigger sample is needed with stratification that accounts for other variables important to
forest management

Ideas for Future Improvements

Methodology used is a standard methodology
Increase sample size
Check for clumped distribution

Publications (most recent)

Report on MNDNR -Division of Ecological Services web page



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**Minnesota Department of Natural Resources:
Northern Goshawk Project**

Program Contact

Maya.hamady@dnr.state.mn.us

Program Purpose

Survey northern goshawk in landscapes where there is no documentation of occurrence

Monitor Productivity at known nesting sites

Assess land cover in 15 territories and develop management recommendations

List Bird Species Covered

Northern goshawk

Temporal and Spatial Extent

3 year survey – (2003-2005)

288 sq miles in the Kabetogama State Forest (St Louis County

and 90 square miles in the George Washington State Forest (St Louis County/Itasca County)

Monitoring

survey for occupancy within 500m of known nest sites (2003-2006)

Monitored an average of 64 nests/year

Type of Data Collected

Population survey (location of active and occupied territories); location of goshawk response; unused stick nests

Productivity information

breeding activity; occupancy rate; nesting rate; nesting success and number of fledglings

Field Methodology

Used broadcast of con-specific alarm call to illicit response

Surveyed all suitable habitat (old/mature upland forest) by placing survey points such that all areas of suitable habitat are within ¼ mile of broadcast point

Location Scale

Several townships within state forest

Data Management System

GIS

Biotics

Excel Tables



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**Minnesota Department of Natural Resources:
Northern Goshawk Project**

Accessibility of Data and Reports

Location of active nesting sites has been entered in to the MN DNR Natural Heritage database

2 completed Reports + 2 draft reports = all need internal review before being made available on the MNDNR website

Program Strengths and Weaknesses

Provides information that is directly useful to management

Labor intensive – costs limit coverage

Ideas for Future Improvements

Methodology seemed effective for specified objectives

More information could be obtained if there was a way to mark individual birds

Publications (most recent)

There will be agency reports after review



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**Survey and Monitoring Activities for Birds in Minnesota's
National Forests**

Program Contact:

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Program Purpose or Objectives:

1. Detecting presence of birds, their nests, or potential habitat in Management Project Areas.
2. Assessing site habitat conditions in order to protect, maintain, or enhance species' habitat Forest-wide through project management actions (such as timber harvest, prescribed burning, road and trail management) or mitigations to such actions.
3. Monitoring nesting activity and productivity (eagles and goshawks)
4. Monitoring achievement of Forest Plan objectives for federally listed threatened and endangered species, Regional Forester's Sensitive Species, management indicator species and other bird species of interest.

List Bird Species Covered

1. Bald Eagle
2. Boreal Owl
3. Northern Goshawk
4. Great Gray Owl
5. Other Regional Forester's Sensitive Species (RFSS)
6. Other: Forest songbirds, game birds, common loon

Temporal and Spatial Extent (counties preferred)

Annual surveys for eagles have been conducted over last 30-35 years; surveys for owls and goshawk (5-10 years). Site-specific surveys for other sensitive species have been conducted intermittently over the past 10+ years.

Surveys and monitoring efforts are primarily conducted within the boundaries of the two national forests. For the Superior National Forest, focus is on national forest system lands (mostly outside of BWCAW) in Cook, Lake and St. Louis Counties but also may encompass other ownerships adjacent to targeted survey areas. For the Chippewa National Forest, focus is on national forest system lands in Cass, Beltrami and Itasca Counties.

Type of Data Collected

Site-specific information for an individual species generally includes habitat description (forest/habitat type, nest tree species/height/diameter), location, date, productivity (observed or heard nestlings) and observer.



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**Survey and Monitoring Activities for Birds in Minnesota's
National Forests**

Field Methodology

Bald eagle (and Osprey)

1. *Known nests*: Low level flights with experienced observers (biologist, biological technicians, and pilot) to detect known nest occupancy early in nesting season (gen. April); occasional follow-up flights in May/June to count nestlings. Information collected on tree species, height, diameter, distance from water, and other factors (osprey nests also checked). These surveys are conducted every five years (eagle).

On the Chippewa, bald eagle breeding activity (early spring) and productivity (early summer) flights have been flown annually 20-30 years.

2. *Potential nest sites*: Low level flights to detect new nests in suitable habitat in targeted project areas (SNF only). Biologist identifies potential habitat using GIS vegetation and water coverage: generally this includes mature forest within ½ mile of fish-bearing streams and lakes. Conducted annually in different project areas. Includes BWCAW.

The Chippewa does not conduct project area specific surveys for additional eagle nest locations. New nest site locations are regularly discovered during the course of conducting the breeding season flights. No organized efforts are conducted to ascertain the locations of new eagle nest sites.

3. Information on new or known nests is also informally collected from field staff or public. These are observations from the ground – follow-up generally completed by District biologist this season or next. New observations also come in occasionally from pilot flying for other reasons (such as fire patrol).

Boreal owl and great gray owl (Superior National Forest only)

Surveys are conducted in stands or areas proposed for projects that could disturb owls or alter their habitat (timber harvest, road) are surveyed (or if potential habitat acreage is too extensive, sample surveyed).

- Suitable potential habitat is identified using GIS coverage of forest vegetation (mature upland forest associated with mature lowland conifer forest) – and a check of BIOTICS database for known sites.
- Depending on situation, presence of drivable roads and snowmobile trails also may determine survey sites.
- For listening routes along roads or trails in a survey area, methodology varies among Districts, but is adapted from methods used by MN boreal owl researchers:
 - 3 min listening @ ½ mile intervals, with or without playback, or
 - 2 min listening @ 1 mile with or without playback
 - Repeat, if possible, in three periods (matches Grosshuescsh)

Data collected similar to Grosshuescsh and Goshawk.



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**Survey and Monitoring Activities for Birds in Minnesota's
National Forests**

Northern goshawk

- Suitable potential habitat is identified using GIS coverage of forest vegetation (mature upland forest with consideration of large mature patches (300+ acre) if there are any).
- BIOTICS or DNR (Hamady) and internal databases searched for known sites.
- Stands or areas proposed for projects that could either disturb or improve goshawk habitat (timber harvest, road) are surveyed. Off-road transects follow the methodology outlined in Hargis and Woodbridge (2005) with call stations 200 meters apart. On-road transects have used the broadcast technique with call stations ¼ to ½ mile apart (Anderson and Boal 2001).
- Detection methodology at known or suspected territories is that used by MN DNR (Hamady) for Territory Occupancy:
 - Survey at 600 meter intervals: with prescribed pattern of alternating broadcasting alarm call and listening at six different compass points (surveyor is at point about 5 min total)
 - If there is a response, collect: time, sex/age, distance and direction, type of response (vocal, perch, flyby), duration of response, behavior, comments.
 - Also collected: info such as mode of travel, route location with UTMs for points, route start and end time, UTM, time start/finish, wind speed, temp, % cloud, precipitation, habitat type/size std size density – for four quadrants.
 - Additionally, the Chippewa has been conducting “leaf-off” stick nest searches of potential nesting habitat within the project area.

If we have had response we go back to hunt for nest. If a nest is found, DNR methodologies (Hamady) for Breeding Status and Fate are used.

Surveys for occupancy of all known goshawk territories are conducted during the courtship and nesting period (April-June), and again in late summer during the post-fledging period (August - September). We avoid the broadcast technique during the incubation and young nestling periods

Other Sensitive Bird Species

Site-specific surveys are conducted for other RFSS species (listed below) may be conducted within a project area. The decision on whether or not to survey an area for a particular species is usually based upon: available information on the species, potential threats to the species, rarity of the species, suitability of the habitat, availability of suitable habitat.

Location Scale

GIS points are available for most sites.

For some older locations: twp/range/section

NOTE: due to the large number of known bald eagle nest sites on the Chippewa, many of these nest trees are located down to within a quarter, quarter section.



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**Survey and Monitoring Activities for Birds in Minnesota's
National Forests**

Data Management System

- Points added to FS stand GIS coverage
- All locations and information pertaining to threatened, endangered, sensitive and other bird species of interest are entered into the FAUNA database on the Chippewa
- Points for eagle (along with any other bird species that the DNR tracks) are generally provided to DNR for entry into BIOTICS database. Site locations for great gray and boreal owls, black-throated blue warbler, yellow rail, peregrine, trumpeter swan, also may be provided to DNR, but this is inconsistent.
- Northern goshawk points provided to DNR (Maya Hamady)
- Stick nest shapefiles (unknown bird) are also provided to DNR local offices (SNF only).
- Eagle sites – current and historical (back to 1960s) entered into FS FAUNA database
- Information is generally also provided to local DNR wildlife staff.
- Paper/electronic files on individual districts

Accessibility of Data and Reports

All FS info (including FAUNA, GIS coverage) is available by request to FS if a biological evaluation determines that it can be provided without endangering known sites. We provide general information if requested by public, but may provide specific info to researchers, other agencies, etc.

The exception is that we do not provide info from BIOTICS – this is DNR-managed, so we refer requests to them.

Program Strengths and Weaknesses

Strengths

Our current system:

- ✓ allows us to manage species at site and territory levels (known sites can be maintained, protected, or enhanced as per Forest Plan direction);
- ✓ allows us to analyze location data within the context of forest types/age, ecological setting and surrounding landscape; though there is also some inconsistency among field units on the Superior that doesn't always allow upward aggregation – a weakness)
- ✓ is affordable and practical.

Weaknesses:

- ✓ It does not allow for specific population monitoring or validation monitoring for Forest Plan objectives.
- ✓ Lots of time and money required to determine presence/absence of secretive species.

Ideas for Future Improvements

Database start ups, transition to new databases

Consistency between district databases and DNR database.

Improve reporting on survey efforts as well as the discovery of a species, *i.e.* quantify effort.



*Minnesota Breeding Birds
Inventory and Monitoring Programs Workshop
February 14th – 15th, 2007*

**Survey and Monitoring Activities for Birds in Minnesota's
National Forests**

Publications (most recent):

Unpublished info:

- Superior and Chippewa National Forests 2005 Monitoring and Evaluation Report
- Biological Evaluations (sensitive birds) and Assessments (eagle) for draft and final projects environmental assessments/impact statements: (e.g., SNF: Echo Trail - 2007, Dunka -2006, CNF: South Leech Lake – 2005, Northwoods 2006)
- Minnesota DNR BIOTICS database for points and other info

OTHER* Bird Surveys conducted by others or in partnership with others (Ongoing)

* (We assume these are covered by other researchers or agencies and so have not included additional info)

Apply to both the Superior National Forest and the Chippewa National Forest

1. Forest Songbird Monitoring – NRRRI (Niemi) – annual
2. Black-throated blue warbler targeted site surveys (irregular, uncommon)
3. American woodcock – FWS – annual
4. Ruffed grouse – MN DNR – annual
5. Breeding Bird Survey - FWS
6. Christmas Bird Count
7. Minnesota Loon Monitoring Program – MN DNR, every 5 years; Baker, Richard. 651/297-3764 Richard.baker@dnr.state.mn.us.

Apply to the Superior National Forest only:

8. New (Summer of 2007) MAPS station at Weiss Creek site (at the old ELC site just west of Isabella on Mitiwan Lake Road). Dave Grosshuesch is sponsor.
9. Bird & Community Ecology in & Adjacent to the BW. UW-Steven's Point: Alan Haney; ahaney@uwsp.edu
10. Boreal owl: its habit and prey in the Superior National Forest; Lisa Belmonte – completed.
11. Boreal owl – Bill Lane – annual surveys along established routes.

Bird Species	Where Listed?	Bird Species	Where Listed?
Northern goshawk	SNF and CNF	Peregrine falcon	SNF only
Red-shouldered hawk	CNF only	Connecticut warbler	SNF and CNF
Boreal owl	SNF only	Three-toed woodpecker	SNF only
Great gray owl	SNF and CNF	Black-backed woodpecker	CNF only
LeConte's sparrow	SNF and CNF	Sharp-tailed grouse	SNF and CNF
Nelson's sharp-tailed sparrow	CNF only	Spruce grouse	CNF only
Olive-sided flycatcher	SNF and CNF	Common tern	CNF only
Yellow rail	SNF and CNF	Black tern	CNF only
Black-throated blue warbler	SNF and CNF	Wilson's phalarope	CNF only
Bay-breasted warbler	SNF and CNF	Trumpeter swan	CNF only



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Landbird Monitoring at National Parks in the Western Great Lakes Region – Improving Consistency and Making Data more Available

Program Contact

Bill Route
bill_route@nps.gov
715-682-0631 x 21

Program Purpose

Improve consistency between National Parks as well as with National Refuges, National Forests, and other programs.

List Bird Species Covered

Breeding birds

Temporal and Spatial Extent

Minnesota -Voyageurs National Park, Grand Portage National Monument, Mississippi National River and Recreation Area (downtown Twin Cities); In Wisconsin - St. Croix National Scenic Riverway, Apostle Islands National Lakeshore; In Michigan - Isle Royale National Park, Pictured Rocks National Lakeshore, Sleeping Bear Dunes National Lakeshore; In Indiana - Indianan Dunes National Lakeshore.

Type of Data Collected

Number heard and observed by species, time, and distance.

Field Methodology

Variable Circular Plots along transects using 3,5, and 10 minute counts.

Location Scale

All points are being documented with GPS.

Data Management System

We are developing a web-based ArcIMS system that will allow users to use maps and custom queries to access the data and print it to Excel files.

Accessibility of Data and Reports

Some are accessible but our goal is to improve the through the ArcIMS site. At this juncture we are testing the site with one park's data.



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Program Strengths and Weaknesses

The National Park Service has embarked on a well-organized and base-funded program to provide monitoring service to the 9 parks in the region. We intend for this to provide consistent data on in to the future. The problem will be growing the budget to keep up with annual cost increases.

Ideas for Future Improvements: Staff time is greatest cost. Working with partners such as Wisconsin (Andy Paulios) in developing eBird will help use volunteers in a more defensible way. Partnering with volunteer groups may be the only way to keep some of this long-term monitoring going.

Publications (most recent):

Lind, J. N. Danz, and J. M. Hanowski. 2005. Analysis of Landbird Monitoring Data for National Parks in the Great Lakes Network. GLKN/2005/08. Available at <http://www1.nature.nps.gov/im/units/glkn/reports.htm>