

**¹Technical Guidance Document for the Vermillion Bottoms
and Lower Cannon River Area Floodplains
Dakota and Goodhue Counties, Minnesota
Completed August 8, 2005**

A cooperative guidance document for public agencies and non-
government organizations

This document is the result of meetings and field tours conducted by representatives of multiple agencies and organizations, including:

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Table of Contents

	<u>Page</u>
Background	3
Area Covered by this Plan	3
Related Planning Efforts	4
Natural Resources Summary	5
Management Issues, Goals and Actions	8
References	21
Appendix A. Management Guidelines for Species of Concern	22
Appendix B. Relevé Vegetation Plot Data	32
Appendix C. List of Birds Species in the Site	44

List of Tables

Table 1. Public Lands in the Vermillion Bottoms – Lower Cannon River Area Floodplains	3
Table 2. Bird Species of Conservation Concern in the Vermillion Bottoms - Lower Cannon River Area	6
Table 3. Public Land Survey Bearing Trees in Project Area	7
Table 4. Management Unit Sizes	7

List of Figures

Figure 1. Land Ownership in the Vermillion Bottoms and Lower Cannon River Area	17
Figure 2. Native Plant Communities and Rare Species Locations in the Vermillion Bottoms – Lower Cannon River Area	18
Figure 3. Areas with DNR and Army Corps of Engineers Forest Stand Data	19
Figure 4. Management Units in the Vermillion Bottoms – Lower Cannon River Area	20

Background

This document is the work of natural resource managers from several agencies and organizations concerned with the conservation of floodplain habitats in the Vermillion Bottoms and Lower Cannon River Area floodplains located in Dakota and Goodhue Counties, Minnesota. This project is an outgrowth of a Minnesota DNR interdisciplinary planning effort (Subsection Forest Resource Management Plan) for southeastern Minnesota that included the Vermillion Bottoms and Lower Cannon River area. During this process, participants agreed that the challenge of managing floodplain habitats to meet diverse goals required a concentrated effort by DNR staff together with other agencies, conservation organizations, scientists, and private landowners. This document is the result of numerous field tours and meetings conducted in 2002 through 2005.

Area Covered by this Plan

The area covered by this plan (referred to as the “project area”) is shown in Figure 1. The plan covers the floodplain areas within the “proposed project boundary” of the Vermillion Bottoms and Lower Cannon River Area in Dakota and Goodhue Counties (Dunevitz 2001). These floodplain areas total about 25,000 acres, which includes about 10,955 acres of forest.

Primary public lands within the project area (Figure 1, Table 1) include the Hastings Scientific and Natural Area, the Cannon River Turtle Preserve Scientific and Natural Area, the Gores Pool Wildlife Management Area (owned by the US Army Corps of Engineers and leased to the state DNR, Division of Fish and Wildlife), other Army Corps of Engineers land, the Espen Island Wildlife Management Area, and the Collischan Bottoms State Forest, a unit of the R.J. Dorer Memorial Forest. Independent School District #256 owns several large parcels in the Cannon River bottoms. In addition, there are several parcels owned by the State Treasurer/Auditor, several by the State Department of Transportation, and several tax-forfeited parcels.

Table 1. Public Lands in the Vermillion Bottoms – Lower Cannon River Area Floodplains

Name of Unit	Managing Agency and Division	Acres
Gores Wildlife Management Area	DNR Fish and Wildlife, Army Corps of Engineers	6449
Espen Wildlife Management Area	DNR Fish and Wildlife	13
Collischan Bottoms State Forest	DNR Forestry	2,836
Cannon River Turtle Preserve Scientific and Natural Area	DNR Ecological Services	836
Hastings Scientific and Natural Area	DNR Ecological Services	69
State of Minnesota	Various agencies, non-DNR	unknown
unnamed	Independent School District #256	400
TOTAL		10,603+

Private lands occurring within the project area include some relatively large landowners (Figure 1). The Prairie Island Indian Community has substantial land holdings on Prairie Island, most of which are in Trust. The Red Wing Wildlife League owns land that is protected with a conservation easement held by the Minnesota Land Trust (Figure 1). Landowners with holdings of 80 acres or more in the project area include 7 in Dakota County, and 15 in Goodhue County.

Related Planning Efforts

The Corps of Engineers is recommending congressional authorization of a long-term program of navigation improvements and ecological restoration for the Upper Mississippi River and Illinois Waterway system (UMRS) over a 50-year period. The program is referred to as the Navigation and Environmental Sustainability Program (NESP). In 2005, the Corps is using existing authorities to initiate a number of pre-construction engineering and design activities related to NESP, under the assumption that program authorization will be forthcoming by 2006. One of these activities is development of a systemic forest and grassland management plan for the UMRS floodplain. This will include development of regional goals and objectives for this vegetation type; identification of data needs, such as systemic forest and grassland inventories, high resolution floodplain elevation data, a floodplain vegetation successional model, applied research to enhance best management practices; and a recommended strategy to develop and implement detailed management prescriptions that maintain and improve these important resources. Plan development will be coordinated with the U.S. Fish and Wildlife Service, the U.S. Forest Service, U.S. Geological Survey, Environmental Protection Agency, Natural Resource Conservation Service, State Departments of Natural Resources, other local watershed management organizations, non-governmental organizations, and the public. Much of the information from this Technical Guidance Document for the Vermillion Bottoms and Lower Cannon River Area Floodplains will be included in the Corps planning effort. The management issues, goals, habitat considerations and research needs identified in this document will serve as an excellent baseline to build upon. In addition, several of the participants from this Vermillion Bottoms effort will be invited to become members of the Corps' product delivery team on the NESP forest and grassland initiative.

Natural Resources Summary

There are several documents that describe the natural resources of this area in detail. The report *An Evaluation of the Ecological Significance of the Vermillion Bottoms and Lower Cannon Area* (Dunevitz 2001) summarizes the native plant communities, rare species, and overall biodiversity significance of the area (Figure 2). Forest stand data for the federal and some of the state-owned lands describe dominant tree cover, age classes of trees, and other vegetation components (Figure 3). These data indicate that most of the forests in the project area are 50 to 70 years old, originating after logging following lock and dam construction, and are dominated by silver maple. Scientists with the Long Term Resource Monitoring Program (LTRMP) have collected extensive vegetative cover data in the Mississippi River floodplain. [The LTRMP is being implemented by the U.S. Geological Survey in cooperation with the five Upper Mississippi River System states (Illinois, Iowa, Minnesota, Missouri, and Wisconsin), with guidance and overall program responsibility provided by the U.S. Army Corps of Engineers.] Bird survey data have been collected by the United States Geologic Survey and the DNR's Minnesota County Biological Survey. The *Environmental Pool Plans, Mississippi River, Pools 1-10* report (River Resources Forum's Fish and Wildlife Work Group 2004) summarizes resource issues and provides maps of current and desired future conditions. The report *Collischan Bottoms Plan (Vermillion Bottoms and Lower Cannon River Area)* (Helbig 2002) includes forest management history of the State Forest lands in the project area and provides a timber management plan for state-owned Forestry and Wildlife lands through the year 2008.

A very brief summary of the highlights of these reports follows. The project area contains one of the largest expanses of floodplain native plant communities in southeast Minnesota. These communities include floodplain forest, lowland hardwood forest, mixed emergent marsh, wet meadow, and calcareous fen. The calcareous fen occurs on the Cannon River only. Floodplain forest dominated by silver maple and emergent marsh dominated by river bulrush occupy large portions of the project area. Because flooding of the Vermillion River is relatively natural (without impoundments), the shallower wet meadow and lowland hardwood forest communities are present in this site but are absent to uncommon in much of the Mississippi River floodplain. Six relevé vegetation plots have been collected in floodplain habitats in the project area by Minnesota DNR ecologists, including 3 in floodplain forest and one each in lowland hardwood forest, emergent marsh, and willow swamp (Appendix B).

This area is one of the top four sites in the state for rare forest birds (Dunevitz 2001). It has the highest numbers of two special concern bird species in southeast Minnesota: red-shouldered hawks and cerulean warblers. It also provides important nesting and/or migratory habitat for peregrine falcons, bald eagles, and Acadian flycatchers, and includes a bald eagle winter roost site and two colonial nesting sites for great blue herons and great egrets. A total of 14 birds of conservation concern have been documented in the site by the Minnesota County Biological Survey (Table 2). In addition, peregrine falcons, which are state threatened and federally endangered, nest in nest-boxes nearby and use the project area for feeding. Area-sensitive rare forest birds have been documented throughout the project area (Figure 2). A total of 153 bird species have

been recorded as breeders or migrants in the project area (Appendix C) (Vermillion Bottoms – Lower Cannon River Important Bird Area Nomination, Minnesota DNR and Audubon Minnesota, in progress).

Table 2. ¹Bird Species of Conservation Concern in the Vermillion Bottoms – Lower Cannon River Area

	Common_name	Scientific_name	breeding	migration	2.a	2.b
	Acadian Flycatcher	<i>Empidonax virescens</i>	1		1	
	Bald Eagle	<i>Haliaeetus leucocephalus</i>	1		1	
	Canada Warbler	<i>Wilsonia canadensis</i>		1		1
	Cape May Warbler	<i>Dendroica tigrina</i>		1		1
	Cerulean Warbler	<i>Dendroica cerulea</i>	1		1	
	Connecticut Warbler	<i>Oporornis agilis</i>		1		1
	Golden-winged Warbler	<i>Vermivora chrysoptera</i>		1		1
	Least Bittern	<i>Ixobrychus exilis</i>	1			1
	Olive-sided Flycatcher	<i>Contopus cooperi</i>		1		1
	Prothonotary Warbler	<i>Protonotaria citrea</i>	1			1
	Red-headed Woodpecker	<i>Melanerpes erythrocephalus</i>	1			1
	Red-shouldered Hawk	<i>Buteo lineatus</i>	1		1	
	Wilson's Phalarope	<i>Phalaropus tricolor</i>		1	1	
	Wood Thrush	<i>Hylocichla mustelina</i>		1		1

2.a State-listed Endangered, Threatened or Special Concern species

2.b Species of conservation concern (meets IBA criteria)

The Public Land Survey (PLS) bearing tree data collected in the mid 1800s were reviewed to determine which trees were most common in the project area prior to most European settlement. The results are shown in Table 3. American elm, silver maple, ash (potentially including green, black and white ash), willow (species unknown) and bur oak were the most common species. It should be noted that this included Prairie Island, an upland sand/gravel “island” in the floodplain that supported bur oak/northern pin oak savanna and prairie. The most notable difference in today’s floodplain forest is the near absence of American elm, and the smaller amount of willow and bur oak.

¹ Birds of conservation concern are defined as those meeting Important Bird Area criteria. For more information, see http://www.audubon.org/bird/iba/iba_intro.html. Table modified from original table compiled by Steve Stucker, MCBS Ornithologist.

Table 3. Public Land Survey Bearing Trees in Project Area

Species	Number of trees
elm	51
maple	50
ash	40
willow	22
bur oak	17
hackberry	8
northern pin oak	3
linden	2
black walnut	1
white oak (may refer to bur oak)	1
cottonwood	1

Table 4. Management Unit Sizes

Unit Number	Size (acres)	Acres of Forest	¹ Primary Owner/Manager
1	4429	1639	DNR SNA, DNR WMA, USACE, private
2	4471	2400	DNR WMA, USACE
3	5925	1832	DNR WMA, USACE, PIIC
4	6436	2722	DNR WMA, USACE, DNR Forestry, Private (Red Wing Wildlife League)
5	2982	2362	DNR Forestry, SNA, private

¹ DNR: Department of Natural Resources; SNA: Scientific and Natural Area; WMA: Wildlife Management Area; USACE: US Army Corps of Engineers; PIIC: Prairie Island Indian Community

Management Issues, Goals and Actions

This section lists issues, goals, and actions developed by the members of this group. The group is in agreement that the completed maps and descriptions of desired future conditions for Pools 3 and 4 of the Mississippi River (River Resources Forum's Fish and Wildlife Work Group 2004) are appropriate for this area; they are reflected in the following goals. An overall goal for the project area is to manage for the natural range of variation of native plant communities, providing habitat for the full range of wildlife species native to these habitats. Specific management actions follow goal statements below.

Issue 1. Even-aged Forest

Much of the current floodplain forest is even-aged, between 50 and 70 years old, and dominated by silver maple. Since silver maple has a life span of about 125 years, it is expected that there will be massive tree canopy die-off 50 to 70 years from now, resulting in a more open canopy. These open sunny conditions are likely to result in a ground layer of reed canary grass, which is extremely aggressive and difficult to control, and which most likely will preclude successful floodplain tree seedling germination.

Goal 1. Maintain or increase the acreage of forested lands, with multiple age classes, in the project area

ACTIONS

- a) Divide the project area into five management units, each of which will have an overall goal for regeneration of floodplain forest and other native plant communities, so that there are enough age classes represented to mature forest stands continually into the future. Where needed in these units, forest regeneration will be promoted using a combination of vegetation management techniques including timber harvest, seeding, tree planting, and reed canary grass control as appropriate. A management unit map was developed that divides the project area into five units (Figure 4). These units include all ownerships, including private lands, although it is recognized that management decisions on private lands will be made by the landowners. They vary in size from 2,982 to 6,436 acres (Table 4). The units were drawn with ownership, stand age, and acreage of floodplain forest in mind. The management unit map will be revised as changes such as windstorms, exotic species invasions, and other disturbance events change the age classes or composition of the stands.
- b) Restore floodplain forest native plant communities or other communities appropriate to soil and landscape position to disturbed open areas such as croplands and reed canary grass monocultures.
- c) Explore ways to make the logging operations economically viable by utilizing forest products.

Issue 2. Reed Canary Grass Prevents Forest Regeneration

Several floodplain forests in the project area already have abundant reed canary grass dominating the ground layer (observed in recent field visits). Additionally, some former croplands have become near monocultures of reed canary grass. It is extremely difficult to eradicate reed canary grass once it is established.

Goal 1. Control reed canary grass.

ACTIONS

- a) Control reed canary grass using the most effective methods, so that natural regeneration of floodplain forest trees may occur, and so that the natural diversity of native floodplain forest ground layer plants will occur.

Issue 3. Reduced Habitat Diversity

There is reduced overall habitat variability compared to presettlement times. Under-represented floodplain community types on the current landscape include submergent marsh, wet meadow, and lowland hardwood forest. While swamp white oak forest is also not present in the project area today, there is no evidence that it was present this far north in presettlement times, though it does occur in Wabasha County along the Mississippi River. This overall habitat diversity loss has resulted from unnatural hydrology due to locks and dams, and from siltation in the backwaters of the larger rivers due to soil erosion from farms and developed areas along the tributary streams.

Goal 1. There should be increased amounts of wet meadow, lowland hardwood forest, and submergent marsh vegetation in the floodplain, and the full array of native plant communities on tributary streams and streambanks.

ACTIONS

- a) Restore under-represented native plant community types in appropriate sites in the project area. If it is determined that swamp white oak forests once occurred in the project area, determine whether a site that could support swamp this community type exists, and pursue a restoration project.
- b) Utilize cost-share restoration programs to restore natural vegetation to stream banks on the Vermillion, Mississippi and Cannon Rivers in the vicinity of the project area, and on smaller streams feeding into these rivers.

Goal 2. Large portions of Prairie Island should be restored to native oak savanna and prairie where there is landowner interest.

ACTIONS

- a) Continue to restore dry prairie and dry oak savanna plant communities on Prairie Island where landowners are interested and where feasible. These restoration sites should be monitored for wildlife use, particularly as breeding sites for declining grassland bird species.

Goal 3. Support watershed and conservation district programs that assist local governments and landowners in stabilizing slopes and protecting upland habitats.

ACTIONS

- a) Pursue funding for programs that reduce sedimentation and pollution from uplands and from smaller streams flowing into the Vermillion and Mississippi Rivers.

Issue 4. Forest Health

It is important that forests contain not only desirable canopy species, but the whole range of herbaceous and woody plant species in all structural classes that occur naturally in floodplain forests in this area. In addition, non-native pathogens such as Dutch elm disease have already impacted the species composition of these forests by greatly reducing the number of mature elms, and a number of other non-native pathogens and insects have the potential to reduce forest health. Non-native invasive plant species such as purple loosestrife, garlic mustard, creeping charlie, and common buckthorn also decrease native plant species diversity.

Goal 1. Patches of diverse, healthy floodplain forest with diverse native species-dominated groundlayers should be present in several different age classes to ensure that canopied forests will persist into the future.

ACTIONS

- a) Control non-native pathogens and non-native invasive plant species where possible.

Issue 5. Degraded Conditions for Forest Interior Birds

It is expected that conditions for floodplain birds will deteriorate as floodplain forests become more open-canopied (Knutson et al. 1996). Areas with large blocks of interior forest dominated by silver maple meet the needs of area-sensitive species, including red-shouldered hawks, cerulean warblers, Acadian flycatchers, cerulean warblers, prothonotary warblers, veerys, wood thrushes, pileated woodpeckers, and eastern wood peewees (Knutson et al. 1996; Kirsch in progress). This habitat is used by large numbers of migratory and resident birds. Large-scale logging or natural tree die-off may result in increased levels of cowbird nest parasitism and decreased reproductive success among forest birds. Scientists have developed a habitat model for cerulean warblers that can be used to create management guidelines for forest interior birds in the project area. Sustainable breeding populations of cerulean warblers in this region require >700 ha (1,730 acre) core blocks of mature, mesic hardwood forest, with low edge-to-area ratio within an approximately 4,000 ha (10,000 acre) matrix. The surrounding matrix should be >50% forested, with >25% mature forests and <15% hostile habitat such as grasslands or croplands (Knutson et al, 2001).

Goal 1. The 7,800 hectares (approximately 19,000 acres) of forest in the project area should be managed in such a way that breeding populations of cerulean warblers, red-shouldered hawks, and other forest interior birds can survive now and into the future. To meet this goal, there should be at least four closed canopy floodplain forest patches of at least 1,000 ha (2,500 acres), with widths and lengths at least 600 m (1/3 mile) to several kilometers (>1 mile) at all times. The matrix around these patches should be >50% forested, with >25% mature forest and <15% open habitat. Mature forests should have at least 70% canopy cover. The matrix between the mature forest patches will be a patchwork mosaic of different age classes, designed to ensure that this pattern will persist into the future. (It should be noted that forests on Scientific and Natural Areas will not be logged, and can be assumed to be places where older forests and natural processes will be allowed to occur). The presence of forest on bluffs adjacent to the floodplains should be taken into account when determining acreage of forest cover.

ACTIONS

- a) Prepare detailed adaptive forest regeneration plans for each management unit. As new information about effective management techniques becomes available, plans will be revised.
- b) Effective forest management techniques to date have involved small group selective cuts and small-patch clearcuts to mimic natural treefall gaps in consideration of the habitat needs of forest interior birds. These cautious approaches will continue to be used until research results indicate a better method of ensuring forest regeneration and maximizing forest interior habitat.

Goal 2. Healthy populations of birds native to these floodplain forests, especially the 14 species considered to be at risk, should thrive in these forests.

Goal 3. The area should be recognized by programs that support efforts to protect birds of conservation concern.

ACTIONS

- a) Identify the project area as an Important Bird Area (IBA) to involve birders in managing and monitoring the forest. Include the Audubon Society as a partner in implementing portions of this management plan, including protecting habitat and monitoring of important bird species. The DNR is in the process of nominating the project area as an IBA.
- b) Support designation of the project area as a Minnesota Bird Conservation Area (a designation bestowed by Minnesota Bird Conservation and Partners in Flight). The DNR is in the process of recommending this area to be designated as a priority project area for bird conservation within the Prairie Hardwood Transition Region (which covers most of SE MN). Designation would likely make projects higher priority for receiving federal grants relating to bird conservation, such as National Fish and Wildlife Foundation funds.

Issue 6. Fragmented Ownership

With fragmented ownership, it is hard to develop a consistent, landscape-based management plan, and forest stand data are generally not available from private lands.

Goal 1. Public land ownership should be consolidated through acquisition of fee title or conservation easements where private landowners are willing sellers, to decrease ownership fragmentation and improve ecologically based forest management.

ACTIONS

- a) Pursue acquisition of fee title or conservation easements of larger private land parcels where willing sellers exist and funds are available.
- b) Work with larger private landowners, educators and forestry plan preparers to develop forest stewardship plans that will be in keeping with management goals for the overall project area. Ensure landowners in the project area are knowledgeable about this plan.
- c) Implement the Forest Legacy Program in Goodhue County to provide federal funding for easements on forestlands.
- d) Pursue Landowner Incentive Program (LIP) grants for the Vermillion Bottoms area. This program is targeted toward interested private landowners with habitat for species at risk. Grants could be used for habitat restoration and management, including floodplain forest logging and restoration aimed at increasing age class diversity in the project area.

Issue 7. Missing Tree Species

There are fewer cottonwood and willow trees in floodplain forests than were present pre-lock and dam. These are pioneer species that become established on newly accreted islands or exposed sands and require sunlight. The current conditions of mostly close-canopied silver maple forests, tree mortality from prolonged flooding, the presence of reed canary grass, and few new areas of exposed substrate create few opportunities for these tree species. Other species that may be less common today than in former years include hackberry, green ash, black ash, swamp white oak, and American elm. Cottonwoods, swamp white oaks, and other tall trees are favored by bald eagles, great blue herons, and great egrets for roosting and nesting habitat. Cavity nesters such as woodpeckers and chickadees are especially dependent on old cottonwood trees.

Goal 1. There should be cottonwood, silver maple, peachleaf willow, green ash, black ash, American elm, hackberry, black willow, and possibly swamp white oak present in various age classes in appropriate places in floodplain forests.

ACTIONS

- a) Regenerate cottonwood and the other tree species listed above using plants and/or seeds in several places throughout the project area, mimicking natural succession where possible, with documentation of methods and monitoring of success. Place priority on regenerating cottonwoods in appropriate places.

Issue 8. Disturbed Hydrologic Regime

The Water Level Management Task Force (interagency task force working on water level drawdowns to improve fish and wildlife habitat on the Mississippi River) is evaluating drawdown options on Mississippi River Pools 1-10, including Pool 3. Summer drawdowns attempt to recreate a more natural hydrograph, and will help improve floodplain forest and aquatic vegetation diversity over time.

Goal 1. Hydrologic patterns more closely resemble those prior to locks and dams.

ACTIONS

- a) Use summer drawdowns to recreate a more natural hydrograph.
- b) Explore ways to restore natural hydrology in the project area through removal of structures where feasible and restoring natural stream meandering to smaller streams.

Issue 9. Proposed Increased Flow to Vermillion River

There is a proposal to increase flow from the Mississippi River to the Vermillion River in the Vermillion Bottoms area to create more effective fish passage at Truedale Slough, where passage is currently limited to a culvert. This will create a small amount of increased flow into the Vermillion River; it is expected that this will improve floodplain forest health, but effects on the forest should be considered when making the final decision.

Goal 1. To restore floodplain connectivity during low and moderate flow conditions between the Mississippi and Vermillion Rivers. Specific objectives include improving fish passage around Lock and Dam 3 during low to moderate flow conditions, designing flow discharges to maintain the natural bank - full channel dimensions of Truedale Slough and the Vermillion River, reducing water detention time in the Vermillion Bottoms to improve water quality and encourage aquatic plant growth, and improving flow conditions to reduce sedimentation rates.

ACTIONS

- a) Modify or replace the existing Truedale spot dike with a low-head, rock ramp structure.
- b) Monitor conditions to determine how well the project objectives have been attained.

Issue 10. Special Habitat Needs for Priority Wildlife Species

There are many wildlife species of conservation concern in the project area, including wood turtles, bald eagles, and woodpeckers, among others. The area contains significant nest colonies of great blue herons and great egrets. Twenty bird species found in Mississippi River floodplain forests are cavity nesters, including seven woodpecker species (Knutson et al 1996). Woodpeckers create nest holes for secondary cavity nesters, including species of concern such as the prothonotary warbler. It is important to ensure that standing dead trees (snags) of various sizes and tree species are present in the floodplain forest to provide habitat for these birds.

Goal 1. Wildlife species of conservation concern will be protected through appropriate management.

ACTIONS

- a) Implement Best Management Practices recommended by the DNR (Minnesota DNR 1985) and by the scientific literature, to protect habitat for priority wildlife species including:
 - Establish buffer zones (110 m, or 330 feet) with no logging around heron rookeries (breeding sites) and red-shouldered hawk nests
 - Use appropriate management actions at bald eagle breeding and wintering sites (Appendix A), including ¼ mile buffer zones with no logging around winter night roost sites.
 - Ensure that habitat for wood turtles is managed appropriately on the Cannon River (Appendix A).
- b) Common species of native wildlife will be considered and kept from becoming rare in the project area. Where compatible with other goals, take advantage of opportunities to enhance habitat for these species.

Issue 11. Need for Research

Current literature on floodplain forest dynamics and management are limited for the Upper Mississippi River. New research efforts should be encouraged to focus on the project area to provide decision support for management activities and a basis for adaptive management into the future.

Goal 1. Secure sufficient funding for research as needed to inform management decisions.

ACTIONS

- a) Form a committee to continue to research funding sources and write grant proposals.

Goal 2. Research will be conducted that informs how to best regenerate floodplain forests and maximize forest interior bird habitat.

ACTIONS

- a) Develop a floodplain forest regeneration study in the project area that includes planting seeds and seedlings of floodplain forest trees, control of reed canary grass and other competitors, and long-term monitoring of success. Preliminary results with 2 to 10 acre clear-cuts, leaving a number of snags for cavity-nesting birds, showed positive regeneration and generally positive effects on forest songbirds (Feavel 1987). Ensure the study includes replication, at least two levels of all treatments (such as different sized logged patches) and a control area.

Goal 3. Work with partners to encourage additional research that will help to answer the following research questions. They were gleaned from lists generated by various groups of scientists and resource managers working with Mississippi River floodplain forests, and modified by this working group:

- What is the current composition and age structure of all forest stands in the site?
- What are all the wildlife species that utilize habitats within the site?
- What are the larger scale relationships between the floodplain forest corridor and adjacent ecosystems? How are the flora and fauna within adjacent ecosystems affected by changes to the floodplain forest, and how are flora and fauna in the floodplain affected by changes to adjacent ecosystems?
- What were the characteristics of the floodplain forest and other floodplain native plant communities prior to construction of the locks and dams?
- How have the floodplain native plant communities changed since construction of the locks and dams? What were the causes?
- How did early human activities impact the floodplain habitats even before construction of the locks and dams?
- How have soils of the floodplain evolved over time? How quickly can and do they change?
- What can we expect the forest to look like in 25, 50, and 100 years without any active management?
- What are the ideal detailed desired future conditions for vegetation in the site?
- Can a model be developed to inform the options of native plant communities to restore on disturbed sites, given (in order of importance) elevation data at 0.5 feet resolution; flood frequency, duration, elevation, and season of occurrence; soil characteristics; water table data; and geomorphology?
- How does each tree native to floodplain forests in this site establish and survive under different hydrologic conditions, including flooding depth, duration, seasonal timing, and return frequency?
- How effective are various forest management techniques, including underplanting, shelterwood, and selective canopy removal, at achieving native tree species regeneration without undue competition from reed canary grass?
- What is the influence of impoundment on floodplain forests as compared to unimpounded large tributary rivers in the Upper Midwest?

Implementation of Management Actions

Implementation of the many actions identified in this plan will take a concerted effort of all of the partners involved in the plan's development, and other partners as well. The group that was involved in preparing this document agreed to:

- Meet on an annual basis to review the list of actions, exchange information on what has been accomplished, and plan the next year's activities. The first meeting will be held in fall of 2005.
- Form committees to address specific actions on an ongoing basis. Committees already formed are a Research Committee and a Land Acquisition Committee.
- Hold a meeting in conjunction with the Upper Mississippi River Conservation Committee's annual meeting in March 2005 to discuss research needs with additional partners and prepare to write research proposals to various granting agencies.
- Continue to keep partners informed in new initiatives and partnering opportunities via e-mail.

Specific management actions for the first year of implementation were identified at a January 6, 2005 meeting. The actions to be taken, along with project leads, were:

- Meet with the Red Wing Wildlife League, Prairie Island Indian Community, Xcel Energy, Izaak Walton League, and other active participants to present the plan and seek their help in implementation, spring 2005. **Lead: Terry Helbig**
- Finalize research and monitoring needs and seek funding. **Lead: Ann Pierce**
- Develop acquisition plan and seek funding. **Lead: Hannah Texler**
- Complete IBA Assessment. **Lead: Mark Martell**
- Implement habitat projects. **Lead: all**
- Develop regeneration plans for each unit. **Lead: site managers**
- Designate as MN Bird Conservation Area **Lead: Jamie Edwards**
- Pursue LIP funding **Lead: Ann Pierce**

Figure 1. Land Ownership in the Vermillion Bottoms and Lower Cannon River Area

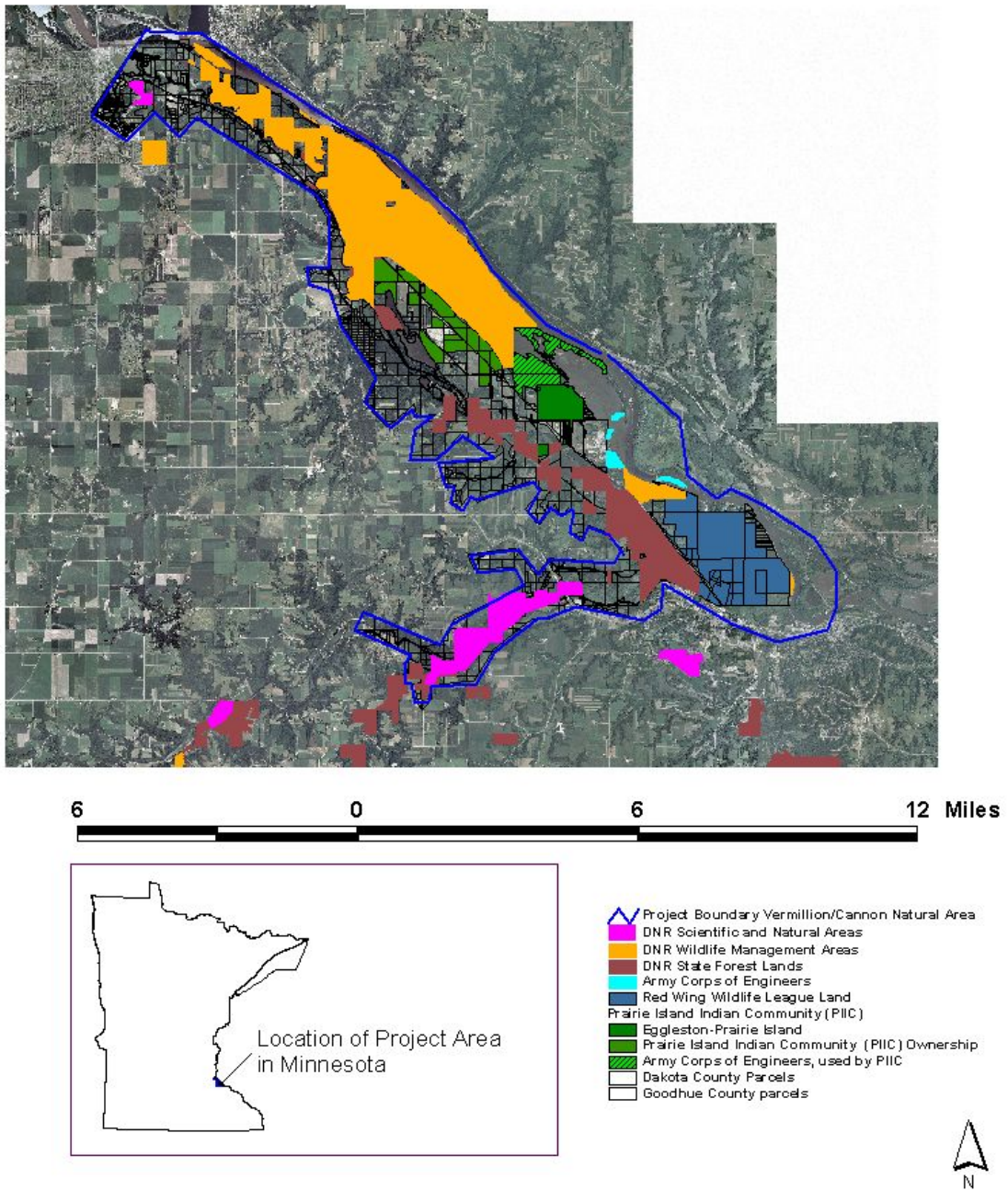
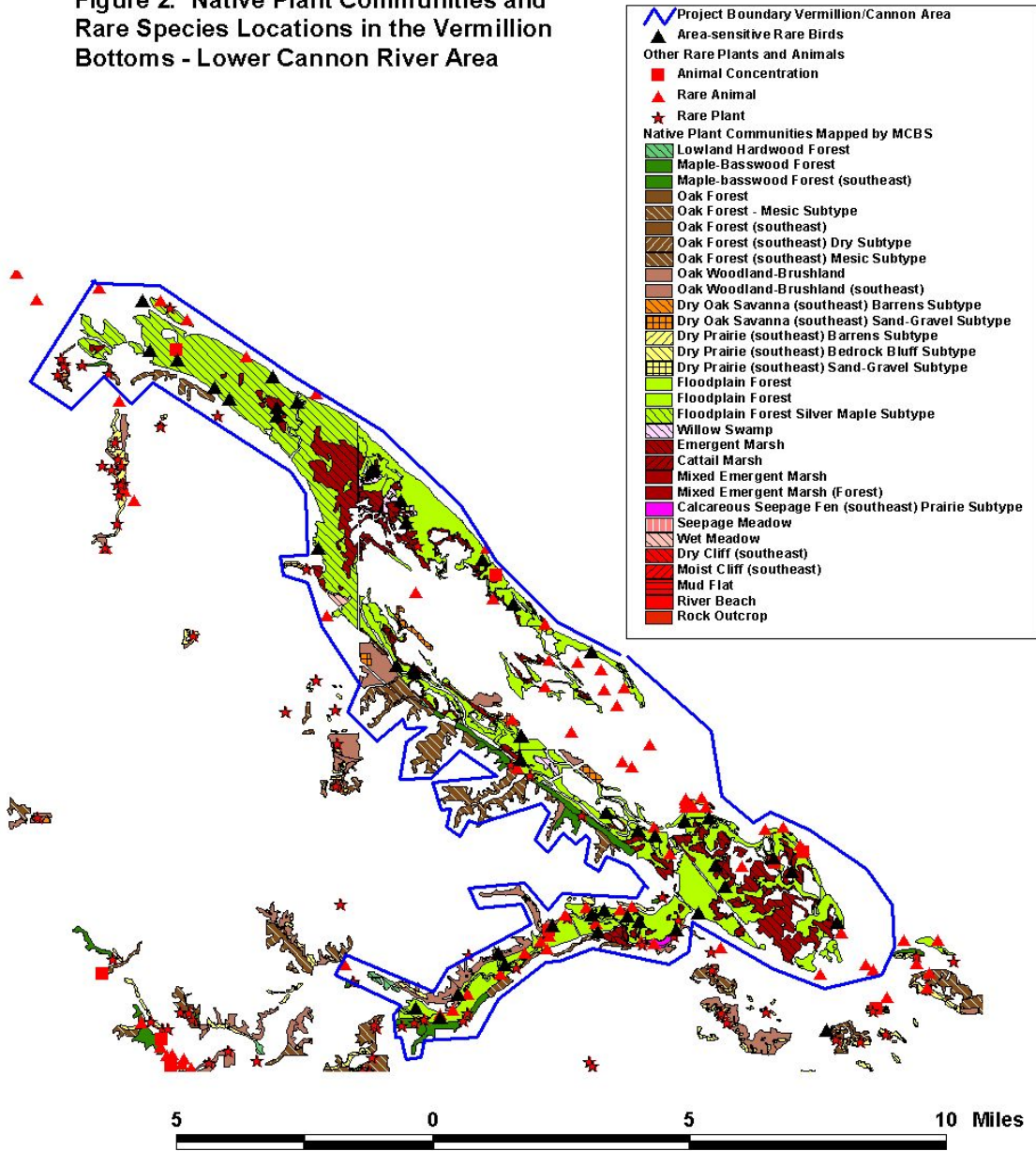
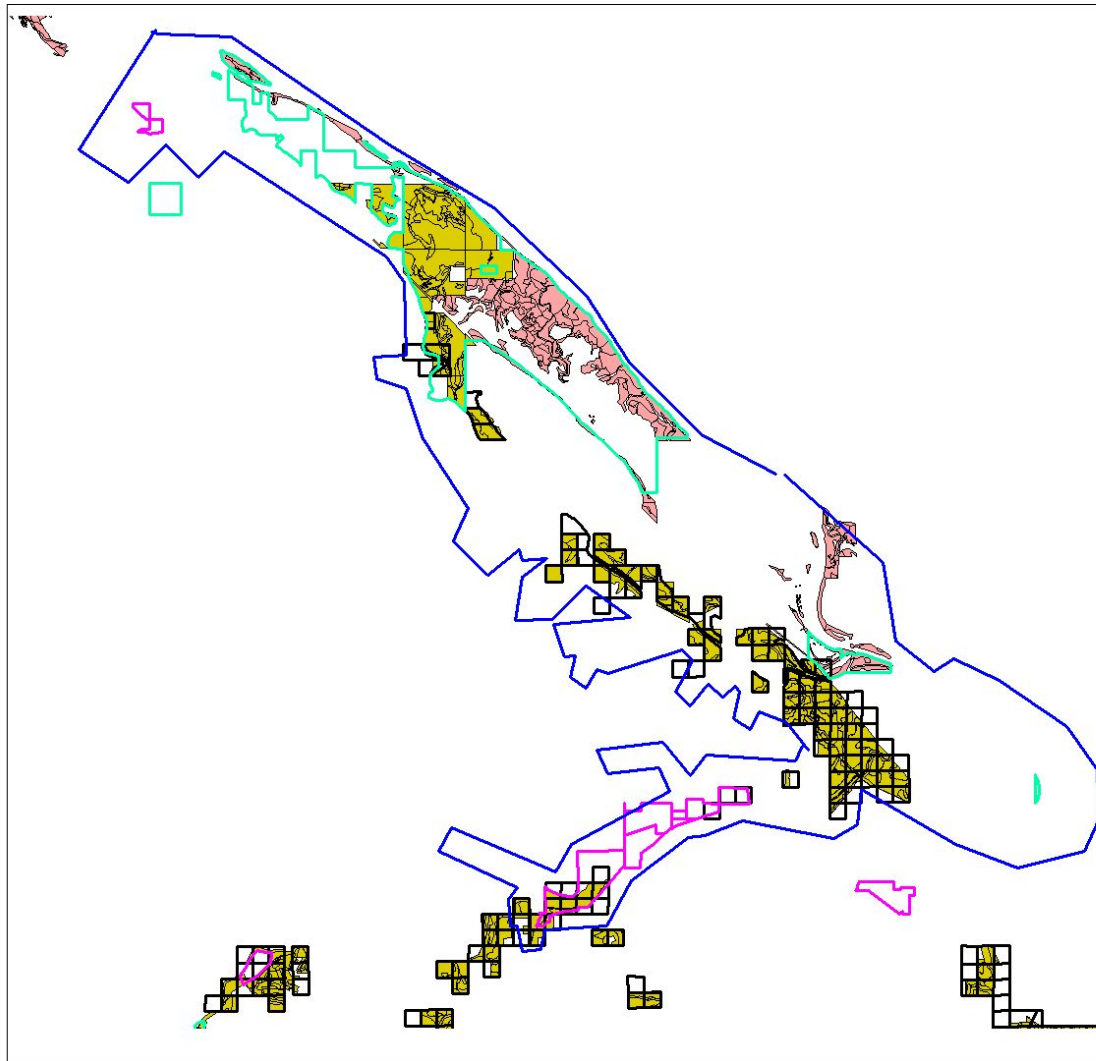


Figure 2. Native Plant Communities and Rare Species Locations in the Vermillion Bottoms - Lower Cannon River Area



Copyright 2004, State of Minnesota, Department of Natural Resources.
 Rare features data included here were provided by the Natural Heritage and Wetland
 Research Program of the Division of Ecological Services, Minnesota Department of
 Natural Resources (DNR), and were current as of July 26, 2004. These data are not
 based on an exhaustive inventory of the state. The lack of data for any geographic
 area shall not be construed to mean that no significant features are present.
 In addition, there may be inaccuracies in the data, of which the DNR is not aware and
 for which the DNR shall not be held responsible. Permission to use these data does not imply
 endorsement or approval by the DNR of any interpretations or products derived from the data.

Figure 3. Areas with DNR and Army Corps of Engineers Forest Stand Data










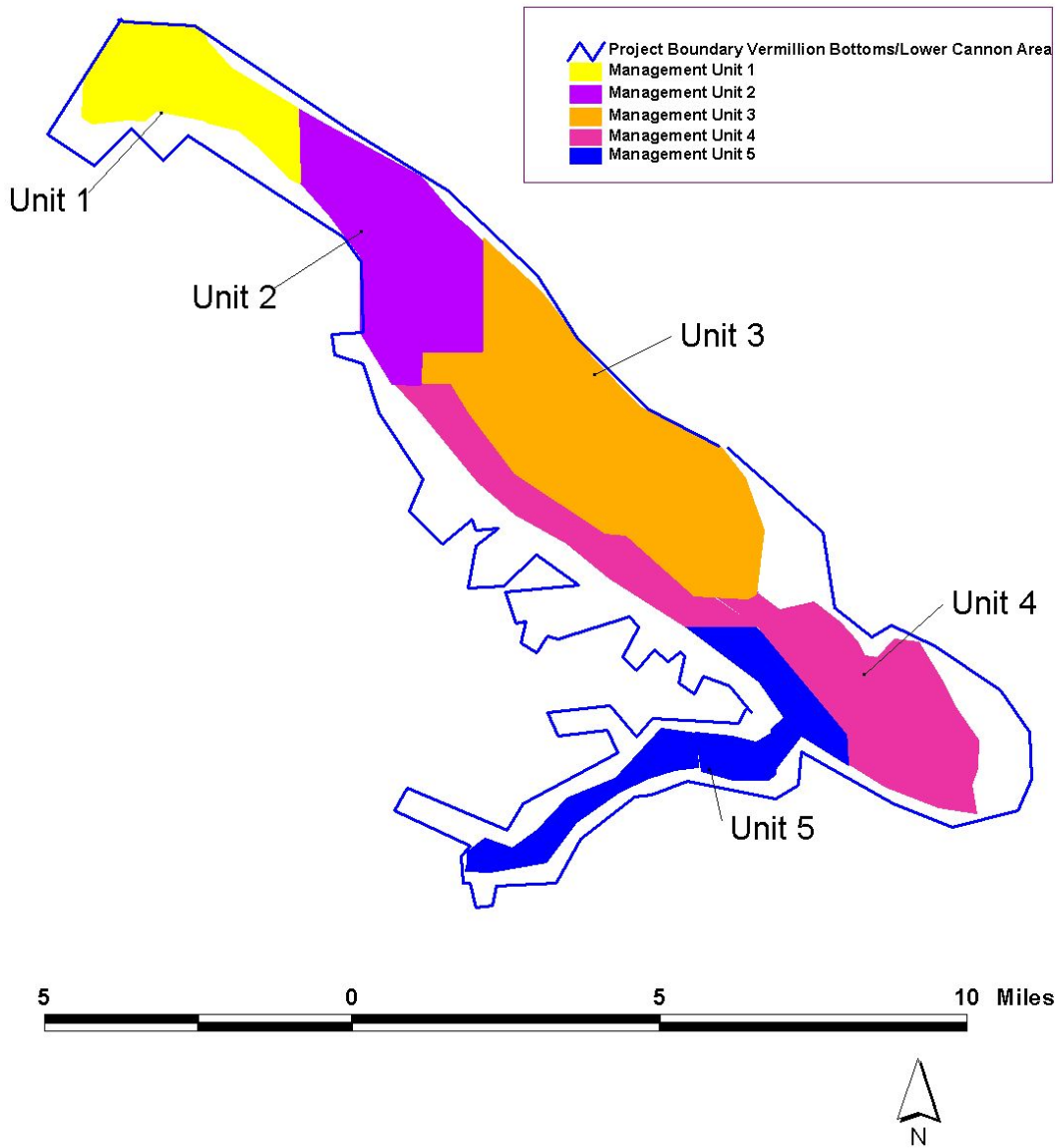
-  Project Boundary Vermilion Bottoms/Lower Cannon Area
-  DNR Wildlife Management Areas
-  DNR Scientific and Natural Areas
-  DNR Forestry Administered Lands
-  Pool 4 Army Corps data
-  Pool 3 Army Corps data
-  DNR Forest Inventory Module data

Figure 4. Management Units in the Vermillion Bottoms - Lower Cannon River Area



References

Dunevitz, H. 2001. An Evaluation of the Ecological Significance of the Vermillion Bottoms and Lower Cannon River Area. Unpublished report, Minnesota Department of Natural Resources.

Feavel, T. 1987. Breeding birds' response to clear cutting bottomland hardwoods. U.S. Army Corps of Engineers preliminary report. .

Helbig, T. 2002. Collischan Bottoms Plan (Vermillion Bottoms and Lower Cannon River Area). Unpublished report, Minnesota Department of Natural Resources. 18 pages.

Kirsch, E. In progress. Breeding birds in Upper Mississippi River floodplain forests; one habitat – one bird community.

Knutson, M.G., J.P. Hoover and E.E. Klaas. 1996. The importance of floodplain forests in the conservation and management of neotropical migratory birds in the Midwest. In: Thompson, F.R., III, ed. Management of Midwestern landscapes for the conservation of neotropical migratory birds, 1995. USFS North Central Forest Experiment Station, Gen. Tech. Rep. NC-187.

Knutson, M.G., G. Butcher, J. Fitzgerald, and J. Shieldcastle. 2001. Partners in Flight Bird Conservation Plan for the Upper Great Lakes Plain (Physiographic Area 16). USGS Upper Midwest Environmental Sciences Center in cooperation with Partners in Flight. La Crosse, Wisconsin.

Minnesota DNR. 1985. Forestry-Wildlife Guidelines to Habitat Management, 1985 Revision. Unpublished report, Minnesota Department of Natural Resources.

Minnesota DNR and Audubon Minnesota (in progress). Vermillion Bottoms – Lower Cannon River Important Bird Area Nomination. Unpublished report.

River Resources Forum's Fish and Wildlife Work Group. 2004. Environmental Pool Plans, Mississippi River, Pools 1-10.

Upper Mississippi River Conservation Committee. 2002. Upper Mississippi and Illinois River Floodplain Forests.

Wlosinski, J. and L. Wlosinski 2001. Predicting flood potential to assist reforestation for the Upper Mississippi River System. Upper Midwest Environmental Sciences Center, Project Status Report.

Appendix A. Management Guidelines for Species of Concern

I. Red-shouldered Hawk Preserve Selection, Design, and Management

Considerations. From Natureserve database (www.natureserve.org), October 6, 2004

Preserve Selection & Design Considerations: Much of the literature indicates the need for large stands of forest for maintenance of breeding hawks. Bednarz and Dinsmore (1981) stated that red-shoulders needed a minimum of 250 ha of forest area for breeding in floodplain habitats. In most areas seem to need tracts of at least 100-250 ha (but may use smaller forest patch if it is part of a larger forested ecosystem) (Bushman and Therres 1988). Generally replaced by the red-tailed hawk in fragmented open forests. Bryant (1986), however, found that even in small woodlots of less than 5 ha red-shoulders were not replaced by red-tailed hawks when mature canopy structure was retained. Average size of woodlots occupied by red-shoulders in his southern Ontario study was only 17.5 ha. The necessary size of woodlot is clearly an issue that needs to be resolved. If large tracts are generally necessary, this requirement limits the potential for private land to provide refugia for this species. This is especially true in areas where urban or suburban development pressures are extreme. The large blocks of both upland and wetland forest in state and federal ownership in many states are therefore the most likely sites for the hawk. Reversion of abandoned farmland to forest offers potential future sites for reestablishment or expansion of present populations.

Management Requirements: While the urgency of special management is at present uneven across its range, over the long-run the requirement for mature forest habitat will continue to place it in jeopardy. Unless forest management plans take into account the special needs of the species, it is likely that the next round of forest harvest will impact hawks at least as severely as the first round. Starting from the current depressed populations, this could easily lead to the extirpation of this species from some regions. Management involves the management of both habitat and people. These procedures generally follow those for other forest-interior breeding birds (Bushman and Therres 1988), and recent management suggestions for the red-shouldered hawk specifically (Hands et al. 1989).

Timber practices have a significant impact on populations. Bednarz and Dinsmore (1981) maintained that tree densities on the order of 150 to 400 trees per acre are desirable. For the northeastern U.S., Peterson and Crocoll (1992) stated that selective cutting that creates small openings in large forest stands may be the best habitat management treatment. Robinson (1991) stated that uneven-age management with small clearings in bottomlands is best. However, too much selective cutting in woodlots may result in replacement of this species by red-tailed hawk. Group selection or standard selection cutting results in small openings scattered throughout a canopy of large overstory hardwoods (Nelson and Titus 1989) with an approximately 70% crown closure (Bushman and Therres 1988). Bryant (1986) theorized that managing for a crown closure of greater than 70% should prevent red-tailed hawks from displacing red-shouldered hawks. However, there is disagreement on the value of small clearings and the best structure of

forests. Some studies show that small clearings benefit red-tailed hawks more than red-shoulders (Hands et al. 1989). Ebberts (1989) found that of two areas studied, the one with higher recruitment had taller nest trees, higher density and dominance indices; in other words, more mature forest structure. The latter study did not present forest structure in terms of canopy closure, but did present data showing that wetland openings averaged only 3% of habitat within a 1-km radius of 30 nest sites in northern Lower Michigan. Although no definitive management recommendations can yet be made, research suggests that establishment and maintenance of mature to overmature bottomland stands of at least 250 ha with > 70% crown closure, appropriately shaped nest trees, and open wetland inclusions should be the goal of red-shouldered management.

In active nesting areas, human use and passage should be minimized or prohibited during nesting season (approximately March through July for the northern range). Disturbances in the nesting territory should be minimized until the young are at least two weeks old (Bushman and Therres 1988). The best size for an undisturbed buffer zone around nest sites is not well documented. Recorded distances between nests and human use areas range from 69 to 840 m. Evers (1992) recommended that a distance of at least 300 ft from the nest should be kept free from human disturbance.

The Allegheny National Forest Land and Resource Management Plan contains guidelines for protecting raptor nests which Nelson and Titus (1989) contended would be useful for managing hawks. These include minimizing disturbances near nest sites, reducing habitat change and closing roads to public use during the breeding season. More details can be found in Nelson and Titus (1989). These management procedures and programs work best as part of a cohesive whole, aimed at management of forest ecosystems, and accomplished through a combination of public relations and education, agency rules and regulations, and environmental laws.

States in the Northeast should each establish a restoration/recovery program, based upon state and regional needs. Recovery teams should work with landowners and foresters to assure that group selection or standard selection cutting is used to best preserve habitat during silvicultural activities.

II. Cerulean Warbler Preserve Selection, Design, and Management Considerations. From Natureserve database (www.natureserve.org), October 6, 2004

Preserve Selection & Design Considerations: Breeding populations in small forest tracts throughout the range are declining rapidly to extirpation. Populations in Wisconsin showed increasing size dependency in a study in which the largest habitat "island" was 40 ha (Gustafson 1985). Robbins et al. (1989) indicate that the probability of occurrence in Maryland study sites reached 50% of its greatest value when tract sizes were 700 ha or greater. Primary breeding habitat is large tracts of floodplain forest of tall, mature deciduous trees; rarely nests in forest tracts smaller than 250 ha (Robbins et al. 1992). In a study in western Tennessee bottomland hardwood forests, birds were not found in tracts less than 1,600 ha in extent (Robbins et al. 1992).

The implications of these results are that protection of land will only be possible in large tracts. These tracts must be at least 4,000 ha in extent and they should be arranged in such a way that a minimal perimeter distance occurs per unit area (Hamel 1992). No proof exists that the provision of such tracts, composed of suitable breeding habitats, will provide a secure future for the warbler as a breeder in the North American avifauna. However, there is ample evidence that failing to provide such tracts will result in a decidedly insecure future.

The location of breeding and wintering habitats of individual populations is unknown. Consequently, protection of breeding habitat for a particular population may afford no long-term security if its wintering ground is also not secure. Similarly, protection of a particular winter location may not afford security for the birds that winter there unless their breeding grounds are also secure. Establishment of a network of large preserves with extensive tracts of old forest, representing the breadth of both the breeding and wintering grounds, will most likely provide a potentially secure future.

Reserves are not necessarily incompatible with a variety of other low intensity land uses, including forest management, as long as the openings created by forest harvest activities are small. The definition of small is speculative, but probably is of the order of magnitude of a treefall gap rather than of an 8-ha clearcut patch. Thoughtful guidance for preserve design considerations is provided by Harris (1984) and Maser (1988).

A summary of recommendations for preserve design on the breeding grounds is (Hamel 1992): 1) Provide a network of large (at least 4,000 ha) compactly shaped reserves, each capable of providing habitat for 1,500 breeding pairs. 2) Distribute these reserves in such a way that they represent the breadth of the species' range in the middle Mississippi Valley, including particularly Ohio, Pennsylvania, West Virginia, Kentucky, Tennessee, Arkansas, Missouri, and Indiana. 3) Provide habitat in these and in other reserves such that compact, continuous, centrally located tracts of old forest are permitted to become established and persist on good soils in these and in other forest tracts.

On the wintering grounds, preserve design should include the following recommendations: 1) Establish a similar network of preserves in primary forest. Such

preserves will also likely be of considerable size, a size as yet undeterminable. 2) Distribute the preserves so that they encompass the breadth of the winter range.

Management Requirements: The management potential for populations of this species is unknown. Populations in large tracts in good habitat are apparently stable, suggesting that factors responsible for the decline are not operating uniformly everywhere. The persistent increase in the known range, particularly in the Northeast, suggests that management potential is good (Hamel 1992). If the cerulean warbler is a management priority, then habitat management consists of restricting timber harvest, preventing chemical contamination, and maintaining natural hydrology. Reforestation and protection of young trees on large, lowland tracts should provide future habitat (Hands et al. 1989). Young hardwoods adjacent to mature stands should also be protected from harvesting to ensure the availability of future habitat. Possible protection techniques include conservation easements on, and purchases of, large forest tracts. Lowland hardwood forests can be protected through enforcement of existing wetland-protection regulations (Robbins et al. 1992).

The fact that many known populations are already restricted to public land indicates that public land managers at the state and federal levels are primarily responsible for the bird's future. The tract size proposed by Hands et al. (1989) of 1,730 ac (700 ha) is a minimal estimate. Different studies in different areas have uniformly indicated that forest fragmentation is a significant issue in the protection. That the minimal tract size has varied from region to region in the range indicates that the land use context in different regions has a strong bearing on the operation of the forest fragmentation phenomenon as it affects warblers (Hamel 1992).

Current major land management activities that can be carried out include: 1) the provision of large tracts of old forest, in rich situations rather than in marginal soil types, at several locations throughout the range, and 2) forest management activities that are sensitive to the fragmentation of existing tracts. Forest management that mimics the gap phase succession of eastern deciduous forests will more likely provide a continuous supply of habitat than will even-aged management in large blocks (Hamel 1992).

III. Bald Eagle Guidelines

Environmental Review Fact Sheet Series

Endangered, Threatened, and Special Concern Species of Minnesota

Bald Eagle (*Haliaeetus leucocephalus*)

Minnesota Status: Special Concern

State rank¹:
S3

Federal Status: Threatened

Global Rank¹: G4

HABITAT

During the breeding season, the Bald Eagle typically inhabits forests near lakes and rivers where large trees are available for nesting. The nest trees are usually within 1 mile of water, and are often closer. In northern Minnesota, red or white pines in the supercanopy (taller than the surrounding forest) are often selected as nest trees, whereas in the central and southern part of the state, eagles choose large hardwoods such as aspen or cottonwood. In winter, Bald Eagles can be found in upland areas where game or carrion is available. However, it is most common for them to congregate along major rivers where open water remains (such as near dams or power plants), as these areas provide opportunities for obtaining their major food items, fish and waterfowl.

LIFE HISTORY

For the purpose of assessing the impacts of human activity on Bald Eagles, the nesting period can be broken into four segments, as detailed in the following table. The “wintering” season for Bald Eagles varies by latitude, but can generally be considered to be October 15th through March 15th (a period which includes spring and fall migration).

Nesting Period Segment	Dates for	
	Northern Minnesota*	Southern Minnesota*
Critical - Eagles are involved with courtship, egg-laying, and incubation.	March 15 th - May 15 th	Feb. 10 th - May 1 st
Moderately critical - Eagles are becoming physiologically conditioned for breeding (February/March), or newly hatched chicks require frequent brooding and feeding (May/June).	Feb. 15 th - March 15 th and May 15 th - June 15 th	Jan. 10 th - Feb. 10 th and May 1 st - June 1 st
Less critical - Eagle chicks are one month old to 1 week post-fledging.	June 15 th - Aug. 15 th	June 1 st - July 31 st
Non-critical - Most eagles are not regularly present at the nest site.	Aug. 15 th - Feb. 15 th	July 31 st - Jan. 10 th

*The state is arbitrarily divided into north and south by State Highway 210.

IMPACTS / THREATS / CAUSES OF DECLINE

- habitat loss
- human disturbance
- farm runoff and industrial pollution
- leg-hold traps
- management activities such as timber harvest and burning
- power lines and transmission structures (collisions, electrocutions)
- roads and bridges (vehicle collisions)
- lead poisoning (e.g. by lead shot ingested by eagles during feeding)
- shooting (in violation of state and federal law)
- contaminants and poisons (particularly organochlorine, organophosphorus, mercury and other heavy metals)

PROTECTION

Bald Eagles are protected under the Migratory Bird Treaty Act, and under the Bald and Golden Eagle Protection Act of 1940 and the Endangered Species Act of 1973, as amended, which prohibit the possession or taking of Bald Eagles, or their nests, eggs, or young. "Taking" is defined by the Endangered Species Act as to harass (i.e., create the likelihood of injury), harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. Prohibited activities include, for example, cutting down nest trees (at any time of the year), and intense human activity that is demonstrated to have caused adult eagles to abandon eggs or young in the nest. Possession permits may be issued by the U.S. Fish & Wildlife Service for Indian religious purposes, or for scientific or exhibition purposes of public museums, public scientific societies, or public zoological parks.

In addition, the National and Minnesota Environmental Protection Acts prevent certain actions which would cause significant adverse impacts to the environment (including destruction of habitat for listed species) if there is a reasonable alternative to the proposed action.

If you are uncertain whether a proposed action may take Bald Eagles or their nests, or if you for any reason cannot follow the recommendations below, contact USFWS Ecological Services at (612) 725-3548.

RECOMMENDATIONS FOR AVOIDING AND MINIMIZING IMPACTS

*These recommendations will be useful in avoiding or minimizing effects that may be caused by federal or non-federal actions, but **all federal actions that may affect bald eagles must also complete consultation with U.S. Fish and Wildlife Service under section 7 of the Endangered Species Act.** A federal action is any action that a federal agency funds, authorizes, or carries out. Contact the U.S. Fish and Wildlife Service at (612) 725-3548 for further information regarding section 7 consultation.*

WINTERING AREAS²

Bald Eagle wintering area habitat contains three main components: foraging (feeding) areas, daytime perching areas, and night roosts. Within these areas, eagles need to be protected from human disturbance, physical alterations of their habitat, environmental contaminants, and loss of food resources.

Foraging and Daytime Perching Areas: In Minnesota, winter foraging areas where Bald Eagles congregate are located primarily along major rivers. Daytime perches tend to be near these foraging areas. While eagles are present, buffer zones (areas within which there is no human activity) of at least 1/4 mile (400m) should be maintained around foraging areas where possible. Where this is impractical, human use should be avoided between sunrise and 10am, when Bald Eagle feeding activity is greatest. Buffer zones around daytime perches should be 1/8 to 1/4 mile (250m-400m). At foraging areas along rivers, trees within 100 ft. of the shore seem to be preferred as perches. Therefore, no trees greater than 12 in. diameter should be removed within 100 ft. (33m) of river banks or other foraging areas. Activities which have the potential to kill trees (such as livestock grazing and dumping of dredge spoil) should be avoided within foraging and perching areas. New road and bridge construction should be at least 2 mile from major foraging areas.

Night Roosts: Bald Eagles are more sensitive to disturbance at night roosts than at foraging and daytime perching areas. No logging, development, or road building should occur at any time in critical roosts. Critical roosts are defined as those used more than 14 nights per season by eagles from local breeding territories *or* more than 14 nights per season by more than 15 eagles *or* roosts which have been documented as active for 5 years or longer. A buffer zone of at least 1/4 mile (400m) should be maintained around night roosts, within which both low and high impact activities, including recreation, are restricted while the roost is in use. New road or bridge construction should be at least 1/5 mile from critical roosts.

NESTING AREAS

Studies show that Bald Eagles are vulnerable to human intrusion. The vulnerability varies with the type of disturbance and the particular eagle, as some individuals have become accustomed to human activity near their nests. However, because some eagles are easily disturbed, human contact with Bald Eagles should be avoided whenever possible, particularly during the critical segment of the nesting period. The following table, adapted from the Minnesota Department of Natural Resources (DNR) Management Guidelines for Bald Eagle Breeding Areas, and the Northern States Bald Eagle Recovery Plan, summarizes recommendations for protecting individual occupied and active nest sites.

If a nest is not occupied during the year in which the activity will occur, the recommendations for the Non-critical Nesting Period Segment may be used year-round. If a nest is abandoned (unused for more than 5 years and not being maintained by eagles), activities are only restricted within the Primary Zone. Whether a nest is occupied, unoccupied, or abandoned must be determined in consultation with a DNR Nongame Specialist (see contact numbers below the table) and the U.S. Fish and Wildlife Service (612-725-3548). Because eagles often rebuild nests that have been blown out of trees, in this situation activities are restricted within the Primary Zone for 3 years after the event. If the nest is not rebuilt, zone restrictions are removed.

<u>Activity</u>	<u>Nesting Period Segment</u>			
	Critical	Moderately	Less Critical	Non-critical
<u>Primary Zone:</u> (within 330 feet of the nest)				
Landscape Alteration ^a	avoid	avoid	avoid	avoid ^b
Construction (structures, trails, etc.) ^c	avoid	avoid	avoid	avoid ^b
Burning ^d	avoid	avoid	avoid	restrict/minimize ^b
Minor Forest	avoid	avoid	avoid	restrict/minimize ^b

Maintenance ^c				
Motorized Access	avoid ^f	avoid ^f	restrict/minimize ^b	restrict/minimize ^b
Human Entry	avoid ^f	avoid ^f	restrict/minimize ^b	restrict/minimize ^b
Low Flying Aircraft	avoid	avoid	no restrictions	no restrictions
Secondary Zone: (330 to 660 feet from the nest)				
Landscape Alteration ^a	avoid	avoid	avoid	restrict/minimize ^b
Construction (structures, trails, etc.)	avoid	avoid	restrict/minimize ^b	restrict/minimize ^b
Burning ^d	avoid	avoid	avoid	restrict/minimize ^b
Minor Forest Maintenance	avoid	avoid	no restrictions ^f	no restrictions ^g
Motorized Access	avoid ^f	restrict/minimize ^b	restrict/minimize ^b	no restrictions ^g
Human Entry	avoid ^f	restrict/minimize ^b	restrict/minimize ^b	no restrictions
Low Flying Aircraft	avoid	restrict/minimize ^b	no restrictions	no restrictions
Tertiary Zone: (660 feet to 1/4 mile from the nest - May extend up to 2 mile from the nest, if topography or vegetation permit a direct line of sight to the disturbance area.)				
Landscape Alteration ^a	avoid	avoid	avoid	no restrictions ^g
Burning ^d	avoid	avoid	avoid	restrict/minimize ^b
Other Activities (as listed above)	avoid ^f	no restrictions ^g	no restrictions ^g	no restrictions ^g

^a Landscape alteration includes activities such as clear cutting or land clearing, which result in significant changes in the landscape.

^b **Restrictions should be decided on a case by case basis**, based on type, extent, and duration of proposed activity, and sensitivity of individual eagle pairs. For assistance, contact your nearest DNR Nongame Specialist: Bemidji (218-755-2976); Grand Rapids (218-327-4267); Brainerd (218-828-2228); New Ulm (507-359-6033); Rochester (507-280-5070); St. Paul (651-297-2277).

^c For construction involving land clearing, see also recommendations for the “Landscape Alteration” activity.

^d *If burning can not be done within the non-critical nesting period segment, please contact your nearest DNR Nongame Specialist (see contact numbers above).*

^e Such as thinning of tree stands, pruning, and other like maintenance.

^f Some eagles have become habituated to human activity and can be tolerant of these activities, particularly if they were occurring regularly at the time the eagles began nesting. In these cases, complete avoidance of the activity may not be necessary. If you believe this is the case in your particular situation, contact your nearest Nongame Specialist (see contact numbers above).

^g However, the habitat should not be altered in ways that would make it unsuitable for future nesting.

REFERENCES

¹ Association for Biodiversity Information. “Heritage Status: Global, National, and Subnational Conservation Status Ranks.” NatureServe. Version 1.3 (9 April 2001).

<http://www.natureserve.org/ranking.htm> (15 April 2001).

Coffin, B., and L. Pfannmuller. 1988. Minnesota’s Endangered Flora and Fauna. University of Minnesota Press, Minneapolis, 473 pp.

Grier, J. W., J. B. Elder, F. J. Gramlich, N. F. Green, J. V. Kussman, J. E. Mathisen, and J. P. Mattsson. 1983. Northern States Bald Eagle Recovery Plan. U. S. Fish and Wildlife Service. 76 pages +appendices.

² Martell, M. 1992. Bald Eagle Winter Management Guidelines. Unpublished brochure, The Raptor Center, University of Minnesota, St. Paul, unpagged. August.

Compiled by the Minnesota Department of Natural Resources Natural Heritage and Nongame Research Program, Endangered Species Environmental Review Coordinator, 500 Lafayette Rd., Box 25, St. Paul, MN 55155/ 651-296-7863 June, 2003

IV. Wood Turtle Management Guidelines

Wood turtle – information from Wisconsin DNR fact sheet

<http://www.dnr.state.wi.us/org/land/er/factsheets/herps/wturtle.htm>

Habitat: Prefer lowland hardwood forests and open wet meadows associated with moderate to fast current streams and rivers with sand or gravel substrates. May forage in upland deciduous mesic forest and open meadows in summer. Use south facing sandy river banks or flat sandy soil openings adjacent to rivers for nesting sites, including gravel banks, roadsides, fields, and meadows. Hatchling and juveniles prefer alder thickets associated with shorelines and are considered critical habitat for this segment of the population.

Management Considerations: Threats include heavy bank erosion, increased small mammal populations (nest predators), water pollution, and vehicular traffic. Use of riprap on river banks may preclude access to nesting sites, and plantings in sandy soil openings and on river banks may destroy nesting sites by shading them out. Populations formerly reduced due to widespread collection by biological supply houses and the pet trade. Poaching still occurs with this species. Wood turtles have a strong association with clear water and may benefit from watershed management aimed at reducing erosion and sedimentation. This species is vulnerable to very heavy nest predation because of communal nesting behavior. Predation exclusions may prove successful in recovering this species. Electrical fencing has been somewhat effective when properly set up.

Stream bank brushing, especially when done along both shorelines and over long distances, strongly disfavors this species, especially the younger age classes.

Wood Turtle Preserve Selection, Design, and Management Considerations. From Natureserve database (www.natureserve.org), October 6, 2004

Preserve Selection & Design Considerations: Overall, land preservation is currently less important than regulatory protection from commercial collection for the pet trade. In the extreme southeastern portion of its range, land protection is of primary importance. In areas where human use conflicts with wood turtle needs, habitat protection should proceed. Preserve design should include protection of wooded stream corridors, nesting, feeding, basking, and overwintering sites, and an upland buffer would be necessary to include in preserve design. The size of the upland buffer would need to be determined from studies of local populations, since wood turtles vary considerably in home range size. Alternatively, a preserve could be fenced to prevent turtles from leaving the protected area, if adequate food, basking, nesting and hibernating sites were available within the preserve. Control of excessive nest predation should also be considered in preserve design. Finally, roads should not be placed close to and parallel to the stream, as adult mortality along roads is significant.

Garber (unpublished) suggested that populations with a minimum of 50 breeding adult females in a population might be viable.

Management Requirements: Because of low natural reproductive success, it is essential to respond to declining populations early. Habitat management could benefit this species in the portions of its range where human use and development are intense. Wood turtles are fairly tolerant of a variety of adjacent land uses. Any management compatible with maintenance of water quality, nesting and hibernating habitat, a reasonable food supply, and natural mortality levels, will be compatible with wood turtles.

Habitat improvement is probably best aimed at nesting, basking, and hibernating sites. Creation of openings in the woods along streams, where herbaceous vegetation and berries can thrive may be a necessary management activity in some areas. Maintenance of natural stream dynamics that create sand bars and islands, natural banks, and open sand shores, and restriction of intense human impact along rivers (restriction of designated campgrounds and access points), are probably the most critical foci of management. Some trout management practices, especially sand traps that remove sand and produce a gravelly stream bed, are counterproductive for wood turtles, which prefer sandy substrate.

Education is also an important management tool, especially on rivers that get heavy canoe use. Canoeists should be informed that this species is protected and should not be collected or used as a target for shooting.

In some areas, predator control would be of benefit. Management of habitat characteristics of adjacent uplands should be aimed at achieving a mixture of vegetation including forest-edge habitat without encouraging raccoon and skunk populations.

Appendix B. Relevé Vegetation Plot Data From Native Plant Communities in the Project Area

MINNESOTA NATURAL HERITAGE & NONGAME RESEARCH PROGRAM DNR RELEVÉ #: **3263**
Department of Natural Resources
500 Lafayette Road
St. Paul, Minnesota 55155
(651) 296-2835
2004 **15:59 Friday, OCTOBER 08,**

----- FINAL RELEVÉ REPORT FORM, MINNESOTA VEGETATION DATABASE ----

GENERAL INFORMATION

Surveyor's Relevé #: **GORE-1** EO Rec #: **0**
*Surveyor's ID Code: **JJH (Jason Husveth)**
Date: **14** Month: **AUG** Year: **1995** (e.g. 04 JUL 1993)
CBS Site #: **39** or Site Name: **Vermillion River Outlet**
DNR Ownership Code: **30 (Mn Dnr Wildlife (Wildlife Management Area))**
*NC Code: **FFXXXX (Floodplain Forest)**
Commun. Ranking in Relevé: Stand typical of Commun. Type: _ Relevé
typical of Stand: _

LOCATIONAL INFORMATION

State Code: **MN** *County Code: **19 (Dakota)**
Quad Codes DNR: **T18A** Universal: **44092F7 (Hastings)**
Township: **115N** (e.g. 143N) Range: **16W** (e.g. 32W)
QORT: **SW** QRT: **SE** of Section **31**
Latitude: **44 degrees, 42 minutes, 58 seconds** LL/GPS
registration:
Longitude: **92 degrees, 46 minutes, 27 seconds** *Accuracy: _
Marker: _

RELEVÉ INFORMATION

Relevé Size (sq. m.): **200** Elev. (ft.): **1348** Slope: **00LV** Slope
Position: _
*ECS Subsection: **0**
Minnesota Soil Atlas Mapping Unit:
*Geomorphic Unit:

Remarks: **Steep eroded bank of the Vermillion River.**

OTHER DATA COLLECTED

Soils: Forestry: o=old growth Water Chemistry:
Publication:
y=forestry
* = Variables with computerized code dictionaries (See Relevé Handbook)

Woody Broadleaf Deciduous, Height: 10-20m, Cover interrupted

3. Acer saccharinum (Silver maple, soft maple)
2. Fraxinus pennsylvanica (Green ash)

Woody Broadleaf Deciduous, Height: 2-5m, Cover barely present

1. Fraxinus pennsylvanica (Green ash)

Woody Broadleaf Deciduous, Height: .5-2m, Cover barely present

1. Acer negundo (Box elder)
1. Ulmus rubra (Red elm, slippery elm)
- +. Acer saccharinum (Silver maple, soft maple)
- +. Fraxinus pennsylvanica (Green ash)

Woody Broadleaf Deciduous, Height: .1-.5m, Cover rare

- 1. *Acer saccharinum* (Silver maple, soft maple)
- 1. *Ulmus rubra* (Red elm, slippery elm)
- +. *Fraxinus pennsylvanica* (Green ash)
- R. *Populus deltoides* (Cottonwood)

Woody Broadleaf Deciduous, Height: .0-.1m, Cover barely present

- 1. *Ulmus rubra* (Red elm, slippery elm)
- +. *Acer saccharinum* (Silver maple, soft maple)

Climber, Height: 2-5m, Cover barely present

- NON 1. *Vitis riparia* (Wild grape)

Climber, Height: .0-2m, Cover rare

- NON 1. *Vitis riparia* (Wild grape)
- +. *Menispermum canadense* (Canada moonseed)
 - +. *Smilax hispida* (Green-briar)

Forb, Height: .0-.5m, Cover barely present

- 3. Unknown or Indeterminable Plant
- 2. *Pilea pumila* (Clearweed)
- 1. *Acalypha rhomboidea* (Three-sided mercury)
- 1. *Amaranthus* (Amaranth)
- 1. *Laportea canadensis* (Wood nettle)
- 1. *Lycopus americanus* (Cut-leaved bugleweed)
- 1. *Mentha arvensis* (Common mint)
- 1. *Oxalis stricta* (Yellow wood-sorrel)
- 1. *Physalis virginiana*
- 1. *Physostegia virginiana* (Obedient Plant)
- 1. *Rudbeckia laciniata* (Goldenglow)
- 1. *Rudbeckia laciniata* (Goldenglow)
- 1. *Sicyos angulatus* (Bur-cucumber)
- 1. *Solanum* (Nightshade)
- 1. *Stachys tenuifolia* (Rough hedge-nettle)
- +. *Bidens comosa* (Red-stemmed aster)
- +. *Bidens* (Bur-Marigold; Beggar-Ticks)
- +. *Helenium autumnale* (Sneezeweed)
- +. *Plantago rugelii* (Rugel's plantain)
- +. *Polygonum scandens* (False buckwheat)
- +. *Rumex stenophyllus* (Curly dock)
- +. *Scutellaria lateriflora* (Mad-dog skullcap)
- +. *Taraxacum officinale* (Common dandelion)
- +. *Urtica dioica* (Stinging nettle)
- +. *Verbena urticifolia* (White vervain)
- . *Solidago* (Goldenrod)

MINNESOTA NATURAL HERITAGE & NONGAME RESEARCH PROGRAM DNR RELEVE #:3264
Department of Natural Resources
500 Lafayette Road
St. Paul, Minnesota 55155
(651) 296-2835
2004

15:59 Friday, OCTOBER 08,

----- FINAL RELEVE REPORT FORM, MINNESOTA VEGETATION DATABASE ----

GENERAL INFORMATION

Surveyor's Releve #: GORE-2 EO Rec
#: 0
*Surveyor's ID Code: JJH (Jason Husveth)
Date: 14 Month: AUG Year: 1995 (e.g. 04 JUL 1993)
CBS Site #: 39 or Site Name: Vermillion River Outlet
DNR Ownership Code: 30 (Mn Dnr Wildlife (Wildlife Management Area))
*NC Code: FFXXXX (Floodplain Forest)
Commun. Ranking in Releve: Stand typical of Commun. Type:_ Releve
typical of Stand:_

LOCATIONAL INFORMATION

State Code: MN *County Code: 19 (Dakota)
Quad Codes DNR: T18A Universal: 44092F7 (Hastings)
Township: 115N (e.g. 143N) Range: 16W (e.g. 32W)
QORT: SW QRT: SE of Section 31
Latitude: 44 degrees, 43 minutes, 3 seconds LL/GPS
registration:
Longitude: 92 degrees, 46 minutes, 24 seconds *Accuracy: _
Marker: _

RELEVE INFORMATION

Releve Size (sq. m.): 400 Elev. (ft.): 0 Slope: 00LV Slope
Position: _
*ECS Subsection: 0
Minnesota Soil Atlas Mapping Unit:
*Geomorphic Unit:

Remarks: Floodplain site along the Vermillion River with steep banks
(~5m high)
at river's edge. Some silver maple dead.

OTHER DATA COLLECTED

Soils: Forestry: o=old growth Water Chemistry:
Publication:
y=forestry

* = Variables with computerized code dictionaries (See Releve Handbook)

Woody Broadleaf Deciduous, Height: 20-35m, Cover continuous
5. Acer saccharinum (Silver maple, soft maple)

Woody Broadleaf Deciduous, Height: 10-20m, Cover rare
2. Acer saccharinum DD (Silver maple, soft maple)
2. Ulmus americana DD (American elm)

Woody Broadleaf Deciduous, Height: .1-2m, Cover barely present
1. Acer saccharinum (Silver maple, soft maple)

Woody Broadleaf Deciduous, Height: .0-.1m, Cover barely present
+. Acer saccharinum (Silver maple, soft maple)
+. Acer saccharinum (Silver maple, soft maple)
+. Ulmus americana (American elm)

Graminoid, Height: .1-.5m, Cover barely present

1. *Leersia oryzoides* (Rice cut grass)

Forb, Height: .5-2m, Cover interrupted

4. *Laportea canadensis* (Wood nettle)

Forb, Height: .0-.5m, Cover continuous

3. *Pilea pumila* (Clearweed)
2. *Laportea canadensis* (Wood nettle)
1. *Bidens frondosa* (Leafy beggar-ticks)
1. *Echinocystis lobata* (Wild cucumber)
1. *Scutellaria lateriflora* (Mad-dog skullcap)
1. *Solanum ptycanthum* (Black nightshade)
1. Unknown or Indeterminable Plant
- +. *Sicyos angulatus* (Bur-cucumber)

MINNESOTA NATURAL HERITAGE & NONGAME RESEARCH PROGRAM DNR RELEVE #:6110
Department of Natural Resources
500 Lafayette Road
St. Paul, Minnesota 55155
(651) 296-2835
2004

15:59 Friday, OCTOBER 08,

----- FINAL RELEVE REPORT FORM, MINNESOTA VEGETATION DATABASE ----

GENERAL INFORMATION

Surveyor's Releve #: EO Rec
#: 13268
*Surveyor's ID Code: HLD (Hannah L. Dunevitz)
Date: 19 Month: JUN Year: 1996 (e.g. 04 JUL 1993)
CBS Site #: 139 or Site Name: Welch Goat Prairies
DNR Ownership Code: 00 (Private Ownership)
*NC Code: LHXXXX (Lowland Hardwood Forest)
Commun. Ranking in Releve: BC Stand typical of Commun. Type: _ Releve
typical of Stand: _

LOCATIONAL INFORMATION

State Code: MN *County Code: 25 (Goodhue)
Quad Codes DNR: T19C Universal: 44092E6 (Welch)
Township: 113N (e.g. 143N) Range: 16W (e.g. 32W)
QORT: SW QRT: NW of Section 27
Latitude: 44 degrees, 33 minutes, 56 seconds LL/GPS
registration:
Longitude: 92 degrees, 43 minutes, 40 seconds *Accuracy: _
Marker: _

RELEVE INFORMATION

Releve Size (sq. m.): 400 Elev. (ft.): 740 Slope: 00LV Slope
Position: _
*ECS Subsection: 0
Minnesota Soil Atlas Mapping Unit: A
*Geomorphic Unit: 40 (Red Wing-La Crescent Uplands)

Remarks: Forest on bench betwn bluffs & Cannon River. Freq standing
dead elms.
Interruptd canopy w/Celtis, Frax pens, Juglans nigra. In plot
canopy
Juglans nigra w/50 & 41cm dbhs. Occ lrg down logs. Silt soil

OTHER DATA COLLECTED

Soils: N Forestry: N o=old growth Water Chemistry: N
Publication: N
y=forestry
* = Variables with computerized code dictionaries (See Releve Handbook)

Woody Broadleaf Deciduous, Height: 35->35m, Cover patchy

3. Juglans nigra (Black walnut)

Woody Broadleaf Deciduous, Height: 20-35m, Cover interrupted

4. Acer negundo (Box elder)
2. Juglans nigra (Black walnut)
+. Ulmus rubra DD (Red elm, slippery elm)

Woody Broadleaf Deciduous, Height: 10-20m, Cover interrupted

4. Ulmus rubra (Red elm, slippery elm)
3. Acer negundo (Box elder)
2. Juglans nigra (Black walnut)

Woody Broadleaf Deciduous, Height: 5-10m, Cover rare

2. Celtis occidentalis (Hackberry)

2. *Ulmus rubra* (Red elm, slippery elm)

Climber, Height: .1-20m, Cover barely present

- NON 1. *Vitis riparia* (Wild grape)

Graminoid, Height: .5-2m, Cover barely present

- + *Elymus* cf. *villosus* (Wild-rye)
+ *Elymus* cf. *virginicus* (Wild-rye)

Forb, Height: .1-2m, Cover continuous

5. *Laportea canadensis* (Wood nettle)
4. *Rudbeckia laciniata* (Goldenglow)
3. *Galium aparine* (Cleavers)
2. *Cryptotaenia canadensis* (Honestwort)
2. *Osmorhiza longistylis* (Anise-root)
2. *Urtica dioica* (Stinging nettle)
1. *Hydrophyllum virginianum* (Virginia waterleaf)
1. *Impatiens* (Balsam; Jewelweed)
1. *Myosoton aquaticum* (Giant chickweed)
1. *Sanicula marilandica* (Black snakeroot)
NON + *Arabis laevigata* ## (Smooth rock-cress)
+ *Arctium minus* (Common burdock)
+ *Aster ontarionis* (Ontario aster)
+ *Teucrium canadense* (Germander)
R. Unknown or Indeterminable Plant

Forb, Height: .0-.1m, Cover interrupted

4. *Glechoma hederacea* (Creeping charlie)
2. *Cryptotaenia canadensis* (Honestwort)
2. *Pilea pumila* (Clearweed)
1. *Myosoton aquaticum* (Giant chickweed)
1. *Osmorhiza longistylis* (Anise-root)
+ *Ellisia nyctelea* (Ellisia)
+ *Hydrophyllum virginianum* (Virginia waterleaf)

Forb, Height: .1-2m, Cover continuous

- + *Amphicarpaea bracteata* (Hog-peanut)

Lichen/Moss, Height: .0-.1m, Cover rare

2. Unknown or Indeterminable Plant
1. Unknown or Indeterminable Plant

MINNESOTA NATURAL HERITAGE & NONGAME RESEARCH PROGRAM DNR RELEVE #:6688
Department of Natural Resources
500 Lafayette Road
St. Paul, Minnesota 55155
(651) 296-2835
2004

15:59 Friday, OCTOBER 08,

----- FINAL RELEVE REPORT FORM, MINNESOTA VEGETATION DATABASE ----

GENERAL INFORMATION

Surveyor's Relève #: _____ EO Rec #: 0
*Surveyor's ID Code: DAC (Hannah Dunevitz and Carmen Converse)
Date: 2 Month: SEP Year: 1994 (e.g. 04 JUL 1993)
CBS Site #: 39 or Site Name: Vermillion River Outlet
DNR Ownership Code: 20 (Mn Dnr Forestry (State Forest and Con-Con Land))
*NC Code: WSXXXX (Willow Swamp)
Commun. Ranking in Relève:A Stand typical of Commun. Type:_ Relève typical of Stand:_

LOCATIONAL INFORMATION

State Code: MN *County Code: 19 (Dakota)
Quad Codes DNR: T18A Universal: 44092F7 (Hastings)
Township: 115N (e.g. 143N) Range: 16W (e.g. 32W)
QORT: SE QRT: NW of Section 31
Latitude: 44 degrees, 43 minutes, 35 seconds LL/GPS
registration:
Longitude: 92 degrees, 47 minutes, 16 seconds *Accuracy: _
Marker: _

RELEVE INFORMATION

Relève Size (sq. m.): 100 Elev. (ft.): 670 Slope: 01NE Slope
Position: _
*ECS Subsection: 19 (Twin Cities Highlands)
Minnesota Soil Atlas Mapping Unit: A
*Geomorphic Unit: 29 (Mississippi Valley Outwash)

Remarks: Seasonally inundated pond. At present soil saturated. Soil is muck.
Slopes slightly toward middle of basin which has some standing water
Surrounded by floodplain forest.

OTHER DATA COLLECTED

Soils: Forestry: o=old growth Water Chemistry:
Publication: y=forestry
* = Variables with computerized code dictionaries (See Relève Handbook)

Woody Broadleaf Deciduous, Height: .0-.5m, Cover interrupted

- 4. Acer saccharinum (Silver maple, soft maple)
- 1. Populus deltoides (Cottonwood)
- +. Salix (Willow)
- +. Salix (Willow)

Graminoid, Height: .1-2m, Cover interrupted

- 4. Leersia oryzoides (Rice cut grass)
- 2. Cyperus erythrorhizos
- 1. Cyperus odoratus ##
- +. Echinochloa muricata (Barnyard grass)
- +. Scirpus fluviatilis (River bulrush)
- +. Scirpus validus (Softstem bulrush)
- +. Setaria ## (Bristly Foxtail-Grass)

Forb, Height: .0-2m, Cover continuous

- 4. *Polygonum coccineum* (Swamp smartweed)
- 2. UNKNOWN
- 1. *Bidens cernua* (Nodding bur-marigold)
- 1. *Bidens frondosa* ## (Leafy beggar-ticks)
- 1. *Rorippa islandica* ## (Yellow-cress)
- 1. *Sagittaria latifolia* (Broad-leaved arrowhead)
- +. *Aster ontarionis* ## (Ontario aster)
- +. *Lycopus americanus* (Cut-leaved bugleweed)
- +. *Mentha arvensis* (Common mint)
- +. *Pilea pumila* (Clearweed)
- +. *Rumex* (Dock; Sorrel)
- +. *Sagittaria rigida* (Sessile-fruited arrowhead)
- +. *Scutellaria* (Skullcap)
- +. *Scutellaria lateriflora* (Mad-dog skullcap)
- +. *Teucrium canadense* (Germander)
- +. *Xanthium strumarium* (Cocklebur)

Lichen/Moss, Height: .0-.1m, Cover barely present

- 1. Unknown or Indeterminable Plant

MINNESOTA NATURAL HERITAGE & NONGAME RESEARCH PROGRAM DNR RELEVE #:6689
Department of Natural Resources
500 Lafayette Road
St. Paul, Minnesota 55155
(651) 296-2835
2004

15:59 Friday, OCTOBER 08,

----- FINAL RELEVE REPORT FORM, MINNESOTA VEGETATION DATABASE ----

GENERAL INFORMATION

Surveyor's Relève #: EO Rec
#: 2842
*Surveyor's ID Code: HLD (Hannah L. Dunevitz)
Date: 16 Month: AUG Year: 1994 (e.g. 04 JUL 1993)
CBS Site #: 40 or Site Name: Mud Hen Lakes area
DNR Ownership Code: 30 (Mn Dnr Wildlife (Wildlife Management Area))
*NC Code: MEPRXX (Mixed Emergent Marsh (Prairie))
Commun. Ranking in Relève:A Stand typical of Commun. Type:_ Relève
typical of Stand:_

LOCATIONAL INFORMATION

State Code: MN *County Code: 19 (Dakota)
Quad Codes DNR: T19B Universal: 44092F6 (Diamond Bluff West)
Township: 114N (e.g. 143N) Range: 16W (e.g. 32W)
QORT: SE QRT: SE of Section 16
Latitude: 44 degrees, 40 minutes, 32 seconds LL/GPS
registration:
Longitude: 92 degrees, 44 minutes, 5 seconds *Accuracy: _
Marker: _

RELEVE INFORMATION

Relève Size (sq. m.): 100 Elev. (ft.): 670 Slope: 00LV Slope
Position: _
*ECS Subsection: 0
Minnesota Soil Atlas Mapping Unit: A
*Geomorphic Unit: 29 (Mississippi Valley Outwash)

Remarks: Soil muck. Plot is on east edge of Spring Banks Lake, in
narrow zone
(~15m), west of floodplain forest. Soil saturated. Small
stream just S
of the plot.

OTHER DATA COLLECTED

Soils: Forestry: o=old growth Water Chemistry:
Publication:
y=forestry

* = Variables with computerized code dictionaries (See Relève Handbook)

Graminoid, Height: .0-.5m, Cover continuous

- 4. Leersia oryzoides (Rice cut grass)
- 3. Scirpus fluviatilis (River bulrush)
- 1. Eleocharis cf. ovata ## (Spike-rush)
- 1. Scirpus validus (Softstem bulrush)
- 1. UNKNOWN
- +. Carex (Sedge)
- +. Cyperus (Nut-Grass; Umbrella-Sedge)
- +. Elymus virginicus (Wild-rye)

Forb, Height: .0-.5m, Cover rare

- 2. Bidens cernua (Nodding bur-marigold)
- 1. Polygonum coccineum (Swamp smartweed)
- 1. Sagittaria latifolia (Broad-leaved arrowhead)
- +. Lycopodium americanum (Cut-leaved bugleweed)

- +. *Polygonum lapathifolium* (Nodding smartweed)
- +. *Sium suave* (Water-parsnip)
- +. *Sparganium eurycarpum*

MINNESOTA NATURAL HERITAGE & NONGAME RESEARCH PROGRAM DNR RELEVE #:6690
Department of Natural Resources
500 Lafayette Road
St. Paul, Minnesota 55155
(651) 296-2835
2004

15:59 Friday, OCTOBER 08,

----- FINAL RELEVE REPORT FORM, MINNESOTA VEGETATION DATABASE ----

GENERAL INFORMATION

Surveyor's Releve #: EO Rec
#: 2843
*Surveyor's ID Code: HLD (Hannah L. Dunevitz)
Date: 16 Month: AUG Year: 1994 (e.g. 04 JUL 1993)
CBS Site #: 0 or Site Name:
DNR Ownership Code: 00 (Private Ownership)
*NC Code: FFXSM (Floodplain Forest Silver Maple Subtype)
Commun. Ranking in Releve: B Stand typical of Commun. Type: _ Releve
typical of Stand: _

LOCATIONAL INFORMATION

State Code: MN *County Code: 19 (Dakota)
Quad Codes DNR: T19B Universal: 44092F6 (Diamond Bluff West)
Township: 114N (e.g. 143N) Range: 16W (e.g. 32W)
QRT: SW QRT: NE of Section 21
Latitude: 44 degrees, 40 minutes, 8 seconds LL/GPS
registration:
Longitude: 92 degrees, 44 minutes, 28 seconds *Accuracy: _
Marker: _

RELEVE INFORMATION

Releve Size (sq. m.): 400 Elev. (ft.): 680 Slope: 00LV Slope
Position: _
*ECS Subsection: 0
Minnesota Soil Atlas Mapping Unit: A
*Geomorphic Unit: 29 (Mississippi Valley Outwash)

Remarks: Frequent old stumps. Canopy of multiple-stemmed silver maple,
dbh 31-
59cm, Soil alluvial (silt). Vermillion River floodplain. Woody
debris
from flooding common.

OTHER DATA COLLECTED

Soils: Forestry: o=old growth Water Chemistry:
Publication: y=forestry
* = Variables with computerized code dictionaries (See Releve Handbook)

Woody Broadleaf Deciduous, Height: 20-35m, Cover continuous
5. Acer saccharinum (Silver maple, soft maple)

Woody Broadleaf Deciduous, Height: 10-20m, Cover rare
2. Fraxinus pennsylvanica (Green ash)
2. Ulmus americana (American elm)
R. Ulmus americana DD (American elm)

Woody Broadleaf Deciduous, Height: 5-10m, Cover rare
2. Ulmus americana (American elm)

Woody Broadleaf Deciduous, Height: .1-.5m, Cover barely present
1. Fraxinus pennsylvanica (Green ash)

Woody Broadleaf Deciduous, Height: .0-.1m, Cover continuous

- 5. *Acer saccharinum* (Silver maple, soft maple)
- R. *Fraxinus pennsylvanica* (Green ash)
- R. *Ulmus americana* (American elm)

Climber, Height: .1-.5m, Cover rare

- 2. *Menispermum canadense* (Canada moonseed)
- NON 1. *Vitis riparia* (Wild grape)

Graminoid, Height: .0-.5m, Cover barely present

- 1. *Leersia oryzoides* (Rice cut grass)

Forb, Height: .0-.5m, Cover rare

- 2. *Laportea canadensis* (Wood nettle)
- 1. *Bidens frondosa* (Leafy beggar-ticks)
- +. *Aster ontarionis* (Ontario aster)
- +. *Echinocystis lobata* (Wild cucumber)
- +. *Pilea pumila* (Clearweed)
- NON +. *Polygonum hydropiperoides* ## (Mild water-pepper)
- +. *Rhus radicans*
- +. *Teucrium canadense* (Germander)

Appendix C. List of all bird species documented in the Vermillion Bottoms and Lower Cannon River Area (developed by Steve Stucker, Ornithologist, Minnesota County Biological Survey, Minnesota DNR)

Vermillion Bottoms - Lower Cannon River IBA (proposed) - bird list								[SPS: 12Jan2005]
Common_name	Scientific_name	MCBS	migration	2.a	2.b	SGCN	Remarks	
Greater White-fronted Goose	<i>Anser albifrons</i>			1			S.Stucker, unpublished data	
Snow Goose	<i>Chen caerulescens</i>			1			Karrow & Cooper 1980**	
Canada Goose	<i>Branta canadensis</i>			1			S.Stucker, unpublished data	
Tundra Swan	<i>Cygnus columbianus</i>			1			Karrow & Cooper 1980	
Wood Duck	<i>Aix sponsa</i>	1					MCBS breeding bird surveys 1990, 1993	
Gadwall	<i>Anas strepera</i>			1			S.Stucker, unpublished data	
American Wigeon	<i>Anas americana</i>			1			Karrow & Cooper 1980	
Mallard	<i>Anas platyrhynchos</i>	1					MCBS breeding bird surveys 1990, 1993	
Blue-winged Teal	<i>Anas discors</i>			1			S.Stucker, unpublished data	
Northern Shoveler	<i>Anas clypeata</i>			1			S.Stucker, unpublished data	
Northern Pintail	<i>Anas acuta</i>			1			Karrow & Cooper 1980	
Canvasback	<i>Aythya valisineria</i>			1			Karrow & Cooper 1980	
Redhead	<i>Aythya americana</i>			1			Karrow & Cooper 1980	
Ring-necked Duck	<i>Aythya collaris</i>			1			Karrow & Cooper 1980	
Lesser Scaup	<i>Aythya affinis</i>			1			Karrow & Cooper 1980	
Bufflehead	<i>Bucephala albeola</i>			1			Karrow & Cooper 1980	
Common Goldeneye	<i>Bucephala clangula</i>			1			Karrow & Cooper 1980	
Hooded Merganser	<i>Lophodytes cucullatus</i>	1					MCBS breeding bird surveys 1990, 1993	
Common Merganser	<i>Mergus merganser</i>			1			Karrow & Cooper 1980	
Red-breasted Merganser	<i>Mergus serrator</i>			1			Karrow & Cooper 1980	
Ruddy Duck	<i>Oxyura jamaicensis</i>			1			Karrow & Cooper 1980	
Ruffed Grouse	<i>Bonasa umbellus</i>			1			S.Stucker, unpublished data	
Double-crested Cormorant	<i>Phalacrocorax auritus</i>			1			S.Stucker, unpublished data	
Least Bittern	<i>Ixobrychus exilis</i>	1			1		1 MCBS breeding bird surveys 1990, 1993	
Great Blue Heron	<i>Ardea herodias</i>	1					MCBS breeding bird surveys 1990, 1993	
Great Egret	<i>Ardea alba</i>			1			S.Stucker, unpublished data	
Green Heron	<i>Butorides virescens</i>			1			S.Stucker, unpublished data	
Turkey Vulture	<i>Cathartes aura</i>			1			S.Stucker, unpublished data	
Bald Eagle	<i>Haliaeetus leucocephalus</i>	1			1		1 MCBS breeding bird surveys 1990, 1993	
Cooper's Hawk	<i>Accipiter cooperii</i>			1			S.Stucker, unpublished data	
Red-shouldered Hawk	<i>Buteo lineatus</i>	1			1		1 MCBS breeding bird surveys 1990, 1993	
Broad-winged Hawk	<i>Buteo platypterus</i>			1			S.Stucker, unpublished data	
Red-tailed Hawk	<i>Buteo jamaicensis</i>			1			S.Stucker, unpublished data	
Virginia Rail	<i>Rallus limicola</i>	1					1 MCBS breeding bird surveys 1990, 1993	
Sora	<i>Porzana carolina</i>			1			S.Stucker, unpublished data	
American Coot	<i>Fulica americana</i>			1			S.Stucker, unpublished data	
Black-bellied Plover	<i>Pluvialis squatarola</i>			1			S.Stucker, unpublished data	
Semipalmated Plover	<i>Charadrius semipalmatus</i>			1			S.Stucker, unpublished data	
Killdeer	<i>Charadrius vociferus</i>			1			S.Stucker, unpublished data	

Lesser Yellowlegs	<i>Tringa flavipes</i>	1		S.Stucker, unpublished data
Solitary Sandpiper	<i>Tringa solitaria</i>	1		S.Stucker, unpublished data
Willet	<i>Catoptrophorus semipalmatus</i>	1		S.Stucker, unpublished data
Spotted Sandpiper	<i>Actitis macularius</i>	1		S.Stucker, unpublished data
Semipalmated Sandpiper	<i>Calidris pusilla</i>	1		1 S.Stucker, unpublished data
Least Sandpiper	<i>Calidris minutilla</i>	1		S.Stucker, unpublished data
Pectoral Sandpiper	<i>Calidris melanotos</i>	1		S.Stucker, unpublished data
Dunlin	<i>Calidris alpina</i>	1		1 S.Stucker, unpublished data
Curlew Sandpiper	<i>Calidris ferruginea</i>	1		5/21/1994; first state record (The Loon)
Short-billed Dowitcher	<i>Limnodromus griseus</i>	1		S.Stucker, unpublished data
Wilson's Phalarope	<i>Phalaropus tricolor</i>	1	1	1 S.Stucker, unpublished data
Ring-billed Gull	<i>Larus delawarensis</i>	1		S.Stucker, unpublished data
Rock Pigeon	<i>Columba livia</i>	1		S.Stucker, unpublished data
Mourning Dove	<i>Zenaida macroura</i>	1		MCBS breeding bird surveys 1990, 1993
Yellow-billed Cuckoo	<i>Coccyzus americanus</i>	1		MCBS breeding bird surveys 1990, 1993
Great Horned Owl	<i>Bubo virginianus</i>	1		S.Stucker, unpublished data
Barred Owl	<i>Strix varia</i>	1		S.Stucker, unpublished data
Common Nighthawk	<i>Chordeiles minor</i>	1		1 S.Stucker, unpublished data
Ruby-throated Hummingbird	<i>Archilochus colubris</i>	1		S.Stucker, unpublished data
Belted Kingfisher	<i>Ceryle alcyon</i>	1		S.Stucker, unpublished data
Red-headed Woodpecker	<i>Melanerpes erythrocephalus</i>	1	1	1 MCBS breeding bird surveys 1990, 1993
Red-bellied Woodpecker	<i>Melanerpes carolinus</i>	1		MCBS breeding bird surveys 1990, 1993
Yellow-bellied Sapsucker	<i>Sphyrapicus varius</i>	1		1 MCBS breeding bird surveys 1990, 1993
Downy Woodpecker	<i>Picoides pubescens</i>	1		MCBS breeding bird surveys 1990, 1993
Hairy Woodpecker	<i>Picoides villosus</i>	1		MCBS breeding bird surveys 1990, 1993
Northern Flicker	<i>Colaptes auratus</i>	1		MCBS breeding bird surveys 1990, 1993
Pileated Woodpecker	<i>Dryocopus pileatus</i>	1		MCBS breeding bird surveys 1990, 1993
Olive-sided Flycatcher	<i>Contopus cooperi</i>	1	1	1 S.Stucker, unpublished data
Eastern Wood-Pewee	<i>Contopus virens</i>	1		1 MCBS breeding bird surveys 1990, 1993
Yellow-bellied Flycatcher	<i>Empidonax flaviventris</i>	1		S.Stucker, unpublished data
Acadian Flycatcher	<i>Empidonax virescens</i>	1	1	1 MCBS breeding bird surveys 1990, 1993
Least Flycatcher	<i>Empidonax minimus</i>	1		1 MCBS breeding bird surveys 1990, 1993
Eastern Phoebe	<i>Sayornis phoebe</i>	1		MCBS breeding bird surveys 1990, 1993
Great Crested Flycatcher	<i>Myiarchus crinitus</i>	1		MCBS breeding bird surveys 1990, 1993
Eastern Kingbird	<i>Tyrannus tyrannus</i>	1		S.Stucker, unpublished data
Yellow-throated Vireo	<i>Vireo flavifrons</i>	1		MCBS breeding bird surveys 1990, 1993
Blue-headed Vireo	<i>Vireo solitarius</i>	1		S.Stucker, unpublished data
Warbling Vireo	<i>Vireo gilvus</i>	1		MCBS breeding bird surveys 1990, 1993
Philadelphia Vireo	<i>Vireo philadelphicus</i>	1		S.Stucker, unpublished data
Red-eyed Vireo	<i>Vireo olivaceus</i>	1		MCBS breeding bird surveys 1990, 1993
Blue Jay	<i>Cyanocitta cristata</i>	1		MCBS breeding bird surveys 1990, 1993
American Crow	<i>Corvus brachyrhynchos</i>	1		MCBS breeding bird surveys 1990, 1993
Tree Swallow	<i>Tachycineta bicolor</i>	1		MCBS breeding bird surveys 1990, 1993
Northern Rough-winged Swallow	<i>Stelgidopteryx serripennis</i>	1		1 S.Stucker, unpublished data
Bank Swallow	<i>Riparia riparia</i>	1		S.Stucker, unpublished data

Barn Swallow	<i>Hirundo rustica</i>	1		MCBS breeding bird surveys 1990, 1993
Black-capped Chickadee	<i>Poecile atricapillus</i>	1		MCBS breeding bird surveys 1990, 1993
Red-breasted Nuthatch	<i>Sitta canadensis</i>		1	S.Stucker, unpublished data
White-breasted Nuthatch	<i>Sitta carolinensis</i>	1		MCBS breeding bird surveys 1990, 1993
Brown Creeper	<i>Certhia americana</i>	1		MCBS breeding bird surveys 1990, 1993
House Wren	<i>Troglodytes aedon</i>	1		MCBS breeding bird surveys 1990, 1993
Winter Wren	<i>Troglodytes troglodytes</i>		1	1 S.Stucker, unpublished data
Sedge Wren	<i>Cistothorus platensis</i>		1	1 S.Stucker, unpublished data
Ruby-crowned Kinglet	<i>Regulus calendula</i>		1	S.Stucker, unpublished data
Blue-gray Gnatcatcher	<i>Polioptila caerulea</i>	1		MCBS breeding bird surveys 1990, 1993
Eastern Bluebird	<i>Sialia sialis</i>		1	S.Stucker, unpublished data
Veery	<i>Catharus fuscescens</i>	1		1 MCBS breeding bird surveys 1990, 1993
Gray-cheeked Thrush	<i>Catharus minimus</i>		1	S.Stucker, unpublished data
Swainson's Thrush	<i>Catharus ustulatus</i>		1	S.Stucker, unpublished data
Wood Thrush	<i>Hylocichla mustelina</i>		1	1 S.Stucker, unpublished data
American Robin	<i>Turdus migratorius</i>	1		MCBS breeding bird surveys 1990, 1993
Gray Catbird	<i>Dumetella carolinensis</i>	1		MCBS breeding bird surveys 1990, 1993
Brown Thrasher	<i>Toxostoma rufum</i>		1	1 S.Stucker, unpublished data
European Starling	<i>Sturnus vulgaris</i>		1	S.Stucker, unpublished data
Cedar Waxwing	<i>Bombycilla cedrorum</i>	1		MCBS breeding bird surveys 1990, 1993
Blue-winged Warbler	<i>Vermivora pinus</i>		1	1 S.Stucker, unpublished data
Golden-winged Warbler	<i>Vermivora chrysoptera</i>		1	1 S.Stucker, unpublished data
Tennessee Warbler	<i>Vermivora peregrina</i>		1	S.Stucker, unpublished data
Orange-crowned Warbler	<i>Vermivora celata</i>		1	S.Stucker, unpublished data
Nashville Warbler	<i>Vermivora ruficapilla</i>		1	S.Stucker, unpublished data
Northern Parula	<i>Parula americana</i>		1	S.Stucker, unpublished data
Yellow Warbler	<i>Dendroica petechia</i>	1		MCBS breeding bird surveys 1990, 1993
Chestnut-sided Warbler	<i>Dendroica pensylvanica</i>		1	S.Stucker, unpublished data
Magnolia Warbler	<i>Dendroica magnolia</i>		1	S.Stucker, unpublished data
Cape May Warbler	<i>Dendroica tigrina</i>		1	1 S.Stucker, unpublished data
Yellow-rumped Warbler	<i>Dendroica coronata</i>		1	S.Stucker, unpublished data
Black-throated Green Warbler	<i>Dendroica virens</i>		1	S.Stucker, unpublished data
Blackburnian Warbler	<i>Dendroica fusca</i>		1	S.Stucker, unpublished data
Palm Warbler	<i>Dendroica palmarum</i>		1	S.Stucker, unpublished data
Bay-breasted Warbler	<i>Dendroica castanea</i>		1	1 S.Stucker, unpublished data
Blackpoll Warbler	<i>Dendroica striata</i>		1	S.Stucker, unpublished data
Cerulean Warbler	<i>Dendroica cerulea</i>	1	1	1 MCBS breeding bird surveys 1990, 1993
Black-and-white Warbler	<i>Mniotilta varia</i>		1	S.Stucker, unpublished data
American Redstart	<i>Setophaga ruticilla</i>	1		MCBS breeding bird surveys 1990, 1993
Prothonotary Warbler	<i>Protonotaria citrea</i>		1	1 MCBS breeding bird surveys 1990, 1993
Ovenbird	<i>Seiurus aurocapilla</i>		1	1 S.Stucker, unpublished data
Northern Waterthrush	<i>Seiurus noveboracensis</i>		1	S.Stucker, unpublished data
Connecticut Warbler	<i>Oporornis agilis</i>		1	1 S.Stucker, unpublished data
Mourning Warbler	<i>Oporornis philadelphicus</i>		1	S.Stucker, unpublished data
Common Yellowthroat	<i>Geothlypis trichas</i>	1		MCBS breeding bird surveys 1990, 1993
Wilson's Warbler	<i>Wilsonia pusilla</i>		1	S.Stucker, unpublished data
Canada Warbler	<i>Wilsonia canadensis</i>		1	1 S.Stucker, unpublished data

Scarlet Tanager	<i>Piranga olivacea</i>	1				S.Stucker, unpublished data
Eastern Towhee	<i>Pipilo erythrophthalmus</i>	1				S.Stucker, unpublished data
Chipping Sparrow	<i>Spizella passerina</i>	1				S.Stucker, unpublished data
Field Sparrow	<i>Spizella pusilla</i>	1			1	S.Stucker, unpublished data
Vesper Sparrow	<i>Poocetes gramineus</i>	1				S.Stucker, unpublished data
Savannah Sparrow	<i>Passerculus sandwichensis</i>	1				S.Stucker, unpublished data
Song Sparrow	<i>Melospiza melodia</i>	1				MCBS breeding bird surveys 1990, 1993
Lincoln's Sparrow	<i>Melospiza lincolni</i>	1				S.Stucker, unpublished data
Swamp Sparrow	<i>Melospiza georgiana</i>	1			1	S.Stucker, unpublished data
White-throated Sparrow	<i>Zonotrichia albicollis</i>	1			1	S.Stucker, unpublished data
Northern Cardinal	<i>Cardinalis cardinalis</i>	1				MCBS breeding bird surveys 1990, 1993
Rose-breasted Grosbeak	<i>Pheucticus ludovicianus</i>	1			1	MCBS breeding bird surveys 1990, 1993
Indigo Bunting	<i>Passerina cyanea</i>	1				MCBS breeding bird surveys 1990, 1993
Red-winged Blackbird	<i>Agelaius phoeniceus</i>	1				MCBS breeding bird surveys 1990, 1993
Eastern Meadowlark	<i>Sturnella magna</i>	1			1	S.Stucker, unpublished data
Yellow-headed Blackbird	<i>Xanthocephalus xanthocephalus</i>	1				S.Stucker, unpublished data
Common Grackle	<i>Quiscalus quiscula</i>	1				MCBS breeding bird surveys 1990, 1993
Brown-headed Cowbird	<i>Molothrus ater</i>	1				MCBS breeding bird surveys 1990, 1993
Baltimore Oriole	<i>Icterus galbula</i>	1				MCBS breeding bird surveys 1990, 1993
House Finch	<i>Carpodacus mexicanus</i>	1			1	S.Stucker, unpublished data
American Goldfinch	<i>Carduelis tristis</i>	1				MCBS breeding bird surveys 1990, 1993
House Sparrow	<i>Passer domesticus</i>	1				MCBS breeding bird surveys 1990, 1993
	Total species found:	53	100	5	9	34
	Total species possible (in category):			28	32	94

State-listed (IBA Cons. Conc. & SGCN)

Conservation concern (IBA criteria)

species of greatest conservation need (Minnesota CWCS)

**Waterfowl Populations in the Prairie Island Area, Fall 1979 and Spring 1980 (Karrow, K.K., and J.A. Cooper. 1980)