

PART 1. COVER PAGE

Project Title: **Mapping and analysis of geographically isolated wetlands**
Amount of funds being requested from EPA: \$119,947 over two years
Name of organization applying for funds: Montana Natural Heritage Program of The Nature Conservancy
Name of primary contact for this pre-proposal: Linda Vance, Ph.D
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Telephone number and e-mail address for primary contact: 406-444-3380, livance@mt.gov
DUNS Number: 072656630

1. Please check the funding program you are applying for (please mark only one):

- | | |
|--|---|
| <input type="checkbox"/> Tribal Source Water Protection | <input type="checkbox"/> Source Reduction Assistance |
| <input checked="" type="checkbox"/> Wetlands Program Development Grant | <input type="checkbox"/> RGI/EPP for watershed project |
| <input type="checkbox"/> Strategic Agriculture Initiative | <input type="checkbox"/> RGI/EPP for air toxics project |
| <input type="checkbox"/> TMDL | <input type="checkbox"/> RGI/EPP for non-tribal source water protection |

2. Please check the type of agency or organization applying for funding:

Non-profit or community-based environmental organization (pass-through to Montana DEQ)

3. Please describe the geographic location of the project being proposed: Helena, MT

4. Please check the Regional priority or priorities this proposal best supports?

- Agriculture Energy
 Enhancing Capacity to Provide Public Health and Environmental Protection in Region 8 States and on Tribal Lands

5. Please list the Strategic Plan goals and objectives this proposal aligns with:

4.3.1 Protect and Restore Ecosystems. 4.3.2: Increase Wetlands.

6. If you are applying for a funding program that requires a match, provide the amount of match being provided \$ 94,890 (match).

PART 2. GENERAL CRITERIA

1) Project Summary

According to a recent NatureServe study, 29% of all wetland types in the U.S. are partially or wholly geographically isolated from navigable waters (Comer et al. 2005). The US Fish and Wildlife Service reported similar findings from landscape analysis of 70 areas across the US, including Montana (Tiner 2003). As a result of the US Supreme Court's 2001 decision in *Solid Waste Agency of Northern Cook County [SWANCC] vs. U.S. Army Corps of Engineers*, many of these geographically isolated wetlands may no longer fall under the provisions of the Clean Water Act, and further narrowing of the Act's jurisdiction may occur as a result of Supreme Court decisions anticipated in 2006. The loss of regulatory jurisdiction over these wetlands has significant implications. Geographically isolated wetland types support 274 at-risk plant and animal species, and more than a third of these appear to be restricted to such wetlands. Forty-three percent of isolated wetland types support at least one of the species listed under the Endangered Species Act (Comer et al. 2005). Moreover, NatureServe's report was limited to wetland types that are characteristically isolated, such as prairie potholes, playas, and boreal bogs. In any given area, typically non-isolated wetland types may also occur in isolation, adding to the number of wetland values and habitats at risk.

The only analysis of the extent of geographically isolated wetlands in Montana to date is the portion of Tiner's (2003) study covering the 51,000-hectare Hoodoo Hills region of north-central Montana. No other areas have been analyzed and mapped. Additionally, no data is available on the acreage of isolated wetlands, the types of wetlands (other than characteristically isolated wetlands) that are most likely to become geographically isolated, the ownership (and therefore jurisdiction) of the surrounding lands, or the specific functions and species of concern associated with those wetlands. This project is intended to fill these gaps by mapping, analyzing and surveying geographically isolated wetlands in Montana. The Montana Natural Heritage Program (MTNHP) will use existing National Wetland Inventory (NWI) maps, wetland maps being produced under a pilot mapping and change detection project, NAIP color IR photography, and maps created specifically for this project to assess the scope, condition, and status of isolated wetlands, including ephemeral and intermittent streams. Using a GIS analysis, database resources, literature reports, field surveys and probabilistic sampling, we will compile an analysis of wetland acreage, types, functions and values that are at risk if isolated wetlands are not regulated by state or federal statutes. From these analyses, and working with the Montana Department of Environmental Quality and the Montana Wetlands Legacy program, we will prioritize the wetland types or/or geographic areas most in need of protection. Field surveys will be conducted to identify high-quality reference wetlands, which will be entered into MTNHP and State databases.

By identifying vulnerable wetland and aquatic resources, this project will enhance Montana's capacity to develop and implement wetland protection programs at the state, local, and tribal levels; will pinpoint areas in need of monitoring and assessment; and will guide effective compensatory mitigation efforts. It will also address key objectives in the Draft Conservation Strategy for Montana Wetlands (Montana DEQ 1997) by increasing the wetlands knowledge base to guide planning on public and private land, identifying wetlands to target for conservation and/or acquisition, and improving the effectiveness of regulatory programs.

2) ACTIVITIES TO BE CONDUCTED

a) Create a model for identifying and analyzing isolated wetlands with the limits of current NWI mapping, and for identifying and mapping ephemeral and intermittent streams

Digitized NWI mapping is complete for almost 30 percent of the 100K USGS Quadrangles covering Montana, and the quality of the maps, outside of riverine and rapidly urbanizing valleys is good. Using 1) NWI digital data, 2) USGS high-resolution (1:24,000) hydrology data and 3)USGS digital raster graphics, and expanding the methodology introduced by Tiner (2003), we will create a GIS model that identifies wetlands that appear to be geographically isolated from navigable waters, including ephemeral and intermittent streams.¹ The model will be verified by examining digital orthophotos or National Agricultural Imagery Program (NAIP) color IR photos for a random sample of wetlands identified as isolated, and we will adjust the model as needed. Field verification of the model's ability to identify ephemeral and intermittent streams will be done as necessary. After the model is refined, we will use it to generate a GIS layer, and combine it with the MTNHP-generated Public Stewardship GIS layer to derive a sub layer of potentially isolated wetlands classified by land ownership.

b) Devise a probabilistic sampling method that will a) allow us to estimate the acreage, numbers, and types of isolated wetlands in areas not covered by current or ongoing NWI mapping and b) guide the acquisition of additional digitized NWI data and/or the creation of new digital maps from color IR photos.

By analyzing the output of the mapping work above, we will be able to determine how many of the 1:24,000 USGS Quadrangle maps in each 1:100,000 Quad must be mapped to permit us to draw statistically valid estimates of the acreage, number and types of geographically isolated wetlands. Because the geographic distribution of wetlands varies by ecological region, we will stratify this analysis by ecological section (Woods et al. 2002). Ten of the fifteen ecological sections in Montana have some level of NWI mapping, which should facilitate this task. If stratification by ecological section does not yield satisfactory results, we will use ecological subsections, soil-based ecosite types (NRCS 2003), and/or digital elevation maps (DEMs) to produce a statistically valid sampling method. Success of the analysis will be gauged by a combination of color IR imagery analysis (for number and acreage) and field surveys (for type).

c) Develop sufficient digital wetland map layers for each ecological section (or subsection) to permit statistically robust estimates of the acreage, extent, and types of geographically isolated wetlands in currently unmapped areas.

Because of the cost and time involved in wetland mapping, we will use the results of Activity b to target mapping. Depending on the number of quads that must be mapped for statistical reliability, we will either attempt to sample-map the entire state, or will select

¹ In the event that a Supreme Court decision further restricts the scope of Clean Water Act jurisdiction by defining isolated wetlands more specifically, we will modify this task to reflect the new meanings of "isolated."

ecological sections with known development pressures or other factors that might render geographically isolated wetlands more vulnerable. We will coordinate this mapping with the Montana pilot wetland mapping and detection of change project (which we will be conducting beginning in 2006), using high-resolution color IR NAIP imagery. This will ensure that potentially vulnerable wetlands in high-growth areas will receive focused attention, that a broad cross-section of the state is mapped, and that changes which may have already occurred in the size and distribution of geographically isolated wetlands can be accurately assessed. Photo interpretation and mapping techniques will follow NWI protocols and procedures.

d). Evaluate the potential for loss of wetland types, functions, or species, and identify high-quality, reference wetlands for future monitoring and assessment.

Using NatureServe and MTNHP databases, we will identify all wetland types, associations, and species at risk. Using the output from Activities 1 and 3, we will assign HGM functions to mapped wetlands with a GIS model created under an earlier EPA Wetland grant. This will enable us to produce an analysis of functions at risk, working with our partners at the Department of Environmental Quality and in the Montana Wetlands Legacy program. We will also conduct field surveys to locate and survey high-quality, reference wetlands. These wetlands will be entered into the MTNHP site database and into the Montana Department of Environmental Quality Wetlands database.

e). Promote the model and maps to wetland planners and managers at all level of government.

The Montana Natural Heritage Program is an active participant in the Montana Wetland Council, and works with federal, state, tribal and non-governmental entities across the state. We will use our contacts, Wetland Council meetings, EPA regional meetings, and watershed forums to ensure broad dissemination of the methodology and the results, and to encourage protection of geographically isolated wetlands.

3) MEASUREMENT:

Outcomes:

a) Wetland program planners and managers at all levels of government in Montana will be able to identify and protect especially vulnerable wetland and aquatic resources. They will have detailed maps of geographically isolated wetlands and ephemeral and intermittent streams in areas currently covered by NWI digital maps and in areas mapped specifically for this project, and statistically sound estimates of the numbers, acreage, and types of geographically isolated wetlands in each ecological section in Montana. This will:

- enhance State, local, and tribal capacity to develop regulatory frameworks, implement wetland protection programs, and target assessment and monitoring efforts towards especially vulnerable wetland resources;

- allow refinement of efforts towards ecosystem protection and prevention of net loss of wetlands;
- improve Montana's wetland knowledge base.

b.) Wetland program planners and managers at all levels of government in Montana will have a quantified assessment of the functions and species at risk in geographically isolated wetlands. This will

- increase their capacity to set program-wide mitigation objectives that include replacing functions threatened on geographically isolated and/or non-jurisdictional wetlands;
- allow them to identify high-priority regions where conservation and acquisition efforts can be directed;
- help them identify appropriate steps to ensure state-based regulation of wetlands not under federal jurisdiction;
- guide planning efforts at all levels of government.

c) Wetland scientists, planners, managers and other interested parties will have a database of high-quality reference wetlands representing geographically isolated wetland types in the state to guide assessment and monitoring efforts,

d) Wetland scientists, planners, managers and other interested parties in other Region 8 states will have an example of a GIS model for identifying geographically isolated wetlands and perennial and intermittent streams.

Outputs (with anticipated completion dates, and estimated EPA-funded cost per output):

a) A GIS layer of geographically isolated wetlands within current NWI map layers, and a GIS layer of probable ephemeral and intermittent streams **(2/15/07, \$25,750);**

b) A model that can be used to identify geographically isolated wetlands and/or perennial and intermittent streams on any new digital maps as they are produced, and that can be adapted by other Region 8 states as needed **(3/15/07, \$6,770);**

c) New digital wetland maps for at least 50 sampled 1:24,000 quads **(2/15/08; \$60,000);**

d) A final report detailing i) model development, sampling methodology, and statistical analysis; ii) estimated acreage, number, and types of isolated wetlands on private and state lands; iii) the extent of any protection (conservation easements) affecting mapped wetlands; and iv) wetland types, functions, and species at risk in Montana, with high-priority areas and reference wetlands identified **(3/15/08; \$25,400);**

f) Updates of the Montana Natural Heritage database and the State of Montana Department of Environmental Quality Wetland database **(3/15/08, \$800).**

g) PowerPoint presentations on the work at a minimum of two statewide or regional meetings or conferences **(4/30/08, \$1,227).**

4) PROGRAMMATIC CAPABILITY OF APPLICANT:

The Natural Heritage Program is Montana's source for information on Montana's native species and habitats, emphasizing those of conservation concern. We collect, validate, and distribute this information, and assist natural resource managers and others in applying it effectively. Established by the Montana State Legislature in 1983, the program is located in the Montana State Library, where it is part of the Natural Resource Information System. The Montana Natural Heritage Program is part of the Natural Heritage Network, and our data are linked to similar programs in all 50 states, most Canadian provinces, and many Latin American countries. MTNHP staff includes eight professional (M.S./Ph.D) scientists, three assistant/support biologists, three data management staff, an information services manager, a web application developer, a finance and grants manager, an office assistant, and an executive director. Contractors and project support personnel are hired as necessary. Projects completed in the last year include but are not limited to:

- Watershed Assessment of the Whitewater and Cottonwood Watersheds, September 2005 (BLM)
- Aquatic Community Classification and Ecosystem Diversity in Montana's Missouri River Watershed, September 2005 (BLM)
- A Vegetation Index of Biotic Integrity for Small-order Streams in Southwest Montana and a Floristic Quality Assessment for Western Montana Wetlands, July 2005 (EPA/DEQ)
- Riparian Forests of the Wild and Scenic Missouri River: Ecology and Management, December 2004 (BLM)

All completed projects can be found on our website at <http://mtnhp.org/reports.asp>. We are currently working with the Montana DEQ on an EPA-funded project to 1)develop a crosswalk between NWI wetland types, hydrogeomorphic (HGM) wetland classes, and the National Vegetation Classification System (NVCS), and 2)create a GIS-based algorithm for assigning HGM types to wetlands. Beginning in January, we will begin an additional project with the DEQ to digitize existing NWI maps, create new digital maps of pilot watersheds, and implement a change detection analysis pursuant to and EPA Wetland Demonstration Program Pilot Grant (WDP). All our contracts are overseen by project or program managers, and a project tracking system ensures that reports and other deliverables are submitted in a timely manner. We have expertise and equipment for field studies and data collection, digitizing, image processing and analysis, GIS analysis, mapping, database creation and maintenance, report publication and web hosting.

5) PROJECT DOES NOT DUPLICATE EFFORTS ALREADY BEING DONE.

No other mapping and analysis of geographically isolated wetlands is being carried out in Montana at this time. The mapping project conducted under the EPA Wetland Demonstration Program Pilot Grant (WDP) focuses on three pilot watersheds where substantial land use change has occurred. The proposed project will complement that effort, but not duplicate it. The maps developed pursuant to Activity 3 will cover watersheds that are not part of the mapping project, while advancing the state Draft Conservation Strategy goal of improving the wetland knowledge base.

6) PROJECT PARTNERS:

a). Montana Department of Environmental Quality

The Montana Natural Heritage program works closely with the Montana Department of Environmental Quality to ensure that projects are completed on time and in a manner that promotes the goals of the state's Wetland Program. Maps, GIS layers, models and final reports will be used by the DEQ to meet objectives in the Draft Conservation Strategy for Montana Wetlands. The funds applied for will be administered by the DEQ.

b). Montana State Library Natural Resource Information System (NRIS)

The Montana Natural Heritage is part of the State Library's Natural Resource Information System, operated contractually through a 20-year public/private partnership with The Nature Conservancy. The State Library and NRIS provides office space, technical, database, network, and web hosting services, and through funding from the State Legislature, supports the core functions of the Natural Heritage Program. All matching funds for this project are from this source (see the budget page, below)

c). Montana Wetlands Legacy.

The Montana Wetlands Legacy partners with over 30 governmental and non-governmental organizations (including the Montana Natural Heritage Program) to protect, restore, and enhance Montana's wetlands. As part of its goal to increase wetlands and improve wetland protection, it develops In-Lieu-of-Fee (ILF) projects to mitigate wetland impacts and chairs a committee that reviews mitigation projects and funding expenditures, and provides guidance on mitigation issues, projects and sites. The Montana Wetlands legacy will use the results of this project to locate and deliver high quality mitigation projects.

PART 3: PROGRAM CRITERIA

The overall goal of this project is to further the development of regulatory and non-regulatory wetland programs in Montana by creating tools, maps and information that will assist in identifying and protecting vulnerable wetland resources. The models developed as part of this project will also have region-wide benefits insofar as they demonstrate innovative, cost-effective approaches to identifying vulnerable resources, thus making efficient use of limited resources and budgets.

The project meets the specific criteria set down for Wetland Program Development Grants as follows:

1. The project strengthens State or Tribal comprehensive wetland programs.

Comprehensive wetland protection in Montana is hindered by limited digital wetland mapping. Seventy percent of the state has no digital maps, and some of the existing maps covering urban areas are already out of date. Consequently, wetland program managers, mitigation planners, and conservation groups cannot easily identify vulnerable wetland resources. By targeting and mapping geographically isolated wetlands and ephemeral and intermittent streams, the project will enhance programmatic capacity to devise wetland protection strategies, including conservation, acquisition, and mitigation projects.

2. The project contributes to the direct protection of wetlands

To the extent that geographically isolated wetlands in Montana are not under the protection of the Clean Water Act, they are at risk, especially when they occur on private land. By identifying those wetlands, and quantifying the functions, types, and acreages involved, this project will provide a basis for State (or tribal) regulatory protection development, as well as pinpointing high-quality wetlands or sites of wetland concentration that can be targeted for acquisition or protection through easements, purchases, or voluntary protection measures.

3. The project is consistent with government wetlands conservation priorities or strategies

Montana's Draft Conservation Strategy lists five goals/objectives: 1) Improving the wetlands knowledge base; 2) Encouraging voluntary conservation on private land; 3) Enhancing conservation on public land; 4) Providing resources: information and education, technical assistance and funding; and 5) Improving regulatory program effectiveness. This project will

- Improve the wetlands knowledge base by identifying, mapping and describing geographically isolated wetlands;
- Encourage voluntary conservation on private land by targeting vulnerable resources that can be earmarked for acquisition, conservation, or voluntary protection;
- Enhance conservation on public land by providing managers with maps and models to use in planning and mitigation;
- Provide informational and educational resources on the distribution, scope, and functions of geographically isolated wetlands;
- Improve regulatory program effectiveness by improving coordination among wetland programs, identifying vulnerable resources, and supporting development of mitigation and mitigation banking plans.

4. The project refines the protection of vulnerable wetlands and aquatic resources

The Clean Water Act has been the first line of defense against wetland loss. All wetlands excluded from its jurisdiction are vulnerable, especially in states like Montana with no comprehensive statewide regulatory scheme that can take its place. When the scope, location, ownership and location of potentially non-jurisdictional wetlands are also unknown, protection of vulnerable wetlands is an elusive goal. By filling this knowledge gap, the project will allow planners, resource managers, and private conservation organizations to prioritize protection efforts to target wetlands that would otherwise be at risk from development or exploitation. The project is especially timely in light of pending Supreme Court decisions on Clean Water Act jurisdiction; if the definition of non-jurisdictional wetlands is expanded, Montana will be in a position to identify any additional classes of vulnerable wetlands that may result from the Courts actions.

5. The project contributes to the development of a comprehensive monitoring and assessment program.

By identifying high-quality reference wetlands from among geographically isolated wetlands types, and including detailed site and species information in MTNHP and DEQ

databases, the project will supply baseline data to support monitoring and assessment. Similarly, by pinpointing the location of geographically isolated wetlands, and identifying their sizes and functions, it will provide benchmarks for monitoring change over time.

6. The project improves the effectiveness of compensatory mitigation.

Any compensatory wetland mitigation program must have a goal of no overall net loss of values and functions. To the extent that geographically isolated wetlands are at risk, so too are the values and functions they provide. By cataloging the nature and extent of those values and functions through mapping and assessment, this project will inform planners, managers, regulators, and the Montana Wetlands Legacy ILF review committee about necessary steps that should be taken to ensure the effectiveness of mitigation projects.

PART 4: PROJECT TIMELINE AND DELIVERABLES

a) Create a model for identifying and analyzing isolated wetlands with the limits of current NWI mapping, and for identifying and mapping ephemeral and intermittent streams.

Start date: upon funding. Completion date: 02/15/07 Deliverables: GIS models and maps

b) Devise a probabilistic sampling method.

Start date: 2/16/2007 Completion date: 03/15/07 Deliverables: none

c) Develop digital wetland map layers to permit statistically robust estimates of the acreage, extent, and types of geographically isolated wetlands in currently unmapped areas.

Start date: 3/16/2007 Completion date: 02/15/08 Deliverables: Digital wetland maps of at least 50 1:24,000 quads

d) Evaluate the potential for loss of wetland types, functions, or species.

Start date: 7/16/2007 Completion date: 03/15/08 Deliverables: Final report on project

e) Identify high-quality, reference wetlands.

Start date: 7/16/2007 Completion date: 03/15/08 Deliverables: database updates

e) Promote the model and maps to wetland planners and managers at all level of government.

Start date: 9/30/2007 Completion date: 04/30/08 Deliverables: Minimum of 2 PowerPoint presentations at statewide and regional meetings

PART 5. BUDGET

	Request	Match	Total cost
Personnel			
Science Staff (Professional and support)	\$61,800		
Information Management Staff		\$20,800	\$20,800
Director and Program Oversight, including Finance		\$17,408	\$17,408
Fringe at 40% of salaries	\$24,720	\$15,283	\$40,003
PERSONNEL TOTAL:	\$86,520	\$53,491	\$140,011
Fieldwork and travel			
Mileage and per diem (3000 miles, 30 days)	\$2,850		\$2,850
Supplies and equipment			
Project supplies	\$500		
General equipment and supplies		\$6,581	\$6,581
Image acquisition/preprocessing	\$2,000		
Fees and expenses			
Phone and internet charges	\$300		
Report printing, GIS duplication	\$600		
Project training, software licenses, etc	\$800		
General staff training	\$3,948		
NON-PERSONNEL TOTAL:	\$10,998	\$6,581	\$17,579
TOTAL EXPENSES:	\$97,518	\$60,072	\$157,590
INDIRECT COSTS (23%)	\$22,429	\$13,817	\$36,246
Montana State Library contributed support (15% of personnel)		\$21,002	\$21,002
TOTAL PROJECT COST			\$214,838
TOTAL REQUESTED FROM EPA	\$119,947		
NON-FEDERAL MATCH:		\$94,890	

REFERENCES:

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Woods, Alan J., Omernik, James, M., Nesser, John A., Sheldon, J., Comstock, J.A., Azevedo, Sandra H., 2002, *Ecoregions of Montana, 2nd edition (color poster with map, descriptive text, summary tables, and photographs)*. Map scale 1:1,500,000.