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# INTERIM REPORT 1988



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*The Minnesota  
County Biological  
Survey is conducted  
by the Minnesota  
Department of  
Natural Resources'  
(DNR) Natural  
Heritage and  
Nongame Wildlife  
programs.*

*This two-year pilot  
project is funded by  
the Legislative  
Commission on  
Minnesota Resources  
(LCMR), The Nature  
Conservancy and the  
DNR's Natural  
Heritage and  
Nongame Wildlife  
programs.*

*Written by the Natural Heritage and Nongame Wildlife programs.  
Report design by Tom Dickson (DNR Division of Fish and Wildlife)  
Cover design by Elizabeth Longhurst.  
Cover photo by Richard Hamilton Smith.*

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## INTRODUCTION

**O**PPORTUNITIES TO PROTECT undisturbed natural environments and their wild species are rapidly being lost. Deforestation, destruction of wetlands, pollution of streams and groundwater, and degradation of native grasslands are depleting the nation's biological diversity at an alarming rate. The maintenance of biological diversity is a critical national issue that has generated widespread public attention.

Preserving biological diversity is essential for the proper functioning of natural ecosystems — the support systems for all living things. Healthy natural ecosystems buffer the effects of pollution, protect water quality, prevent soil erosion, improve land values, and provide opportunities for outdoor recreation. In addition, the species that make up biologically diverse areas are untapped reservoirs of genetic materials potentially useful in agriculture, medicine and industry. On many levels, biological diversity is basic to maintaining the quality of life we enjoy.

Recognizing the national urgency to take stock of its unique natural resources, the State of Minnesota has initiated the Minnesota County Biological Survey (MCBS). Conducted by the Department of Natural Resources' (DNR) Natural Heritage and Nongame Wildlife programs, the Survey systematically gathers ecological data, county-by-county, on sensitive natural habitats and rare plant and animal species in the state. Comprehensive biological data generated by the Survey has already proven to be a sound foundation for developing

Richard Hamilton Smith



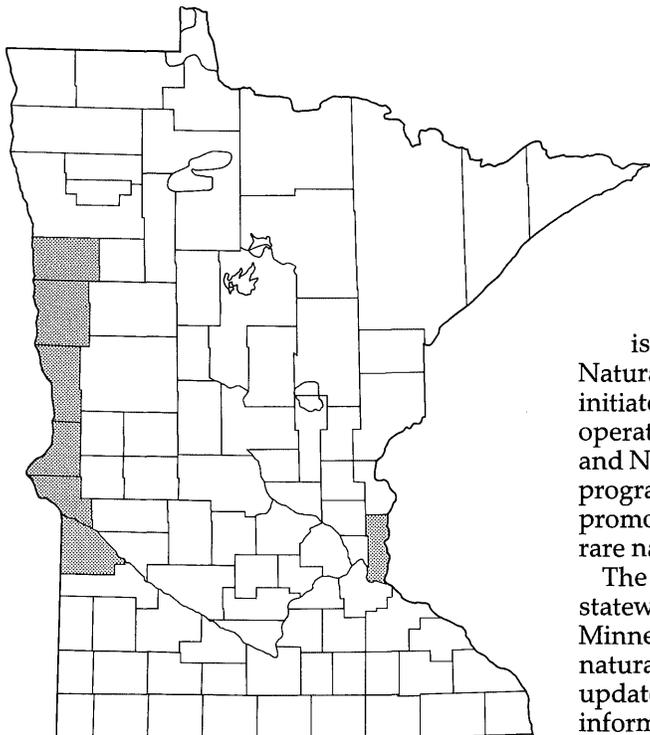
*Natural environments and their wild species, such as this remnant of native prairie in western Minnesota, are increasingly rare, making them the subject of intensive inventory efforts by the Minnesota County Biological Survey.*

clear conservation goals and strategies for maintaining and enhancing Minnesota's rare natural features. The Minnesota County Biological Survey is now a vital part of the Department's larger ongoing effort to inventory, protect and manage the rare and endangered elements of Minnesota's natural resources.

This report summarizes the objectives and procedures of the Minnesota County Biological Survey. It features the accomplishments of the first eight months of the Survey, and gives a preview of the objectives for 1988-89. ■

## OBJECTIVES

*The Minnesota County Biological Survey began its pilot phase (July, 1987 through June, 1989) in seven counties. These include six counties in western Minnesota — (from north to south on map) Norman, Clay, Wilkin, Traverse, Big Stone and Lac Qui Parle — and Washington County in the Twin Cities Metropolitan Area.*



**T**HE FUNDAMENTAL OBJECTIVE of the Minnesota County Biological Survey is to systematically identify locations of Minnesota's rare natural ecosystems and their component natural communities and species. Six counties in the western prairie region — Norman, Clay, Wilkin, Traverse, Big Stone and Lac Qui Parle — and Washington County in the Twin Cities Metropolitan Area have been selected for systematic inventory during the program's pilot phase, from July, 1987, through June, 1989. The rapid development and resultant loss of natural areas in the Metro area and the continued loss of native prairie habitat across the state were the prime reasons for selecting these counties.

All ecological information generated from the MCBS is entered into the Minnesota Natural Heritage Database. This database, initiated in 1979, is maintained and operated by the DNR's Natural Heritage and Nongame Wildlife programs. These programs conduct biological research and promote the stewardship of Minnesota's rare natural features.

The Natural Heritage Database is the only statewide repository of information on Minnesota's rare species and significant natural communities. This continuously updated storehouse of ecological information is made up of manual files, computerized datafiles and map files. Through the Natural Heritage and Nongame Wildlife programs, the information is made available to planners, land managers, private consultants and other decision makers.

Access to the database is invaluable during initial planning stages for new highways, utility corridors and other development projects; it provides early notification of potential natural resource conflicts and helps avoid inappropriate development. The database is used to guide public and private land purchases where protection of relatively undisturbed natural environments is the primary objective. In addition, it has proved critical to furthering ecological research and in promoting conservation education on Minnesota's endangered natural resources. ■

## PROCEDURES

**D**URING THE FIRST field season of the MCBS, efforts were concentrated on identifying *natural areas* — remnants of land that have escaped significant alteration by man. Natural areas represent what the Minnesota landscape looked like prior to European settlement in the 1850s. Such areas are made up of *natural communities* — distinctive groupings of native plants and animals living together under similar environmental conditions. In 1987, the MCBS inventoried the least-disturbed remaining forest, wetland and prairie natural communities. The Survey in 1988 will focus on locating individual rare plant and animal species that are associated with or dependent on these natural communities.

The MCBS has developed an efficient and cost-effective inventory procedure. It works on several levels, beginning with

interpretation of aerial photographs, followed by low-altitude aircraft surveys of selected tracts, and finally ground surveys of an even more focused selection of sites. The highest-priority natural area sites are intensively surveyed on the ground by field ecologists. Standardized evaluation forms are used to document the identity, condition, number and distribution of rare plant and animal species and natural community types found at each natural area. This ecological information is then added to the Minnesota Natural Heritage Database. ■



*Flying provides a rapid means of determining which sites merit ground survey. Field survey of the highest quality sites by trained biologists is crucial to the success of the Survey.*



*Using a stereoscope, MCBS staff can interpret aerial photographs and make preliminary selections of sites to be surveyed.*

## WASHINGTON COUNTY SURVEY

*Cedar Bend White Pines is one of the most diverse natural areas in Washington County. It contains a clear, spring-fed stream and steep ravines covered by pine/hardwood forests.*



MINNESOTA'S FIRST European settlers were attracted to the St. Croix River Valley and Washington County area because of the diversity and abundance of its natural resources. For generations, the biological diversity of the area's river system, timber and rich agricultural lands supported recreation, commerce, agriculture and industry.

In the last several years, however, as the Twin Cities Metropolitan Area has expanded, land use in Washington County has shifted dramatically from agricultural production to housing development. According to the *Star-Tribune*, more new lots in the county were proposed for construction during just three months of 1987 than in the entire year of 1986.

Planning and development decisions

### Results of the 1987 Survey

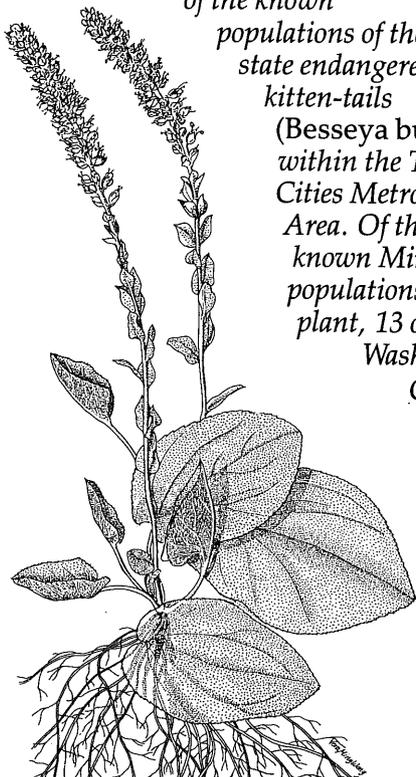
Washington County, despite its small size of 419 square miles, has a remarkable diversity of natural communities, such as bluff prairies, oak forests, pine-hardwood forests, marshes, and floodplain forests. Following more than a century of settlement and development, nearly all of these natural communities have been replaced; they are now extremely rare features on the landscape.

After reviewing existing records of biological data and aerial photographs of Washington County, MCBS biologists identified 210 sites for

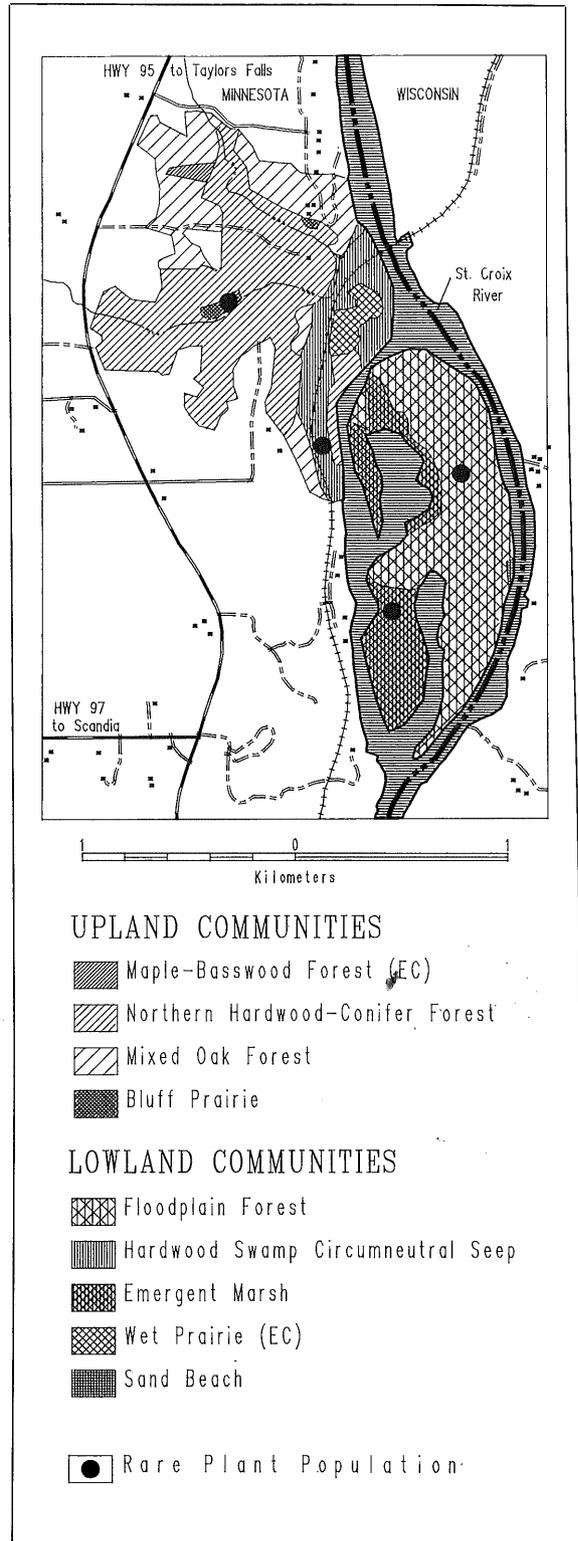
investigation. During the 1987 field season, 183 of these were surveyed for significant natural communities. From these sites, ecologists identified and recorded 87 occurrences of natural communities and 46 new populations of rare plant species. In addition, they collected 90 species of plants never before documented for Washington County. This information has been integrated into the state's resource planning process as described in the following section on Conservation Planning.

made during the next few years will be critical in determining the future of Washington County's natural areas. Should an area be developed for housing and industry, or should it be reserved for outdoor recreation, for research and education, or as a natural reservoir of genetic diversity? The answers to questions such as these need to be made using as much biological information about the county as possible. The Washington County Biological Survey is identifying the area's significant natural features — such as bluff prairie, mussel beds and wetland seeps — so that conservation and development planners can work together to direct the growth of the county while paying attention to important natural area sites. ■

*In Minnesota, most of the known populations of the state endangered kitten-tails (*Besseyia bullii*) lie within the Twin Cities Metropolitan Area. Of the 33 known Minnesota populations of this plant, 13 occur in Washington County.*



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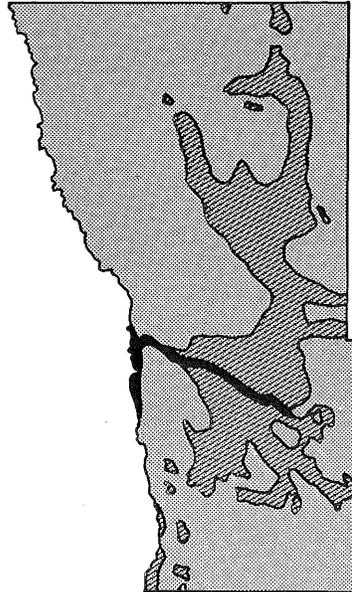


*By overlaying several kinds of maps in a computerized Geographical Information System, any number of customized maps can be produced to fulfill the particular needs of ecologists, park managers or development planners.*

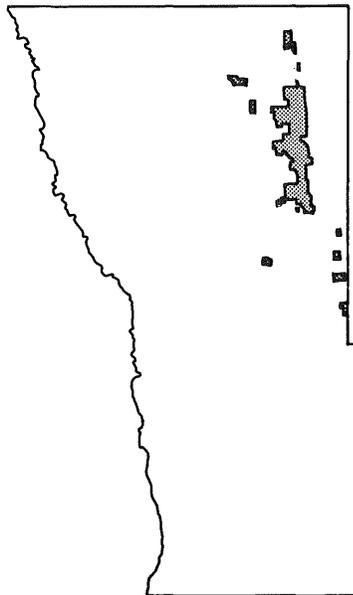
*This map of Cedar Bend White Pines is a composite of computer maps of streams, roads, rare natural features and houses.*

## WESTERN MINNESOTA SURVEY

*Wilkin County in the 1850s — the extent of native tallgrass prairie before intensive settlement. (Light gray areas represent dry prairie and savanna, medium gray areas represent wet prairie, and black indicates floodplain forest).*



*Wilkin County today — the total remaining native prairie habitat as determined by the Minnesota County Biological Survey. (Gray indicates remaining native prairie.)*



*The marbled godwit (Limosa fedoa), a characteristic prairie bird now rare in Minnesota due to the loss of prairie habitat.*

**T**HE PRIMARY geographic focus of the MCBS during its two-year pilot phase is western Minnesota — specifically the extreme western tier of counties: Lac Qui Parle, Big Stone, Traverse, Wilkin, Clay and Norman. These counties make up much of Minnesota's prairie region, and were selected because native prairie protection is a critical resource issue.

Over 99 percent of Minnesota's original 18 million acres of native prairie, or grassland, has been plowed under. The loss and deterioration of native prairie habitat has reduced the population and geographic distribution of many prairie species. Over 40 percent of the state's legally listed rare species live or grow in native prairie.

Many Minnesotans now recognize that prairies are a unique part of the state's historical and biological heritage. As a result, public policy now explicitly mandates the protection of prairies in Minnesota through a variety of legislation, such as the Minnesota Native Prairie Tax Credit Program (established in 1980), the Native Prairie Bank Program (1987), and the Prairie Landscape Reserve Program (1987).



In order to effectively carry out these conservation programs, resource agencies need comprehensive biological data on the location, extent and quality of existing native prairie. The MCBS is providing this information by establishing the total inventory of existing native prairie sites within the Survey counties.

### **The Prairie Counties**

In the 1850s, the natural landscape of the six-county Survey area was almost entirely covered by native prairie. The only woodlands were narrow corridors along the major rivers. After a century of settlement, however, the once-continuous prairie has been reduced to isolated remnants generally unsuitable for cultivation.

Some of the largest areas of existing native prairie in the state occur within the Survey counties located in the Red River Valley. The central part of the valley, due to its deep fertile soils, is nearly continuous cropland. However, toward the eastern margin of the valley, cultivation was inhibited by an undulating landscape of dry beach ridges and wet swales marking former glacial lake shorelines. Within this interbeach area, thousands of acres of prairie still exist as privately owned pastures and hayfields, or as public land.

Richard Hamilton Smith



*Native prairie in western Minnesota is critical habitat for numerous rare plant and animal species.*

## **Results of the 1987 Survey**

**I**nitial analysis of both aerial photography and past inventory records led to the identification of 548 potential native prairie tracts within the Survey counties. By the end of 1987, field survey data was available and organized in standard format for 457 sites. On these sites, MCBS biologists documented 192 occurrences of prairie natural communities and 189 populations of rare plant species. The

natural communities ranged from shortgrass prairies found on gravelly beachridges and sand dunes, to tallgrass prairies found on the deep, fertile soils of the lake plain and in low swales. Data on these occurrences of special ecological features is being used to initiate a series of conservation actions and recommendations (see Conservation Planning section). ■

# CONSERVATION PLANNING

**T**HE SYSTEMATIC COLLECTION of special ecological information in the seven MCBS counties has already resulted in better planning and management for land use in those areas. A total of 163 sites have been recommended for various levels of conservation protection and management such as acquisition, enrollment in voluntary land registry, and enrollment in prairie protection programs.

In addition to identifying these sites, the MCBS has created or been a part of many local and state planning projects.

## Washington County

The results of the MCBS for Washington County have been entered into the State Planning Agency's Geographic Information System. This computer-based system, located at the agency's Planning Information Center, allows planners and researchers to make effective use of the survey data. Information may be obtained in the form of reports, computer data files or maps. Survey data can also be combined with other information to produce tailor-made, site-specific maps useful in a

variety of planning and development projects.

Already, information gained from the MCBS has been used by the City of Mahtomedi, City of Afton Planning Commission, Washington County Parks, Metropolitan Council, DNR Division of Parks and Recreation, Wisconsin DNR, National Park Service and U.S. Fish and Wildlife Service.

Recommendations for conservation protection have been made for specific sites:

- 5 sites of outstanding natural area value recommended to the State Scientific and Natural Area Program and The Nature Conservancy as potential nature preserves;
- 10 sites recommended as candidates for The Nature Conservancy's private lands registry program;
- 3 sites on public land recommended for inclusion within the Scientific and Natural Area Program's public lands register.

## Western Counties

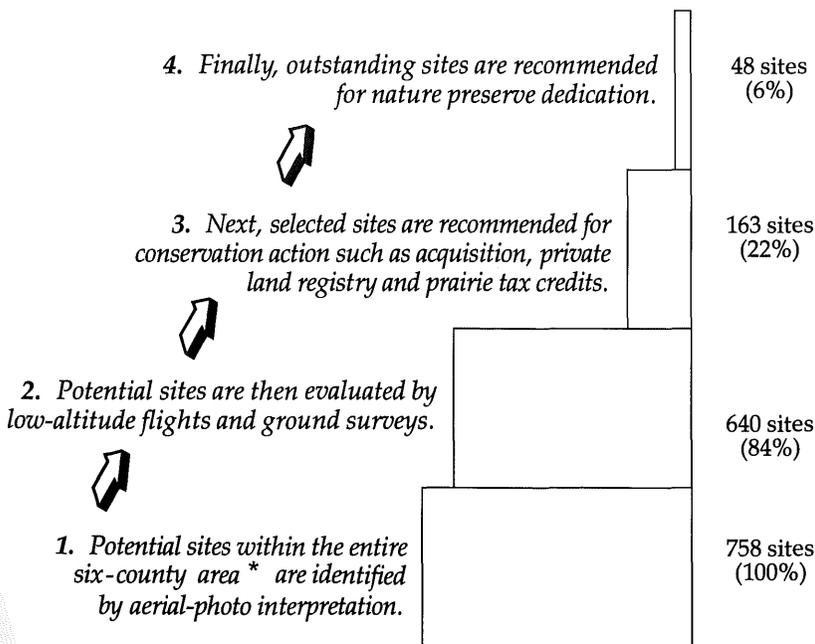
A series of county maps displaying all remaining native prairie habitat in five of the six survey counties has been produced (Big Stone County will not be surveyed until 1988). These maps and associated survey reports are being used to develop a wide range of prairie conservation plans. So far, the following measures have been taken:

- 59 sites identified as meeting the requirements for enrollment in the Native Prairie Tax Credit Program;
- 12 sites identified as meeting the requirements for enrollment in the Native Prairie Bank;
- 43 prairie tracts recommended to The Nature Conservancy and the State Scientific and Natural Area Program for acquisition as potential nature preserves, or as additions to existing preserves and publicly administered lands;
- 36 prairie sites identified as candidates for The Nature Conservancy's private lands registry program;
- 10 prairie tracts found on public land recommended for inclusion within the Scientific and Natural Area Program's public lands register;
- 4 landscape complexes identified as potential prairie landscape reserves. ■



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*Burrowing owl (Athene cunicularia) habitat in two counties is being assessed by use of satellite imagery interpretation and classification.*



\* Big Stone County will be surveyed in 1988.

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## EDUCATION

**T**HE MCBS IS HELPING the public better understand the importance of conserving biological diversity. Information from and about the MCBS is used statewide by agencies, organizations and small groups. Cooperative university research projects expand the perspective of the MCBS to include investigation of new concepts and procedures.

### Public Education

A display describing the Survey and a display from the Smithsonian Institution on biological diversity are being exhibited during special events at numerous locations throughout the state such as the Barlage Center for Science (Moorhead), Afton State Park and the Bell Museum of Natural History. In 1987, conservation groups used field trips to MCBS sites as part of their public education programs. Thirteen organizations, including Carpenter Nature Center, The Nature Conservancy, and the Lac Qui Parle County 4-H, sponsored trips to MCBS sites.

### Cooperative University Research

The MCBS is depending on the cooperation of academic institutions for a successful survey. Plant and animal specimens collected during the Survey are being stored in U of M repositories, and technical expertise is provided by university staff. In 1987, two special cooperative research projects were initiated.

The U of M's Remote Sensing Lab is investigating the use of satellite imagery and computerized classification — to assist in the identification of prairie and burrowing owl habitat in two counties.

Another research project, which began in 1988, will look at the relationship of grassland birds and various habitats within a large Wilkin County landscape area. ■

*Conservation education is the first step in developing awareness of the importance of biological diversity.*



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## FUTURE OF THE MCBS

**T**HE MINNESOTA COUNTY BIOLOGICAL SURVEY provides a cost-effective mechanism to comprehensively assess the status and distribution of the rarest elements of Minnesota's natural diversity. The identification of unique biological features in the six counties surveyed by the MCBS is being translated into conservation recommendations and actions.

The success and widespread support of the MCBS in its first year indicates that a systematic biological survey is needed in all of Minnesota's counties. Plans are now underway to expand the Survey into several additional counties in 1989, and with additional funding, the survey will continue to identify and assess the unique features of Minnesota's natural environment. ■



*"The quality of life in Minnesota is directly tied to the maintenance of its varied natural environment."*



Department of Natural Resources, Division  
of Fish and Wildlife, 500 Lafayette Road,  
St. Paul, MN 55155-4020; (612) 296-9782.