Environment and Natural Resources Trust Fund
2017 Request for Proposals (RFP)

Project Title: **ENRTF ID: 030-A**

Waterfowl Vital Rates in Transition Habitats of Minnesota

Category: A. Foundational Natural Resource Data and Information

Total Project Budget: $ 141,120

Proposed Project Time Period for the Funding Requested: 3 years, July 2017 - June 2020

Summary:

This project will evaluate vital rates of waterfowl in a unique breeding region of Minnesota. Unlike other prairie habitats, almost no information exists to manage this savanna-like system.

Name: Joshua Stafford

Sponsoring Organization: U.S. Geological Survey - South Dakota Coop Unit and SDSU

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Brookings SD 57007

Telephone Number: (605) 688 5759

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Web Address http://www.coopunits.org/South_Dakota/People/Joshua_Stafford/index.html

Location

Region: Northwest

County Name: Becker, Clay, Mahnomen, Norman, Polk

City / Township: Detroit Lakes

Alternate Text for Visual:

Map of Detroit Lakes Wetland Management District

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

PROJECT TITLE: Waterfowl Vital Rates in Transition Habitats of Minnesota

I. PROJECT STATEMENT

The majority of scientific literature used to guide waterfowl habitat management decisions is based on research conducted in prairie-dominated landscapes such as the Dakotas, where wetlands tend to be shallow potholes in open grasslands, and lacking forested components. In Minnesota, public lands managed for waterfowl production span prairie, transitional, and even forested habitats. Predicted duck pair use depicted in USFWS "thunderstorm maps" indicate many areas of the transition zone where breeding pairs of upland-nesting ducks may settle in relatively great abundances, and therefore may be considered important areas for these species. Due to considerable differences between the prairie habitats where traditional strategies were developed and the transitional habitats of Minnesota where these strategies are applied, accurate information concerning vital rates of waterfowl produced on transition lands is needed.

Given the potential disparity in management outcomes for waterfowl production between prairie systems and the transition zone, a research project addressing waterfowl production would provide information to guide waterfowl conservation planning (e.g., development of breeding pair models) and management decisions, while preserving biotic integrity of transitional habitats. The information generated from this project would likely aid public and private land managers in making informed decisions concerning waterfowl production in transitional habitats and be utilized in local, Regional, State, or larger landscape-scale conservation planning efforts.

We propose to collect data on waterfowl vital rates in Minnesota transitional habitats by estimating abundance and distribution of breeding waterfowl, estimating density of nesting and nest success of upland nesting waterfowl, conducting brood counts to provide an index of waterfowl production and recruitment, and modeling breeding duck abundance, nesting density, and nest success as a function of site- and landscape-level characteristics.

II. PROJECT ACTIVITIES AND OUTCOMES

Activity 1: Study Site Selection **Budget: $21,954**

USFWS staff, conservation partners, and the research team will select a minimum of 15 study sites within the Northwest Region that are priority management units for waterfowl productions yet also contain plant community characteristics of oak savanna and woodland habitats. This activity will be accomplished using GIS analysis and on-the-ground assessments.

Outcome	Completion Date
1. A minimum of 15 study sites in which to monitor and collect needed data	15 Mar 2018

Activity 2: Data Collection- Breeding Waterfowl Surveys **Budget: $41,542**

A team of field personnel will collect critical breeding waterfowl and wetland data on the selected study sites. The team will conduct breeding waterfowl surveys following the Four-square mile (FSM) protocol. Species, sex, number, and behavior of waterfowl will be recorded. Wetland characteristics collected include basin area, wetland type and class, and percent full.

Outcome	Completion Date
1. Breeding Waterfowl Pair Counts	6 Jun 2018, 2019
2. Wetland Assessments	6 Jun 2018, 2019

Activity 3: Data Collection- Nesting and Brood Ecology **Budget: $41,542**

A team of field personnel will conduct waterfowl nest searches for early, mid-and late-nesting hens. Nests will be marked and revisited every 7-10 days until fate is determined. Data collected includes species, location, clutch size, incubation status, egg biometry, and fate. Habitat criteria measured includes vegetation height, visual obstruction reading (VOR), and litter depth. We will develop an index of brood production by conducting brood counts on wetlands within in selected study sites.

Outcome	Completion Date
1. Nest Searches and Nest Success	20 Jul 2018, 2019
2. Nest Site Location and Characteristics	20 Jul 2018, 2019
3. Brood Surveys	15 Aug 2018, 2019

Activity 4: Data Analysis and Model Development **Budget: $36,082**

We will use the nest survival model in Program MARK to estimate the daily survival rates of nests as a function of habitat covariates. We will use logistic regression to evaluate the influence of habitat variables on nest site selection. We will use generalized linear mixed-effects models to analyze abundance of nests and duck broods among sites and between years. We will use a simulation-based Bayesian approach to estimate parameters of species-specific statistical models, site- and year-level contrasts, and lack-of-fit statistics. We will use model results and ArcGIS 10.3 to create a spatial layer quantifying breeding duck abundance, nesting density, and nest success. We will analyze brood counts from each of the study species using separate Poisson regression models.

Outcome	Completion Date
1. Nest Survival and Selection Models	Jun 30, 2020
2. Abundance and Brood Count Models	Jun 30, 2020
3. Spatial Layer	Jun 30, 2020

III. PROJECT STRATEGY

A. Project Team/Partners

- Dr. Joshua Stafford (U.S. Geological Survey) is the Principle Investigator of this research project, will serve as thesis and research co-advisor, and will assist with quantitative analyses and provide expertise on migratory bird ecology.
- Rebecca Esser (U.S. Fish and Wildlife Service) will assist with study site selection, field logistics, and liaise with USFWS initiatives.
- Dr. Troy Grovenburg (South Dakota State University) will serve as thesis and research co-advisor, and assist with study design, implementation, and quantitative and GIS analyses.
- Stacy Salvevold (U.S. Fish and Wildlife Service) will also assist with study site selection, field logistics and sampling as necessary, and liaise with USFWS initiatives.
- Project Partners Receiving Funds:
- SDSU: Funds may be transferred directly to SDSU or to the University via the USGS Cooperative Fish and Wildlife Research Units Research Work Order process. Funds would be used to support a graduate student, field research, and investigator support if appropriate. In-kind support from the University will be in the form of unrecovered overhead, and direct support from funds controlled by project personnel (Stafford and Grovenburg).

  Project Partners Not Receiving Funds:
- USFWS: Will provide technician and vehicle support for field work, as well as contribute to equipment and supplies costs if feasible.

B. Project Impact and Long-Term Strategy

U.S. Fish and Wildlife Service staff in Detroit Lakes recently completed a Habitat Management Plan (HMP), modeled after the Strategic Habitat Conservation framework, to guide implementation and evaluation of management actions on priority units over the next 15 years. The most critical information needed, but missing during HMP development, was waterfowl breeding and production data from units within the transition zone. A large amount of District-owned lands (>30%) are found within the prairie-hardwood transition; therefore this is a significant need of the District. Information will be integrated into the District's Priority Tool to assist with prioritizing lands for management during the annual work planning process. Findings from this proposed study will be used to make critical management decisions at the management unit and landscape-level. This

2017 Detailed Project Budget

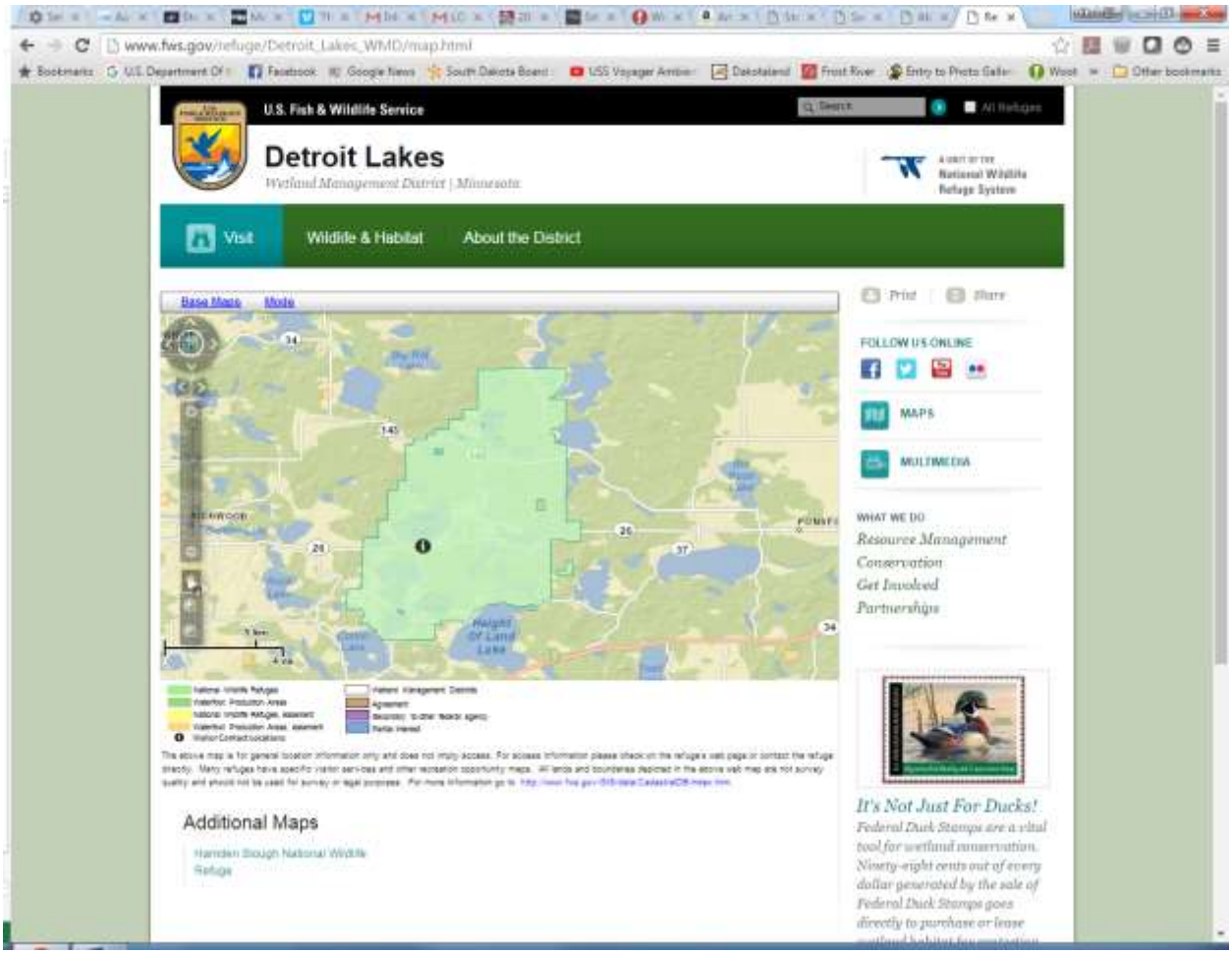
Project Title: *Waterfowl Vital Rates in Transition Habitats of Minnesota*

IV. TOTAL ENRTF REQUEST BUDGET *3* **years**

BUDGET ITEM *(See "Guidance on Allowable Expenses", p. 13)*	**AMOUNT**
Personnel: Graduate Student Stipend (0.49 FTE)	$ 60,750
Personnel: Investigator Salary (0.5 months plus 16.5% fringe plus health)	$ 15,000
Personnel: Field Technicians (2 technicians each field seasont [15 Apr-15 Aug], $10/hour, 40 hours per week, plus 1% fringe	$ 28,870
Equipment/Tools/Supplies: Field Equipment/Supplies	$ 4,500
Travel: Mileage for fieldwork and working with partners ($0.42/mile)	$ 12,500
Additional Budget Items: Tuition Remission	$ 19,500
TOTAL ENVIRONMENT AND NATURAL RESOURCES TRUST FUND $ REQUEST =	$ 141,120

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: *Indicate any additional non-state cash dollars secured or applied for to be spent on the project during the funding period. For each individual sum, list out the source of the funds, the amount, and indicate whether the funds are secured or pending approval.*	$ 5,000	*Secure - USGS -SDSU will contribute to*
Other State $ To Be Applied To Project During Project Period: *Indicate any additional state cash dollars (e.g., bonding, other grants) secured or applied for to be spent on the project during the funding period. For each individual sum, list out the source of the funds, the amount, and indicate whether the funds are secured or pending approval.*	$ -	*Indicate: Secured or Pending*
In-kind Services To Be Applied To Project During Project Period: *Indicate any additional in-kind service(s) secured or applied for to be spent on the project during the funding period. For each type of service, list type of service(s), estimated value, and indicate whether it is secured or pending. In-kind services listed must be specific to the project.*	~$10,000	*Secured - In the form of vehicle and other support*
Funding History: *Indicate funding secured but to be expended prior to July 1, 2016, for activities directly relevant to this specific funding request, including past and current ENRTF funds. State specific source(s) of fund and dollar amount.*	$ -	
Remaining $ From Current ENRTF Appropriation: *Specify dollar amount and year of appropriation from any current ENRTF appropriation for any directly related project of the project manager or organization that remains unspent or not yet legally obligated at the time of proposal submission. Be as specific as possible. Indicate the status of the funds.*	$ -	*Indicate: Unspent? Legally Obligated? Other?*


www.fws.gov/refuge/Detroit_Lakes_WMD/map.html
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Additional Maps
Hamden Slough National Wildlife Refuge
It's Not Just For Ducks!
Federal Duck Stamps are a vital tool for wetland conservation. Ninety-eight cents out of every dollar generated by the sale of Federal Duck Stamps goes directly to purchase or lease

CURRICULUM VITA

Joshua D. Stafford

Education and Degrees Held

1997	B.S.	Wildlife Science	Oregon State University
2000	M.S.	Wildlife Science	South Dakota State University
2004	Ph.D.	Forest Resources (Wildlife)	Mississippi State University

Professional Positions and Experience:

2011present, Assistant Unit Leader and Adjunct Associate Professor, U.S. Geological Suvey, South Dakota Cooperative Fish and Wildlife Research Unit, South Dakota State University
2005–2011, Director, Forbes Biological Station and Bellrose Waterfowl Research Center, Illinois Natural History Survey, Havana.
2004–2011, Assistant Professional Scientist, Center for Wildlife and Plant Ecology, Illinois Natural History Survey, Havana.
2000–2004, Graduate Research or Teaching Assistant, Mississippi State University
1997–2000, Graduate Research Assistant, South Dakota State University

Selected Recent or Relevant Publications:

Stafford, J. D., A. K. Janke, E. B. Webb, and S. R. Chipps. 2016. Invertebrates in Managed Waterfowl Marshes. Pages 565-600 in D. Batzer and D. Boix, editors. Invertebrates in Freshwater Wetlands: An international perspective on their ecology. Springer.

Graff, B.J., J. A. Jenks, J. D. Stafford, K. C. Jensen, and T. W. Grovenburg. 2016. Assessing spring direct mortality of avifauna from wind energy facilities in the Dakotas. Journal of Wildlife Management. DOI: 10.1002/jwmg.1051

Sidie-Slettedahl, A. M., K. C. Jensen, R. R. Johnson, T. W. Arnold, J. E. Austin, and J. D. Stafford. 2015. Evaluation of autonomous recording units for detecting three species of secretive marsh birds. Wildlife Society Bulletin 39:626-634.

Janke, A. K., M. J. Anteau, N. Markl, and J. D. Stafford. 2015. Is income breeding an appropriate construct for North American ducks? Journal of Ornithology. DOI 10.1007/s10336-015-1200-y.

Stafford, J. D., A. K. Janke, M. J. Anteau, A. T. Pearse, A. D. Fox, J. Elmberg, J. N. Straub, M. W. Eichholz, and C. Arzel. 2014. Spring migration of waterfowl in the northern hemisphere: a conservation perspective. Wildfowl Special Issue 4:70-85.

Mammenga, P. D., J. D. Stafford, and M. Grovijahn. 2014. Waterfowl Nesting Structures. Pages 277-308 in K. C. Jensen, K. F. Higgins and S. J. Vaa, editors. A History of Waterfowl Management, Research, and Hunting in South Dakota.

O'Neal, B. J., J. D. Stafford, and R. P. Larkin. 2014. Migrating ducks in inland North America ignore major rivers as leading lines? Ibis 157:154–161. DOI 10.1111/ibi.12193.