Name of Organization: University of Wisconsin-Green Bay

Type of Organization: College or University

Contact Information: Dr. Robert Howe

Natural and Applied Sciences

2420 Nicolet Drive

Green Bay WI 54311

Phone: (920) 465 - 2272 **Extension:**

Fax: (920) 465 - 2376

E-Mail: hower@uwgb.edu

Project Title: GIS Framework for Bird Conservation and Monitoring

Project Category: Habitat (Ecological) Protection and Rest

Rank by Organization (if applicable): 0

Total Funding Requested ($): 138,759 **Project Duration:** 1.5 Years

Abstract:

The Great Lakes Basin supports one of the richest and most productive breeding bird faunas in North America, including many species of Neotropical migrants that are declining across much of their range. Research during the past 15 years in the western Great Lakes states of Minnesota, Wisconsin, and Michigan has led to large body of data documenting the distribution and specific habitat associations of most resident bird species. We propose to develop scientifically rigorous tools for applying this information and to augment existing data with targeted field surveys of under-represented species. Outcomes include comprehensive, dynamic maps of bird distributions in the western Great Lakes Basin and an interactive World Wide Web application designed to guide bird conservation planning activities at local and regional scales.

Geographic Areas Affected by the Project

States:

☐ Illinois	☐ New York	☒ Superior	☐ Erie
☐ Indiana	☐ Pennsylvania	☐ Huron	☐ Ontario
☒ Michigan	☒ Wisconsin	☒ Michigan	☐ All Lakes
☒ Minnesota	☐ Ohio		

Geographic Initiatives:

☐ Greater Chicago ☐ NE Ohio ☐ NW Indiana ☐ SE Michigan ☐ Lake St. Clair

Primary Affected Area of Concern: All AOCs

Other Affected Areas of Concern:

For Habitat Projects Only:

Primary Affected Biodiversity Investment Area: All BIAs

Other Affected Biodiversity Investment Areas:

Problem Statement:

The Great Lakes Basin supports one of North America's most important areas for breeding birds, including at least 15 species that are experiencing statistically significant population declines. Because birds in this region are highly mobile (and in most cases, migratory) conservation of viable populations is complex and requires large scale planning. Research by scientists in Illinois, for example, suggests that bird populations in western Great Lakes forests serve as demographic sources for populations in fragmented forests to the south. Conservation of habitats for breeding birds in the Great Lakes Basin therefore has implications that extend beyond the boundaries of this watershed.

Since 1995 we have been collaborating with scientists at the University of Wisconsin-Madison, Cornell University, Canadian Forest Service, and Canadian Wildlife Service in an effort to develop quantitative bird-habitat models for mapping the distribution of land birds in the Great Lakes Basin. As a result of research supported by the Great Lakes Protection Fund, we have generated coarse resolution maps of bird distributions throughout the Great Lakes Basin. These maps, coupled with existing data from state breeding bird atlases, the North American Breeding Bird Survey, and standardized point counts on public lands, provide the starting point for our proposed work.

This project addresses the basin-wide indicator "breeding bird diversity and abundance" as outlined in the May 1999 EPA paper "Selection of Indicators for Great Lakes Basin Ecosystem Health." We aim to mobilize existing resources and technical expertise to develop a computer application (database + user interface) for identifying the expected breeding birds in any geographic area in the western Great Lakes. This tool will provide a framework for regional monitoring of bird diversity indicators and will help identify bird diversity "hot-spots" for land protection.

Proposed Work Outcome:

The goal of our project is to develop conservation priority maps and an interactive computer application for use by government agencies, The Nature Conservancy, regional land trusts, and local communities in the western Great Lakes Basin. Breeding bird data have been assembled at the Natural Resources Research Institute (NRRI) as part of our previous Great Lakes bird diversity project. Preliminary maps of basin-wide bird distributions have been developed using climate data, satellite imagery, and bird occurrences from state atlas programs and the North American Breeding Bird Survey. Because the predictive variables are imprecise, however, these maps provide only a coarse description of potential bird distributions. The existing maps also fail to provide reliable predictions for rare species that are poorly represented in the bird databases.

The first phase of our proposal seeks to improve existing bird-habitat maps by exploring alternative formulations of the bird/habitat/climate models, including the development of finer scale analyses based on regional (as opposed to basin-wide) bird-habitat data. Results from alternative models will address the robustness of our predictions and will identify species for which additional information is needed. The second phase of our project will use geographically specific

field surveys (including both new and existing field data) to test the mapping results and to improve the database for species that are not adequately represented in our current databases. As more and more information becomes available from field surveys, new iterations of the models will lead to increasing reliability of the maps. The revised bird-habitat models will be used to generate regional maps of bird diversity "hot spots," which will be supplied to The Nature Conservancy, government agencies, and other land protection institutions. Finally, we propose to develop an interactive application that identifies expected bird species in any geographic area of interest within the western Great Lakes. A list of species derived from the bird/habitat/climate models will be divided into groups according to bird-habitat associations. Individual species will be annotated with information about special habitat requirements (e.g., minimum forest area) and monitoring procedures. This application will be made available on the World Wide Web for use by local conservation planners, landowners, foresters, and others. Development of the interactive, web-based algorithm will be developed with programming expertise that already exists in our institutions, combined with information from numerous bird-related projects

Project Milestones:	**Dates:**
Project Start	07/2000
Field Surveys	07/2000
Draft Bird Diversity Maps	03/2001
Prototype World Wide Web Application	05/2001
Field Surveys	06/2001
Completed Bird Diversity Maps	09/2001
Completed World Wide Web Application	11/2001
Project End	12/2001

☐ Project Addresses Environmental Justice

If So, Description of How:

☒ Project Addresses Education/Outreach

If So, Description of How:

A major element of this project is development of an interactive computer application that will be made available on the World Wide Web. This tool will enable educators, scientists, and resource managers to generate an annotated list of bird species for any geographic region in the western Great Lakes Basin. Information provided with the list will be aimed at specific habitat and conservation needs.

Project Budget:

	Federal Share Requested ($)	Applicant's Share ($)
Personnel:	20,000	4,334
Fringe:	6,600	1,430
Travel:	3,000	0
Equipment:	0	0
Supplies:	5,200	0
Contracts:	93,319	0
Construction:	0	0
Other:	0	0
Total Direct Costs:	128,119	5,764
Indirect Costs:	10,640	2,479
Total:	138,759	8,243
Projected Income:	0	0

Funding by Other Organizations (Names, Amounts, Description of Commitments):

Matching funds indicated in the submitted budget will come from 5% of the salary of the prinicipal investigator (Howe) during 2000-2001. Additional matching salary commitment is expected from NRRI and TNC, although these amounts have not been included here. Computer facilities will be provided initially by the University of Wisconsin-Green Bay's Center for Biodiversity and NRRI. We have sought funding from The Nature Conservancy ($17,500) for GIS analysis at NRRI and for preliminary field studies of under-represented bird species. Other pending grant proposals related to this project are:

Milwaukee Zoological Society (field work by graduate student)..... $2000
U.S. Forest Service (field work) $5000

Niemi (principal investigator), Howe, Hanowski, and others also are preparing a large collaborative grant proposal to the EPA's Environmental Indicators in Estuarine Environments Research Program (approximately $6 million over 4 years). Although only indirectly related to this proposal, results from the Environmental Indicators project would provide field data and satellite image analysis that would be valuable for refining the bird-habitat models and maps described here.

Description of Collaboration/Community Based Support:

This project will be carried out jointly with scientists at the Natural Resources Research Institute (NRRI) of the University of Minnesota-Duluth (Dr. Gerald Niemi, Dr. Malcom Jones, and JoAnn Hanowski), and the Great Lakes Regional Office (Dr. Mary Willson) and Michigan Field Office (Dr. David Ewert) of The Nature Conservancy (TNC). Funds for TNC and NRRI have been lumped under "Contracts" in the budget and incorporate separate amounts for salaries, fringes, and indirect costs. Development of the World Wide Web application will be carried out in collaboration with Jennifer Davis, Data Coordinator of the Wisconsin Breeding Bird Atlas at the University of Wisconsin-Green Bay.