

**Environment and Natural Resources Trust Fund
2016 Request for Proposals (RFP)**

Project Title:

ENRTF ID: 137-E

Assessing Climate Effects on Wetlands Water and Species

Category: E. Air Quality, Climate Change, and Renewable Energy

Total Project Budget: \$ 1,070,448

Proposed Project Time Period for the Funding Requested: 3 years, July 2016 to June 2019

Summary:

We will use integrated, cutting-edge methods to provide resource managers a field assessment of how wetland water availability and dependent species are responding to climate on 50 state conservation areas.

Name: Walt Sadinski

Sponsoring Organization: U.S. Geological Survey

Address: 2630 Fanta Reed Road
La Crosse WI 54603

Telephone Number: (608) 781-6337

Email wsadinski@usgs.gov

Web Address _____

Location

Region: Statewide

County Name: Statewide

City / Township:

Alternate Text for Visual:

The attached graphic shows the proposed study area and examples of methods and resultant data.

_____ Funding Priorities	_____ Multiple Benefits	_____ Outcomes	_____ Knowledge Base
_____ Extent of Impact	_____ Innovation	_____ Scientific/Tech Basis	_____ Urgency
_____ Capacity Readiness	_____ Leverage	_____ TOTAL	_____ %



Environment and Natural Resources Trust Fund (ENRTF)

2016 Main Proposal

Project Title: Assessing effects of climate on surface-water availability and wetland-dependent species on Minnesota conservation lands to inform multiagency conservation strategies

PROJECT TITLE: Assessing effects of climate on surface-water availability and wetland-dependent species on Minnesota conservation lands to inform multiagency conservation strategies

I. PROJECT STATEMENT: Minnesota’s varied landscapes of wetlands and interconnected uplands provide ecosystem services vital to human well-being and habitat necessary for the survival of unique wetland-dependent biodiversity. The ecological conditions that underpin the functions of these landscapes are highly vulnerable to climate change. Yet, we lack integrated scientific information of the type necessary to understand essential relations between climate and key ecological conditions on these landscapes. This information is necessary for multiagency resource managers to develop effective strategies to mitigate or adapt to effects from climate change on state and federal conservation lands throughout the state. Working efficiently to reduce these limitations requires coordinated, leveraged efforts among state and federal science and resource agencies, which largely are responsible for addressing impacts from climate change on conservation lands in Minnesota. Our overall goal is to provide resource managers a rigorous integrated assessment of how temperature and precipitation are affecting the availability of surface water and wetland-dependent amphibian populations, as indicator species, on these landscapes across Minnesota. We will do this by relating measurements of temperature and precipitation obtained from weather stations to wetland water depths, amphibian calling phenology, and seasonal calling activity measured *in situ* at field sites in three important Level-III Ecoregions in Minnesota and to site occupancy derived from field data. We will use established and cutting-edge technologies, such as acoustic recorders and new analytic approaches, and leverage resources, expertise, and data from a broader, ongoing, multipartner study, while conducting this work.

II. PROJECT ACTIVITIES AND OUTCOMES

Activity 1: Select and verify field-research sites and purchase and assemble equipment. **Budget: \$309,893**
We will create a Geographic Information System that describes the locations and landscapes of all Minnesota state wildlife management areas (WMA) in three Level-III Ecoregions, the North Central Hardwood Forests (51), the Northern Glaciated Plains (46), and the Western Corn Belt Plains (47). We will use our standardized protocols to select ten WMA for field research scattered throughout 46 and 20 WMA scattered throughout each of 46 and 51, as well as to select one wetland in each WMA for instrumentation. This latter task will include field reconnaissance of study WMA and wetlands. We also will purchase, program, and assemble equipment and fabricate housings in preparation for field deployments during the spring of 2007.

Outcome	Completion Date
1. Selection of study WMA and wetlands, including field reconnaissance, completed.	10.30.2016
2. Purchasing and programming equipment and assembling housings completed.	2.28.2017

Activity 2: Initiate and conduct field research. We will install one acoustic recorder, one water-depth logger, one air-temperature logger, and one water-temperature logger at each of the 50 individual study wetlands in early spring of 2017, 2018, and 2019. We also will install barometric pressure loggers and rain gauges at a subset of these sites based upon distances between sites. We will visit each study wetland regularly from approximately April 1st through August to replace batteries and data cards in the acoustic recorders and stop annual field work near the end of September. **Budget: \$438,225**

Outcome	Completion Date
1. Completed annual installation of research sensors at each of the 50 study wetlands.	4.30.2017-2019
2. Completed annual field research. (N.B. USGS will extend 2019 field work from 7.1-9.30.)	9.30.2017-2019



Environment and Natural Resources Trust Fund (ENRTF)

2016 Main Proposal

Project Title: Assessing effects of climate on surface-water availability and wetland-dependent species on Minnesota conservation lands to inform multiagency conservation strategies

<i>3. All field data uploaded and replicated, QA/QC procedures applied, and data-management requirements completed for each season.</i>	<i>11.31.2017-2019</i>
---	------------------------

Activity 3: Collecting annual weather-station data, analyzing all annual data, writing interim reports. These tasks will be ongoing over the course of each year. **Budget: \$161,165**

Outcome	Completion Date
<i>1. Annual outside data collected, all annual data analyzed, and interim reports completed.</i>	<i>3.1.2017-2019</i>

Activity 4: Writing final report and manuscripts. **Budget: \$161,165**

Outcome	Completion Date
<i>1. Final report completed.</i>	<i>8.15.2019</i>
<i>2. Manuscripts submitted to scientific journals.</i>	<i>2019-2020</i>

III. PROJECT STRATEGY

A. Project Team/Partners

Dr. Walt Sadinski, a research ecologist at USGS’s Upper Midwest Environmental Sciences Center (UMESC), will be the overall lead for this project and work on all of its phases. UMESC expects to contribute four or more pay periods of Dr. Sadinski’s time to this project per year. Mark Roth, a UMESC biologist, and two additional UMESC biologists (names to be determined) will conduct the field work, maintain equipment, manage and analyze data, and assist in report and manuscript preparation. UMESC will hire a new postdoctoral associate during the final year to work on data synthesis and writing of the final report and preparing manuscripts.

B. Project Impact and Long-Term Strategy

Data and integrated information from this project will provide the first comprehensive assessment of relations between climate and key ecological conditions on Minnesota conservation lands across much of the southern half of the state. The final report and expected scientific publications will provide Minnesota resource managers from various organizations critical information they need to work toward mitigating or adapting to effects from climate change. Our results also will provide previously unavailable information on the natural resources and ecological conditions for 50 separate state conservation areas, including data relevant to the global issues of surface-water availability and amphibian declines. In addition, this research will complement work we are doing with multiple partners from federal and state agencies and universities in producing similar data for several other research locations in the United States (including AK) and Canada. We will leverage resources and expertise from this larger effort in executing ENRTF-sponsored research. Examples of other research areas in Minnesota currently include the Tamarac NWR, Voyageurs NP, the St. Croix National Scenic Riverway, and the Upper Mississippi River National Wildlife and Fish Refuge. Thus, results from work conducted under an ENRTF grant would be relevant for state resource managers in developing multiagency landscape-level management strategies relative to climate change. Our work with our partners is long-term and ongoing (since 2008) and dependent upon individual annual budgets. If the state of Minnesota wanted to extend ENRTF-funded research over a longer time period to improve understanding of climate-change dynamics under a wider range of conditions, we will have established a straightforward framework and process for them to do so.

C. Timeline Requirements

We need at least three years of field data to begin to describe relations between climate and key ecological conditions at our study sites given annual environmental variation. As stated above, our proposed research would provide a unique opportunity for the state of Minnesota ultimately to establish our ENRTF-supported research sites as long-term research sites beyond the timeline we have proposed here.

2016 Detailed Project Budget

Project Title: "Assessing effects of climate on surface-water availability and wetland-dependent species on Minnesota conservation lands to inform multiagency conservation strategies"

IV. TOTAL ENRTF REQUEST BUDGET 3 years

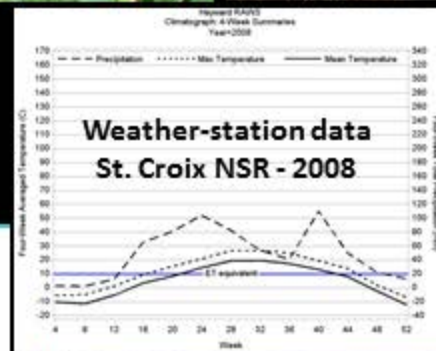
BUDGET ITEM (See "Guidance on Allowable Expenses", p. 13)	AMOUNT
Personnel	\$ -
GS-9 Biologist (FY2016 = 1 employee x 15 pay periods + 2 employees x 9 pay periods) (FY2017 and FY2018 = 3 employees x 15 pay periods ea.) 70% salary, 30% benefits	\$ 553,500
GS-11 Biologist (26 pay periods) 70% salary, 30% benefits	\$ 118,200
GS-13 Research Ecologist (4 pay periods per year) 70% salary, 30% benefits	\$ 93,348
Professional/Technical/Service Contracts	N/A
Equipment/Tools/Supplies	N/A
55 acoustic recorders	\$ 74,250
70 air/water pressure loggers	\$ 52,500
120 temperature loggers	\$ 22,500
20 rain gauges	\$ 15,000
Server for storing voluminous acoustic, water, climate, and geospatial data	\$ 37,500
Supplies and materials to build housings, attach recorders and loggers, conduct work in wetlands, etc.	\$ 10,500
Acquisition (Fee Title or Permanent Easements)	N/A
Travel	\$ -
Lodging and per diem for field work conducted in Minnesota in FY2016, 2017, and 2018	\$ 77,400
Fuel for field work conducted in Minnesota in FY2016, 2017, and 2018	\$ 6,750
Travel to attend conference	\$ 9,000
Additional Budget Items	N/A
TOTAL ENVIRONMENT AND NATURAL RESOURCES TRUST FUND \$ REQUEST =	\$ 1,070,448

V. OTHER FUNDS (This entire section must be filled out. Do not delete rows. Indicate "N/A" if row is not applicable.)

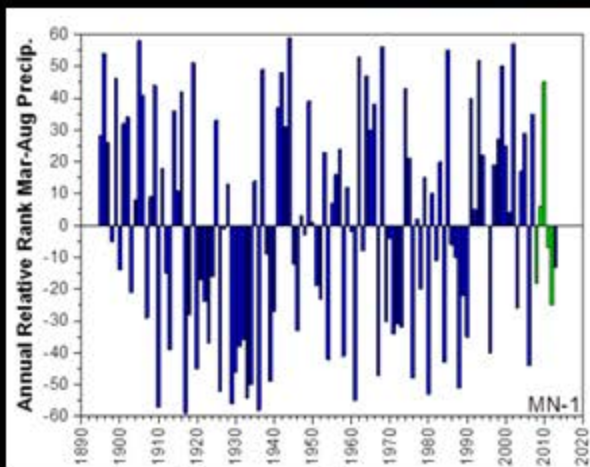
SOURCE OF FUNDS	AMOUNT	Status
Other Non-State \$ To Be Applied To Project During Project Period	N/A	N/A
Other State \$ To Be Applied To Project During Project Period	N/A	N/A
In-kind Services To Be Applied To Project During Project Period		
GS-11 Research Ecologist - 4 pay periods per fiscal year. 70% salary, 30% benefits	\$ 93,348	Secured
Travel for Field Season	\$ 7,750	Secured
GS-9 Biologist - Field Season 70% salary, 30% benefits	\$ 50,625	Secured
GS-11 Research Ecologist - 20 pay periods for Field Season and manuscript completion. 70% salary, 30% benefits	\$ 155,580	Secured
GS-9 Biologist -13 pay periods for manuscript completion. 70% salary, 30% benefits	\$ 39,000	Secured
Funding History	N/A	N/A
Remaining \$ From Current ENRTF Appropriation	N/A	N/A



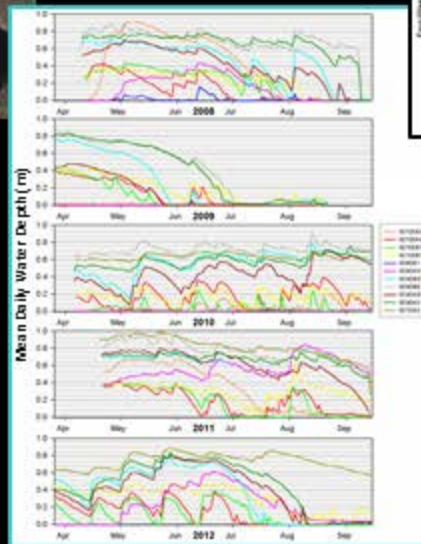
Folden Woods State Wildlife Management Area Ecoregion 51 (Credit Google Earth)



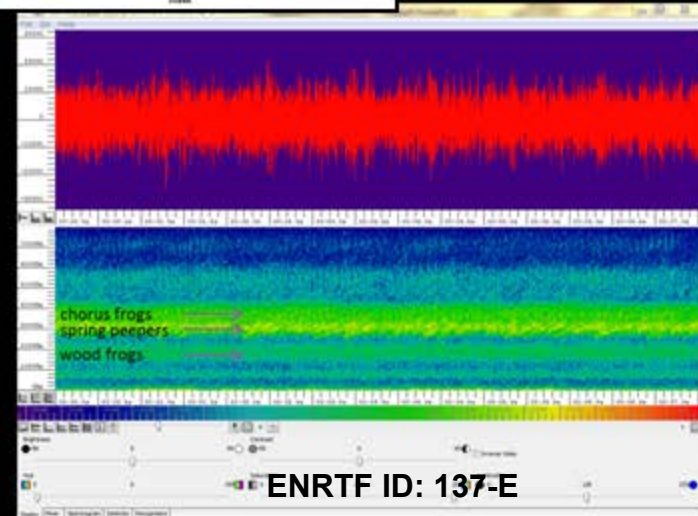
Air-temp logger



Example of historical precipitation data for MN climate-region 1



Example of annual seasonal water depths for wetlands in the St. Croix NSR



Example recording of calling amphibians

Project Manager Qualifications

Dr. Walt Sadinski has been a research ecologist for the U.S. Geological Survey (USGS) at the Upper Midwest Environmental Sciences Center (<http://www.umesc.usgs.gov/>) since 2002. He also has been the principal investigator for the USGS's Amphibian Research and Monitoring Initiative (<http://armi.usgs.gov/>) for the Midwest Region since that time. For several years, he has been the overall lead in developing and implementing an integrated network of partners and research sites to study the long-term impacts of climate change and other global-change factors on ecological conditions in wetland-upland landscapes. Multidisciplinary collaborators in this effort use established and cutting-edge methods to measure environmental conditions, including the use of acoustic recorders and new analytic approaches for acoustic data. Dr. Sadinski will be the project lead for the work described in this proposal.

Organization Description

"The USGS is a science organization that provides impartial information on the health of our ecosystems and environment, the natural hazards that threaten us, the natural resources we rely on, the impacts of climate and land-use change, and the core science systems that help us provide timely, relevant, and useable information." (<http://www.usgs.gov/aboutusgs/>)