Environment and Natural Resources Trust Fund
2012-2013 Request for Proposals (RFP)

Project Title: **ENRTF ID:** **008-A**

Population Ecology of Wood Ducks in Minnesota

Topic Area: A. Fisheries & Wildlife Research

Total Project Budget: $ 677,175

Proposed Project Time Period for the Funding Requested: 5 yrs, July 2013 - June 2018

Other Non-State Funds: $ 0

Summary:

The proposed project will examine the utility of nest boxes to inform management of wood ducks in natural cavities and effects of hunting regulation changes on population growth rates.

Name: Charlotte Roy

Sponsoring Organization: MN DNR

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Bemidji MN 56601

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Web Address http://www.dnr.state.mn.us/index.html

Location

Region: Statewide

County Name: Statewide

City / Township:

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

PROJECT TITLE: Population Ecology of Wood Ducks in Minnesota

I. PROJECT STATEMENT

In 2011, Minnesota increased the daily bag limit of wood ducks from 2 to 3 birds and opened the duck season a week early as permitted by the US Fish and Wildlife Service (USFWS). These changes may increase the harvest of wood ducks in Minnesota. Minnesota is 1 of 3 important waterfowl breeding states in the Mississippi Flyway, including Wisconsin and Michigan, and has traditionally set conservative hunting regulations to protect its breeding populations. Thus, there is concern regarding the effects of these regulatory changes on the size of the breeding wood duck population. We propose to investigate demographic vital rates of wood ducks, including nest success, hen breeding season survival, and brood survival; and to increase monitoring efforts so that harvest rates and annual survival rates can be estimated, and population models can be developed.

The goal of the nesting study is to compare vital rates of wood ducks nesting in nest boxes to those of wood ducks nesting in natural cavities on the same study area. Most nesting studies of wood ducks are conducted in nest boxes because it is easier to obtain data from hens nesting in boxes. However, we know from other published studies that nest boxes do not emulate conditions in natural cavities, yet we manage a population that nests primarily in cavities with data collected from nest boxes. Understanding these differences is needed to guide management of a population for which data are limited and difficult to obtain. Accurate vital rates will improve population modeling and provide information on the annual variability of production among years in birds using natural cavities.

The goals of the population monitoring component of the proposed project are to (1) generate estimates of harvest parameters and annual survival rates of wood ducks from banding data, (2) test published predictions of the changes in harvest rates that coincide with a regulatory change (i.e., 2 v 3 bird daily bag limit), (3) examine the relationship between harvest rates and annual survival rates, (4) develop a population model for wood ducks, and (5) compare estimated rates of population growth generated from aerial surveys and population models. Such information will enable improved management decisions, benefiting both waterfowl hunters and non-consumptive resource users.

To achieve these goals and objectives, we will capture and attach leg bands to wood ducks. For the nesting study, hens will be marked with radio-transmitters and followed back to their nesting locations in natural cavities and nest boxes. We will monitor nests until termination to determine nest success. We will then use radio-telemetry to locate hens and broods and monitor survival to fledging. These data will be used to generate vital rate estimates.

II. DESCRIPTION OF PROJECT ACTIVITIES

Activity 1: Nesting ecology study **Budget:** $345,290

We will capture female wood ducks each spring as they begin nesting. Each hen will receive a radio-transmitter so that we can track her to her nest for weekly monitoring until hatch or nest termination. Nests will be checked using ladders as necessary, camera equipment on a telescoping pole, and single-rope climbing technique. We will then track hens and their broods at least twice a week using telemetry techniques. We will count ducklings and determine approximate ages for calculations of brood survival and attrition.

Outcome	Completion Date
1. Nest success estimates for 3 years	15 Sept 2016
2. Hen breeding season survival estimates for 3 years	15 Nov 2016
3. Brood survival estimates for 3 years	15 Nov 2016
4. Publish results in research summaries and peer-reviewed publications	31 Dec 2017

Activity 2: Banding and monitoring wood ducks **Budget:** $331,885

Outcome	Completion Date
1. Preliminary analyses of 1996-2010 wood duck banding data and estimation of sample sizes of banded individuals required for future work	Complete
2. Five year banding effort	20 Sept 2017
3. Data analysis	30 June 2018
4. Development and evaluation of wood duck population models	30 Nov 2018
5. Publish results in research summaries and peer-reviewed publications	15 Jan 2019

Preliminary analyses of 1996-2010 banding data have been conducted to identify information gaps and necessary sample sizes. These gaps will be filled by banding ducks at 4-5 new sites in Minnesota. Re-encounter data from live and hunter-harvested birds will be obtained from the US Geological Survey (USGS) Bird Banding Lab, and used in data analyses. These analyses will provide estimates of harvest and annual survival rates, and will be used to develop population models. Resultant models will be evaluated.

III. PROJECT STRATEGY

A. Project Team/Partners

Dr. Charlotte Roy, Department of Natural Resources-Wetland Wildlife Population and Research Group (DNR-WWPRG), principal investigator - nesting ecology study; Dr. James Berdeen, DNR-WWPRG, principal investigator - banding; Dr. John Fieberg, DNR-Biometrics Unit, collaborator; Dr. Jeffrey Lawrence, DNR-WWPRG, collaborator; USFWS, collaborators. Funds will go to the DNR to conduct the nesting ecology research and to increase banding efforts beyond what is feasible without these funds. The USFWS will contribute by attempting to increase wood duck banding efforts at their capture sites.

B. Timeline Requirements

The nesting ecology research will require 3 field seasons to capture annual variability in vital rates. Banding efforts will be conducted for 5 years. Data analysis will occur up to approximately one year after the last field season because the USGS Bird Banding Lab requires time to finalize and process this data after hunting season.

C. Long-Term Strategy and Future Funding Needs

This information will be used to guide management and population monitoring of wood ducks. More specifically, the research component will examine the validity of using information collected from nest boxes in lieu of data from natural cavities for management. Knowledge of the relationship between harvest rates and annual survival rates can inform harvest management decisions, and reliable population models can provide insight into changes in the wood duck population.

2012-2013 Detailed Project Budget

Population Ecology of Wood Ducks

IV. TOTAL ENRTF REQUEST BUDGET: *5* Years

BUDGET ITEM	AMOUNT	
Personnel:	$	-
NR Technicians (not yet hired) - banding. Each position is 15% full-time. 92.35% of dollars are for salary. 7.65% of dollars are for benefits. Banding is performed 1.5 months during late summer - early fall for 5 years. Ten NR Techs hired per field season.		$ 222,375
NR Technicians (not yet hired) - nesting ecology. Each position is 33% full-time. 92.35% of dollars are for salary & 7.65% of dollars are for benefits. Field research performed 4 months for 3 years during spring - summer. Eight NR techs hired per field season.		$ 210,384
Contracts: N/A .	$	-
Equipment/Tools/Supplies:	$	-
Waterfowl capture equipment and bait		$ 4,500
Waders and field wear		$ 8,000
Telemetry equipment (transmitters)		$ 40,000
Tree climbing gear		$ 4,000
Electronic nest observation equipment		$ 15,000
Misc. supplies.		$ 900
Acquisition (Fee Title or Permanent Easements): N/A .	$	-
Travel:	$	-
Lodging (1-2 housing facilities for nesting ecology project & 4-5 housing facilities for banding project).		$ 34,000
Vehicle (predominantly mileage and monthly charges)		$ 94,000
Additional Budget Items: DNR used a rate of 6.5% to calculate costs for direct support services, which are DNR's direct and necessary business services required to support this proposal.	$	44,016
TOTAL ENVIRONMENT AND NATURAL RESOURCES TRUST FUND $ REQUEST =	$	677,175

V. OTHER FUNDS

SOURCE OF FUNDS	AMOUNT	Status
Other Non-State $ Being Applied to Project During Project Period: U.S. Fish and Wildlife Service will continue banding at current levels, and will increase efforts if funds staff time are available.	$ -	Pending
Other State $ Being Applied to Project During Project Period: This is the projected 5-year budget for preseason waterfowl banding, the MNDNR project which bands most wood ducks. This project is funded with Migratory Bird Stamp funds. The budget for this project must be approved every year.	$ 57,500	Pending
In-kind Services During Project Period:	$ -	
Charlotte Roy (MNDNR) salary for 3 months per year for 3 years. The time dedicated to this project will entail NR Technician hiring and oversight, field research, data compilation and analysis, and writing reports.	$ 9,000	
James Berdeen (MNDNR) salary for 3 months per year for 5 years. The time dedicated to this project will entail NR Technician hiring and oversight, field research, data compilation and analysis, and writing reports.	$ 15,000	
Remaining $ from Current ENRTF Appropriation (if applicable): N/A .	$ -	-
Funding History: N/A	$ -	

PROJECT MANAGER QUALIFICATIONS **PROJECT TITLE: POPULATION ECOLOGY OF WOOD DUCKS**

Charlotte Roy has been a Research Scientist with the Wetland Wildlife Populations and Research Group of the Minnesota Department of Natural Resources (MN DNR) since 2007. Her research projects with the MN DNR have included Refuge Use and Post-fledging Ecology of Ring-necked Ducks, Investigations of the Invasive Faucet Snail and the Parasites Responsible for Lesser Scaup Die-offs in Minnesota, and Nesting Ecology of Ring-necked Ducks. Before joining the DNR, her research included studies of Cavity-nesting Wood Ducks, Modeling of Cavity Availability for Cavity-nesting Waterfowl in the Midwest, Metapopulation Dynamics of Swamp Rabbits in Bottomland Hardwood Forests, Genetic Relatedness of Raccoons, Landscape Genetics of Swamp Rabbits and Northern Bobwhite, Avian Response to Hydrological Restoration on the Cache River, Population Viability Analyses for Peregrine Falcons in the Midwest, and Mourning Dove Responses to Changes in Hunting Regulations. She has been working with waterfowl for 13 years and executing wildlife research for 16 years.

EDUCATION

PhD, Biology (2004-University of Missouri-St. Louis)
MS, Zoology (1998-Southern Illinois University Carbondale)
BS, Biochemistry (1996-State University of New York at Buffalo)

SELECTED PUBLICATIONS ON WOOD DUCKS

Denton, J. C., C. L. Roy, G. Soulliere, and B. Potter. *In press.* Change in density of duck nest cavities at forests in the North Central United States. Journal of Fish and Wildlife Management.

Denton, J. C., C. L. Roy, G. Soulliere, and B. Potter. *2012.* Current and Projected Abundance of Potential Nest Sites for Cavity-nesting Ducks in Hardwoods of the North Central United States. Journal of Wildlife Management 76(2): 422-432.

Roy, C., J. M. Eadie, E. M. Schauber, N. S. Odell, E. Berg, and T. Moore. *2009.* Public information and conspecific nest parasitism: does nest density affect information quality? Animal Behaviour 77: 1367-1373.

Roy, C. L., P. G. Parker, and R. J. Gates. *2009*. Egg morphology is an unreliable indicator of intraspecific nest parasitism in wood ducks. The Condor 111(2): 377-381.

Roy Nielsen, C., and R. J. Gates. *2007.* Reduced nest predation of cavity-nesting Wood Ducks during flooding in a bottomland hardwood forest. The Condor 109(1): 210-215.

Roy Nielsen, C., R. J. Gates, and E. Zwicker. *2007.* Projected availability of natural cavities for wood ducks in southern Illinois. Journal of Wildlife Management 71(3): 875-883.

Roy Nielsen, C., P. G. Parker, and R. J. Gates. *2006.* Intraspecific nest parasitism of cavity-nesting wood ducks: costs & benefits to hosts & parasites. Animal Behaviour 72(4): 917-926.

Roy Nielsen, C., R. J. Gates, and P. G. Parker. *2006*. Intraspecific nest parasitism of wood ducks in natural cavities: comparison with nest boxes. Journal of Wildlife Management 70(3): 835-843.

Roy Nielsen, C., B. Semel, P. W. Sherman, D. F. Westneat, and P. G. Parker. *2006.* Host-parasite relatedness in wood ducks: patterns of kinship and parasite success. Behavioral Ecology 17(3): 491-496.

PROJECT MANAGER RESPONSIBILITIES

As Project Manager, Charlotte will oversee research, write reports, present to LCCMR, and work with co-investigators Jim Berdeen, John Fieberg, and Jeff Lawrence to ensure that project objectives are met.

ORGANIZATION DESCRIPTION

The Minnesota Department of Natural Resources' overall mission is to work with citizens to conserve and manage the state's natural resources, to provide outdoor recreation opportunities, and to provide for commercial uses of natural resources in a way that creates a sustainable quality of life.