July 1, 1993

LCMR FINAL STATUS REPORT

I. Minnesota County Biological Survey - Wildlife 7

Program Manager: Carmen Converse
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A. M.L. 91, Chpt. 254, Art. 1, Sect. 14, Subd. 9.d

Appropriation: $ 1,000,000
Balance: $ 0

Minnesota County Biological Survey: This appropriation is from the Minnesota environment and natural resources trust fund to the commissioner of natural resources to continue the biological survey in Minnesota counties previously funded by Laws 1989, chapter 335, article 1, Section 29, subdivision 3. item (t).

B. Compatible Data: During the biennium ending June 30, 1993, the data collected by projects funded under this section that have common value for natural resource planning and management must conform to information architecture as defined in guidelines and standards adopted by the Information Policy Office. In addition, the data must be provided to and integrated with the Minnesota Land Management Information Center's geographic data bases with the integration costs borne by the activity receiving funding under this section.

D. Match Requirement: (not applicable)

II. Narrative

The Minnesota County Biological Survey (MCBS) was initiated in 1987 in response to the need to determine the status of biological diversity in Minnesota. MCBS continues to collect biological information on the distribution and status of rare plants, rare animals, and natural habitats. During FY92-93, Natural community surveys will be completed in thirteen counties, and the survey will begin in three new counties. Ecological data collected by MCBS is entered into the Natural Heritage Information Management System, Minnesota's most comprehensive repository of rare natural features information.

Information Management System enhancement, and production of reports and maps interpreting the results of survey efforts of the first 20 counties surveyed are the primary objectives of this biennium. These products will promote the use of survey results in environmental review, forest and wildlife planning, urban and recreational development, nature preserve acquisition, and public education.

III. Objectives

A. Collect Information on Minnesota's rare natural resources by using a systematic county-by-county inventory.

A.1 Narrative

Natural community field inventories will be completed in the thirteen counties where surveys began in 1989. Natural area surveys will begin in three new counties, including a northern forested county and a Mississippi River bluffland county.

A.2 Procedures

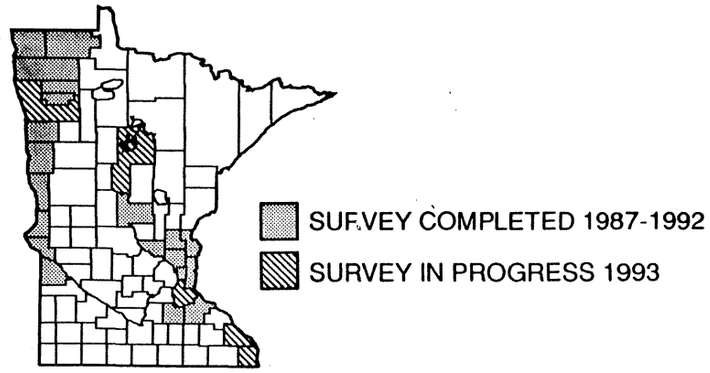
A multi-level survey process initiated in 1987 will be followed. This process begins the first year with interpretation of aerial photography and satellite imagery followed by aircraft and ground surveys to assess natural area and natural community quality and condition. Additional specialized techniques are used during the second and third years to survey selected rare species or groups of species (birds, mammals, reptiles and amphibians). As a part of the process, data is incorporated from other existing surveys such as phase II forest inventory, minerals surveys, wildlife habitat inventories, metropolitan parks surveys, soil surveys and geographic files stored at LMIC.

A.3 Budget

a. Amount Budgeted: $ 480,000
b. Balance: $ 0

A.4 Timeline:

	Jan 91	Jul 91	Jan 92	Jun 92	Jan 93	Jun 93
Planning/Review existing data	***	***			***	
Airphoto/Satellite imagery interpretation	****	*****			***	
Aerial Survey		**			**	
Natural Community Survey		*******		*******		****
Rare Plant Survey		*******		***		***
Rare Animal Survey		*****		****		****



A.5 Status:

a. The Survey was completed in Goodhue, Kittson, Rice, Roseau, Morrison, Red Lake, Pennington and Marshall counties. The Survey has completed inventory of 20 counties since 1987.

b. The Survey continues in Polk and Winona. Surveys continue in three new counties that were added to the Survey during the biennium: Cass, Dakota, and Houston.

c. MCBS will continue in FY94-95 with the addition of five new counties. Preliminary work has begun on three: Pine, Mahnomen and Wabasha.

d. The investment of time in the coordination of the MCBS with other related inventories has had positive results. Examples follow:

* In cooperation with DNR Parks and Recreation, the collection and computerization of bearing tree data from the Public Land Survey Records of 1847-1907 was accelerated. Data has been provided to the National Forests, DNR Forestry, and selected counties for special projects.

* As part of a cooperative agreement with the Chippewa National Forest, 30 releves were collected in forested wetlands and 46 rare plants were collected within the Forest boundaries. These data are being used in the development of an Ecological Classification System in the Chippewa National Forest and as a demonstration area for DNR's Integrated Resource Management initiative.

* The MCBS animal survey completed work at Camp Ripley as part of a U.S. Army effort to establish a network of long term monitoring sites on military reserves. (Land Condition Trend Analysis).

* As part of an agreement with the Metropolitan Airports Commission, the rare features inventory of the Dakota Search Area was nearly completed. This area of Dakota county is proposed by the Metropolitan Airports Commission as a possible site for a new major Twin Cities international airport. Surveys of the remainder of Dakota county are proposed for completion in 1993.

* MCBS and DNR Forest inventory staff coordinated a meeting of personnel representing selected DNR resource inventories with the purpose of identifying areas of increased cooperation, data and resource sharing, and training.

* Continued cooperation with the Mississippi River Valley Blufflands Initiative (Recreation-50, subd. 3(f) has enabled the expansion of the Survey into Houston county, and the distribution of the Goodhue county map of MCBS results.

* MCBS staff attended several meetings to discuss national and midwest regional ecological inventory coordination efforts. (examples: Midwest Natural Heritage Regional ecologists-development of regional

natural community classification systems, Environmental Protection Agency-EMAP Great Lakes project, US Fish and Wildlife Service Longterm Resource Monitoring Project-Upper Mississippi River, and their proposed Upper Midwest GAP analysis project).

e. MCBS continues to refine Survey methodology to include the use of newly available data and technology.

* Survey staff successfully used Global Positioning Systems in the Chippewa National Forest to permanently record the location of vegetation sample plots.

* A new GIS procedure was developed to analyze and compare existing State Forest Timber Inventory data with Natural Community classifications in Roseau County. This assisted the plant ecologist with the review of forest stand data in preparation for the inventory of unique natural communities.

* The production of GIS generated maps displaying bearing tree data assisted plant ecologists in the air photo interpretation phase of the initial site identification process. By viewing these maps, they were able to better identify remnant areas of native vegetation.

* Potential survey site maps generated by the GIS system provided for better coordination of site selection between the plant and animal ecologists working in the same county at different times.

* Ecologists used leaf-on 1992 CIR DNR Forestry photography of Houston and Winona counties to supplement 1991 NAPP photography. MCBS was forced to buy copies of NAAP photography due to the delay in the delivery of the state's copy intended for use by all agencies.

* Through the use of laptop computers, the field staff had the option to immediately enter Survey data while working in many areas of the state. An efficient procedure for updating the master file is still in progress.

A.6 Benefits: The status and distribution of Minnesota's most endangered resources will be identified providing a basis for the maintenance of Minnesota's biological diversity through processes such as environmental review, forest and wildlife planning, appropriate urban and recreational development, Scientific and Natural Area and other nature preserve acquisition.

B. Effectively integrate MCBS data with other natural resource data by improving and expanding the Natural Heritage Information Management System.

B.1 Narrative:

The Natural Heritage Information Management System will continue to expand through the addition of new and updated data on the distribution of rare natural features located by MCBS. Existing information networks and Geographic Information Systems (GIS) will be improved to provide for increased access to data and for

flexibility in the display and integration of data. In addition, the computerization of other supplemental data collected during the survey will complement goals of related projects. (e.g., land survey records, native and exotic plants, vegetation databases).

B.2 Procedure:

All data collected by MCBS are entered into the related map, manual and computerized files that make up the Natural Heritage Information Management System. Data collected by MCBS are entered into the following computerized databases: Rare features (geographic), Releve (vegetation samples), County flora checklist, MCBS site, Eagle, Colonial waterbird, and Bearing tree (from Public Land Survey notes 1847-1907). Rare features data are also mapped on U.S.G.S. topographic maps, and both site and rare features data are digitized using ARC/INFO GIS.

All plant and animal voucher specimens are identified, labelled and deposited in appropriate repositories. Field data sheets are filed manually in preparation for microfilming for archival purposes. Color slides, video tapes, and other photography are catalogued. All MCBS data are indexed for accession in order to easily produce maps and reports.

The structure of the Information System has been significantly altered over the past two years to provide for more efficient data management through related databases, multiuser systems and GIS. Continued development of these systems is essential to achieve MCBS goals.

B.3 Budget:

a. Amount Budgeted: $ 320,000
b. Balance: $ 0

B.4 Timeline:

	Jul 91	Jan 92	Jun 92	Jan 93	Jun 93
Data entry and analysis of new MCBS records	********			********	
Computer generated maps, reports	**********	**********	**********		
Multiuser and GIS system development	**********	**********	**********		
Integration of MCBS data within DNR and with other agencies and organizations	**********	**********	**********		

B.5 Status:

a. New locations of 2424 rare features were added to the Natural Heritage Information System since July 1991. Since 1987, MCBS has added 4561 records of rare features to the Information System, representing 29% of the total records statewide.

b. Rare features data now exists in digital format (ARC/INFO) for a total of 12 counties surveyed by MCBS. Bearing tree maps can be plotted for over 65% of the state. Custom maps have been created for specific planning purposes, and digital files have been sent

to other divisions, agencies, organizations and some local units of government that have the staff and GIS capabilities to use the data (e.g. Dakota County, The Nature Conservancy, the Division of Forestry). The distribution of GIS files intensifies the need to resolve issues of data security, misinterpretation, and the need for periodic updates. These issues are currently being pursued by the Natural Heritage Program staff.

c. The distribution of a new brochure on the Natural Heritage Information System has increased the number of data requests. The response is encouraging, but implies the need for full-time staff in the Natural Heritage and Nongame Wildlife Research programs to assist with the interpretation of data generated by the MCBS.

d. MCBS is tracking the progress of the development of a national list of the country's flora and fauna, with the potential for importing digital files directly into the Information System. A standard list is important for consistency in data analysis of vegetation samples (releves), the creation of specimen labels, and more rapid exchange and summary of plant and animal diversity on a state, regional and national scale.

B.6 Benefits: Diverse natural resource goals can be more effectively integrated by use of multi-user systems, GIS and vegetation databases. The ability to produce custom reports, maps and species checklists for distribution to organizations (e.g., environmental consulting firms, the State Horticulture Society) academic institutions, and agencies (e.g., Soil Conservation Service, Metropolitan Council, County Planning Commission, U.S. Fish and Wildlife Service, DNR Parks) will be enhanced by the application of these advanced data management systems.

C. Educate the public and natural resource professionals by providing high quality products that interpret survey results and promote the understanding of protection and management of Minnesota's endangered natural resources.

C.1 Narrative: The recent increase in awareness of environmental issues related to endangered resources has resulted in a demand by the public and natural resource professionals for interpretation of the ecological information collected by MCBS. Publication of county maps of rare features, along with both technical and popular reports that summarize and interpret the survey results is an essential response to the demands of this diverse audience.

C.2 Procedures:

The publication of maps, technical and popular reports describing methodology and survey results in the first 20 counties is already in progress. Significant staff time will be used to produce final reports and to edit county maps. An administrative assistant will coordinate distribution of standard reports and maps to other agencies and organizations (schools, libraries, nature centers, universities, county boards, planning boards, consulting firms). As needed, biologists will also prepare written conservation and management recommendations for selected high quality sites in response to requests from within and outside the agency. These

requests will be coordinated through the standard environmental review process. Finally, all field survey forms will be microfilmed to archive field data that is not computerized.

C.3 Budget:

a. Amount budgeted: $ 200,000
b. Balance: $ 0

C.4 Timeline:

	Jul 91	Jan 92	Jun 92	Jan 93	Jun 93
Complete technical and popular reports	**********	**********	**********		
Publish county maps	**********	**********	**********		
Microfilm field survey forms		**		***	
Site recommendations/environmental review		****		****	

C.5 Status:

a. Publications

* A guide to the natural history of the Anoka Sandplain and St. Croix River Valley is being circulated for technical review as part of the publication process. This guide includes descriptions of the vegetation and rare features of the area, and features photographs, county maps, and directions to exemplary sites in the region.

* Maps of Big Stone, Lac Qui Parle, and Sherburne counties were published and distributed, and the publication process is well underway for Chisago, Isanti, Ramsey and Anoka counties. In publishing the Sherburne map, an experimental photographic process was successfully used to transfer digital map files into color separates, thereby saving considerable time once required using manual cartographic procedures. This process is now being further simplified to produce press-ready color separates directly from digital files.

* Computer-generated maps of Rice and Goodhue counties were plotted (400 copies of each) and distributed. The much-improved text fonts of ARC/INFO, the access to LMIC plotters, and the investment in skilled computer cartographers have resulted in improved products. The quality of the products has also resulted in increased demands for customized products that we have sometimes been delinquent in delivering due to staff limitations.

* A report entitled "Rare biological features within the proposed new major airport search area, Dakota County, Minnesota" was prepared and delivered to the Metropolitan Airports Commission.

* "Minnesota's native vegetation: a key to natural communities" (version 1.5) was compiled by MCBS and Natural Heritage ecologists and distributed to selected resource managers.

* Nearly 1000 progress reports on the survey status were distributed. These included one-page county summaries for 11 counties.

* A report entitled "Animal surveys at the Minnesota Army National Guard Camp Ripley training site" was submitted to Camp Ripley summarizing results of animal surveys in the Camp done as part of the Morrison county survey.

* MCBS was featured in over 60 periodicals or newsletters.

b. MCBS was a part of 134 public information events. Examples:

* Results of the Survey in the Chippewa National Forest were presented to the Deer River Ranger District and to the Forest biologists. The MCBS botanist in Cass County located a new population of Goblin Fern (*Botrychium mormo*), and led a field tour of these populations for Federal foresters resulting in a later independent discovery of another new location by a forester.

* The Metropolitan Airport Committee was updated at several meetings on the progress and recommendations of the inventory of rare features in the airport search area.

* A presentation on the results of the rare bird surveys conducted in the Northwestern counties was made to the Minnesota Ornithologists' Union during their annual meeting.

* MCBS staff organized over 50 volunteers in a number of rare plant searches for Federally protected Western prairie fringed orchid, prairie bush clover and Minnesota dwarf trout lily.

* MCBS was a featured radio broadcast of the Minnesota Lottery's Environmental Journal.

* Plant ecologists working in Houston and Winona counties prepared a poster featuring work in the blufflands region that was displayed at a Winona workshop for the Upper Mississippi River Valley, and a meeting of the Upper Mississippi River Conservation Committee in La Crosse.

c. The plant ecologists have expended a considerable amount of time in the interpretation of the results of the Survey to users. Complimentary staff ecologists with expertise in natural area protection and management, planning, and environmental review are needed in the Endangered Resources programs to implement the results of the Survey on a regional basis.

d. The following is a selection of rare feature protection efforts.

* A 6,900 acre addition to Beaches Lake Wildlife Management Area that was identified as critical aspen parkland habitat by the MCBS in Kittson and Roseau counties, was acquired by DNR from the Nature Conservancy under the RIM Critical Habitat Matching Program.

* Three sites recommended for Scientific and Natural Area (SNA) status have become SNA's: Two Rivers Aspen Parkland Prairie (Roseau County), Uncas Dunes SNA addition (Sherburne County) and Prairie

Smoke Dunes (Norman County). In addition an 80 acre Lake Bronson Parkland SNA is proposed for Kittson county.

* MCBS continued to provide data and ecological interpretation to the staff of the Mississippi River Bluffland Initiative to assist with their blufflands protection efforts. An example is the delivery of MCBS data, including maps of rare features to Wacouta township to help develop land use plans.

* Staff contributed to planning related to Rice county's Big Woods protection and restoration project by providing computer generated maps and interpretation of rare features.

* Staff provided ecological interpretation used in the development of DNR's Region 4 and 5 Plan in southern Minnesota.

* MCBS botanists attended a Department of Agriculture field trip to the sites of the Federally threatened Leedy's Roseroot (*Sedum integrifolium* ssp *leedyi*) to discuss protection and management implications with regional managers.

* MCBS coordinated a field trip to Goose Lake Swamp, an 1900 acre area of mostly public land in Pennington County where the MCBS identified locations of 15 rare species, including an important population of western prairie fringed orchid (*Platanthera praeclara*), a federally threatened species. A follow up meeting with land managers discussed protection and management issues.

* Staff participated in a 10 year Timber Management planning schedule (TMPIS) and in the preparation of the DNR Region 1 plan.

* Ecologists evaluated the proposed Juneberry Ridge water control project in Kittson and Roseau counties.

* MCBS and Scientific and Natural Area staff met with Camp Ripley and DNR Forestry staff to develop a strategy for management of a potential natural area within the Camp (Morrison County) that would incorporate the training goals of the military with natural resource management.

* MCBS staff participated in a Multi-Owner Landscape Level Management Session held in Cass Lake to discuss opportunities and strategies for joint projects such as Ecological Classification Systems, GIS development, and Leech Lake Watershed Planning. Major participants included the Chippewa National Forest, DNR, Cass County, and the Leech Lake Tribal Council.

* The Cass county ecologist prepared a description of MCBS for use in the Leech Lake Reservation five year plan.

* Plant ecologists presented interpretation of natural community classification as part of a Forest Stewardship workshop entitled "Planning for Biodiversity".

* Natural area sites identified by the Survey were used for additional survey and research including wetlands in Rice county (St. Olaf research), prairies and savannas in the blufflands region (Karner

blue butterfly research), and areas in Dakota county for Loggerhead Shrike inventory.

* Ecologists assisted with the Upper Great Lakes Ecoregional map development.

C.6 Benefits: The distribution of results in several standard formats in combination with the production of customized computer products will decrease staff time required to interpret data, will document the survey results to serve as a benchmark, and will increase the public's awareness of Minnesota's endangered resources and biological diversity.

IV. Evaluation

MCBS can be evaluated by its ability to:

1) Develop and refine a cost effective inventory methodology.
2) Demonstrate a significant acceleration of data collection as compared to methodology used prior to 1987.
3) Identify the highest quality natural areas and rare species habitats and provide documentation leading to public or private acquisition or enrollment in land conservation programs (e.g., RIM, Prairie Landscape Reserve Program, SNA dedication, private land registry).
4) Increase data integration and access to the Natural Heritage Information Management System through the use of multi-user systems and GIS.
5) Produce county maps displaying rare features in a standard format and publish technical and popular reports to increase public understanding of Minnesota's endangered resources.
6) Promote academic training in conservation biology and provide baseline data for additional research on rare features.

V. Context

A. LCMR partially funded the establishment of the Natural Heritage Program in FY 1978-79, and initiated the pilot phase of MCBS in FY 1988-89 with matching private dollars. The success of MCBS led to continued support by LCMR during the 1990-91 biennium when it provided about 20% of the project's funding. The Natural Heritage and Nongame Wildlife programs jointly conduct MCBS in concert with other research and inventory efforts. Prior to MCBS, no systematic survey of rare ecological features at a comprehensive statewide level had been attempted. Increasing pressure for land development necessitated the accelerated inventory initiated by MCBS to ensure protection of the State's biological diversity. Most of the known past surveys that reliably document Minnesota's significant biological features are routinely reviewed during the MCBS process along with other related resource inventories (soils, geology, timber, wildlife). Several midwestern states (Wisconsin, Missouri, Michigan, Illinois, Indiana) have conducted similar biological inventories. MCBS has adapted some of their survey techniques.

B. Since 1987 MCBS has directly cooperated with numerous agencies and organizations. During this biennium notable cooperation is anticipated from the U.S. Fish and Wildlife Service National Wetlands Inventory

(loans of photography and viewing facilities), the University of Minnesota Remote Sensing Lab (satellite imagery interpretation), the U of M Botany Department (Herbarium database-LCMR project Wildlife 18 subd 9(e), and specimen curation), the Bell Museum of Natural History (specimen curation), Aquatic Invertebrate Assessment-LCMR project Wildlife 60 subd. 9(f), Mississippi River Valley Blufflands Initiative--LCMR project Recreation 50, subd. 3(g), the Scientific and Natural Areas Program, and the Nature Conservancy.

Supplemental Funding:

Base Level funding granted in the 1989 Legislative sessions:
(M.L. 89 Chpt. 335, Art. 1, Sec. 21 Subd.7)

Reinvest in Minnesota	$ 170,000	2 positions
General Fund	$ 300,000	1 position
Nongame Wildlife Program	$ 80,000	
TOTAL	$ 550,000	

Change level request 1991 Legislative session:

Reinvest in Minnesota $ 300,000 1 position

C. LCMR partially funded the pilot phase of MCBS and continues to provide primary financial support. Details of accomplishments are recorded in six month status reports submitted beginning in January 1988.

LCMR funding has been requested to continue MCBS in the next biennium (FY94-95). At the current level of funding, the proposed completion of the MCBS is 2010.

D. Minnesota County Biological Survey FY 1990-91 funding

LCMR	$ 150,000	2 positions
Reinvest in Minnesota	$ 170,000	2 positions
General Fund	$ 300,000	1 position
Nongame Wildlife Program	$ 100,000	
TOTAL	$ 720,000	

E. Not available

VI. Qualifications

1. Program Manager: Carmen Kay Converse

   a. Bachelor of Science, Natural Resources, University of Wisconsin, Madison 1975.

   b. Supervisor, Minnesota County Biological Survey, Section of Wildlife, Minnesota Department of Natural resources 1987-present.

2. Not applicable.

VII. Reporting Requirements

Semi annual status reports will be submitted no later than January 1, 1992 July 1, 1992, January 1, 1993 and a final status report by June 30, 1993.