Project Title: **ENRTF ID:**   **185-G**

Precision Conservation Models - Applications to Working Forest Lands

Category: G. Land Acquisition for Habitat and Recreation

Total Project Budget: $ 377,000

Proposed Project Time Period for the Funding Requested: 2 Years, July 2014 - June 2016

Summary:

This project applies state-of-the-art tools to inform precision conservation acquisitions of threatened forest lands in the vulnerable and rapidly changing Pineland Sands Aquifer region.

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Sponsoring Organization: MN DNR

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Location

Region: Central

County Name: Cass, Hubbard, Wadena

City / Township:

_____ Funding Priorities _____ Multiple Benefits _____ Outcomes _____ Knowledge Base

_____ Extent of Impact _____ Innovation _____ Scientific/Tech Basis _____ Urgency

_____ Capacity Readiness _____ Leverage _____ Employment _____ TOTAL _____%

PROJECT TITLE: Precision Conservation Models - Applications to Working Forest Lands

I. PROJECT STATEMENT

A rich interplay of forests, agricultural lands, lakes and rivers, fish and wildlife, and quality recreational opportunities characterizes the prairie-forest border of Northern Minnesota. Major and rapid changes are driving the region's future. Expanding and projected acceleration of irrigated agriculture pose challenges to maintain the region's working forests. Along with forest loss, water quality and groundwater sustainability are pressing concerns. In addition, climate change could shift the prairie-forest border northeastwards and threaten multiple natural resource values. Recent research has identified protection of key industrial forest lands as one important climate resilience strategy for protecting surface water quality and coldwater fisheries, in addition to protecting terrestrial habitat, groundwater quality, and recreational access. DNR staffs have identified an initial set of priority parcels in the Pineland Sands Aquifer region in central MN for proposed acquisition using Outdoor Heritage Funds as an initial hedge against forest conversion. The key driving factors of land-use and climate pressures, limited resources for acquisition, and tradeoffs between multiple resource values, will require a more robust 'ecosystem services' approach to inform precision-conservation of working forest lands in the region.

Ecosystem services are benefits that nature provides people. They include resources that have market values such as timber and crops. They also include critical benefits that currently lack established market values, such as carbon sequestration to mitigate climate change, and nutrient retention to protect water quality. Until recently natural resource managers lacked the methods and tools to evaluate those essential ecosystem services under alternative management scenarios. Our current models to identify and protect the highest priority lands to maximize conservation benefits are static and lack the ability to project how today's benefits can be sustained in the face of future landscape changes. The Natural Capital Project, a partnership of the UMN, Stanford University, The Nature Conservancy, and the World Wildlife Fund, has developed a tool to help fill this gap: InVEST (Integrated Valuation of Ecosystem Services and Tradeoffs; www.naturalcapitalproject.org/InVEST.html).

This project will apply InVEST in innovative ways to inform the land acquisition decisions of DNR and its partners working to achieve the best conservation outcomes on private working forest lands in the Pineland Sands Aquifer region. It will evaluate the relative performance of several possible land-use and land management scenarios with respect to sediment retention, water purification, groundwater protection, carbon storage, timber production, and habitat quality over the next fifty years. The analysis results will be used to inform the choice of priority parcels of industrial forest lands and other lands to be protected via acquisition and other conservation strategies.

II. DESCRIPTION OF PROJECT ACTIVITIES

Activity 1: Land-use and land management scenario development   **Budget: $75,000**

In consultation with a stakeholder advisory team (e.g. county reps, major landowners, NGOs, agency staff) we will develop four to five land-use and land management scenarios in the Pineland Sands Aquifer region for the next 50 years. Potential scenarios could include: two rates of agriculture and development expansion on suitable industrial forest and other private lands and several different precision conservation scenarios that aim to maximize conservation benefits. These scenarios will be iteratively reviewed with a stakeholder advisory team.

Outcome	Completion Date
1. Establishment of stakeholder advisory team and effective communication approach	*Dec. 1, 2014*
2. Current GIS land-use and land cover characterization for Pineland Sands Aquifer region	*Jan. 1, 2015*
3. 4-5 scenarios of land-use and land management change for the region	*May 1, 2015*

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Activity 2: Ecosystem services modeling   **Budget: $255,000**

We will use the InVEST tool to model the provision of ecosystem services provided under the land-use and management scenarios to show how much of each service is produced in biophysical terms (i.e. lbs. of phosphorous retained) and in economic terms (for select services) over the fifty year period. Services modeled include sediment and nutrient retention for water quality improvement, carbon storage and sequestration for climate change mitigation, groundwater protection, timber production, and habitat quality.

Outcome	Completion Date
1. Development of a groundwater ecosystem services model for the Pineland Sands Aquifer	July 1, 2015
2. Quantification and valuation of 5-6 ecosystem services provided under each scenario	Jan. 1, 2016
3. Analysis of tradeoffs amongst the scenarios	Mar. 1, 2016

Activity 3: Acquisition priorities based on precision conservation tools   **Budget: $47,000**

The project team and stakeholder advisory team will use the results of the ecosystem services modeling from the InVEST tool to develop a prioritized set of parcels for acquisition that are most likely to maximize and sustain conservation benefits over the next fifty years. These parcels will become project proposals for acquisition using Legacy Amendment funds, and other state and federal funding sources, thus ensuring today's investments will be sustainable in the future. Complementary conservation actions by various stakeholders will also be recommended.

Outcome	Completion Date
1. Acquisition plans and funding proposal for priority industrial forest land parcels	June 30, 2016
2. Complementary local and regional conservation actions for Pineland Sands Aquifer region	June 30, 2016

III. PROJECT STRATEGY

A. Project Team/Partners

Andy Holdsworth, Ph.D. Science Policy Coordinator of DNR's Operations Services Division, will manage this project. The core project team funded by this project will consist of a half-time DNR project coordinator, a contract ecosystem services modeler, and a part-time GIS specialist. Dr. Steve Polasky of the University of Minnesota's Institute on the Environment/Natural Capital Project will advise on contracting the ecosystem services modeler. This team will work in consultation with acquisition and natural resource staff in DNR's Forestry, Fish and Wildlife, and Ecological and Water Resources Divisions. A stakeholder advisory team will be established and consulted throughout the project to create meaningful scenarios, review modeling results, and provide guidance on recommended conservation actions.

B. Timeline Requirements

This project will require two years (July 1, 2014 through June 30, 2016) to provide timely guidance for acquisition funding proposals and adequate time for land-use and land management scenario development, ecosystem services modeling, and stakeholder engagement throughout the project.

C. Long-Term Strategy and Future Funding Needs

This project is designed to advance DNR and regional partners' use of innovative precision conservation models to ensure our conservation acquisitions and other actions produce sustainable natural resource outcomes for the people of Minnesota. It will leverage and extend conservation prioritization work and outreach that DNR and partners have conducted in 2012-2013 in the Pineland Sands Aquifer region. The results of this project will promptly be used to inform acquisition proposals to various state and federal funding sources.

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2014 Detailed Project Budget

Project Title: Precision Conservation Models - Applications to Working Forest Lands

IV. TOTAL ENRTF REQUEST BUDGET 2 years

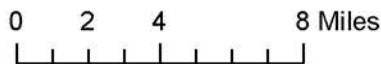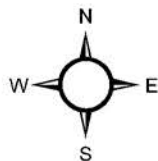| BUDGET ITEM	AMOUNT
Professional Services:	
Project management services ($68/hr)	$ 115,600
GIS data development services ($56/hr)	$ 66,400
This appropriation includes project management services that will be billed using a professional services rate of $68/hr and GIS data development services billed at a rate of $56/hr. The professional services hourly rate includes salary and fringe for project staff, supervisory time, travel costs, supplies, agency directs, and related costs necessary to carry out the project's functions.	
Contracts:	
Ecosystem Services/InVEST modeling	$ 123,000
Groundwater ecosystem services model development	$ 56,000
Precision conservation model development	$ 8,000
Equipment/Tools/Supplies:	
Misc. supplies for ecosystem services modeling	$ 1,000
Travel:	
Lodging during travel to stakeholder meetings	$ 2,000
Additional Budget Items:	
Expenses for hosting stakeholder meetings, incl. room rental, refreshments for participants, AV, printing	$ 5,000
TOTAL ENVIRONMENT AND NATURAL RESOURCES TRUST FUND $ REQUEST =	$ 377,000

V. OTHER FUNDS

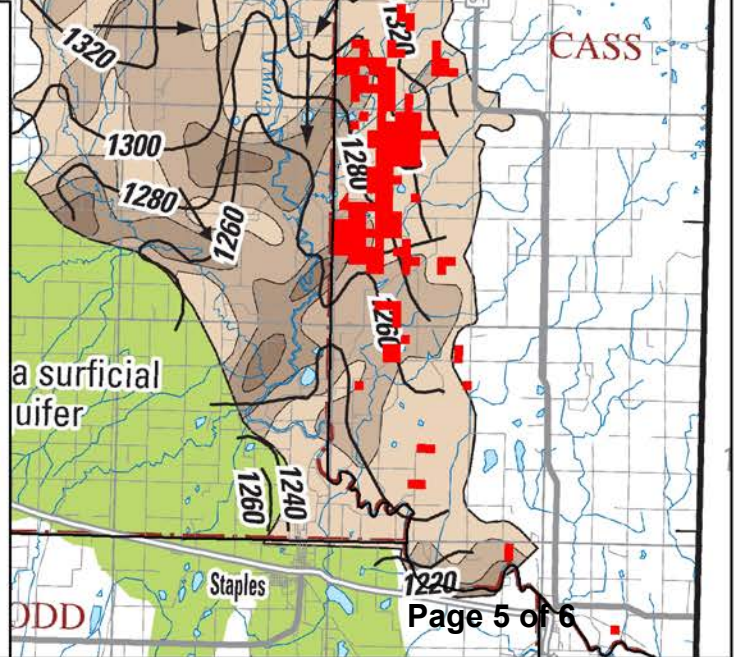| SOURCE OF FUNDS	AMOUNT	Status
Other State $ Being Applied to Project During Project Period: NA	$ -	-
In-kind Services During Project Period: voluntary services provided by stakeholder advisory team members	$ 36,000	*Pending*
Remaining $ from Current ENRTF Appropriation (if applicable): NA	$ -	-
Funding History: NA	$ -	-
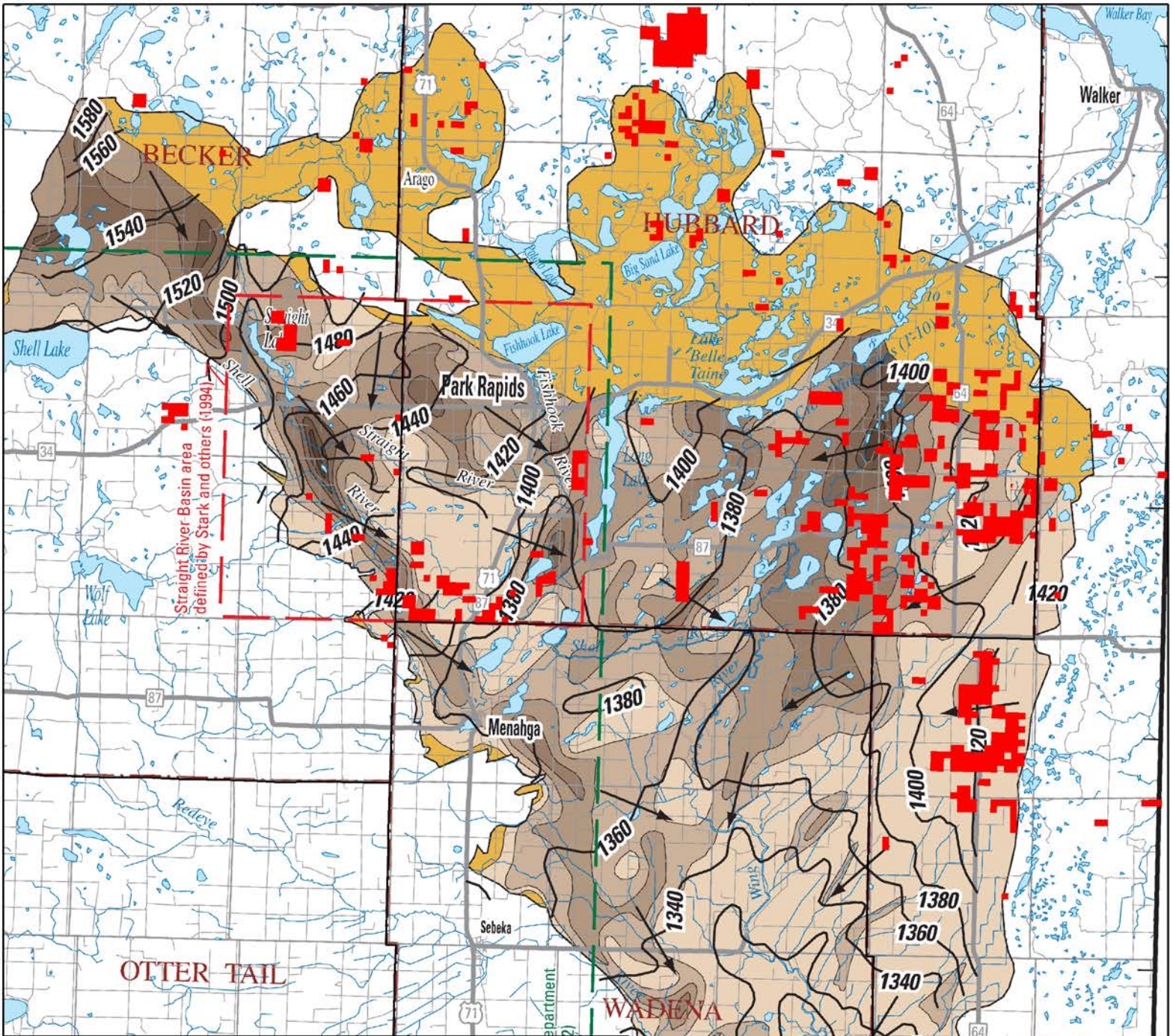
Pineland Sands Aquifer

and Industrial Forest Lands

USGS map showing depth of aquifer contours with Industrial Forest Lands for assessment in red (or black in B&W copy).

BECKER

HUBBARD

Walker

Walker Bay

Arago

Big Sand Lake

Shell Lake

Straight Lake

Park Rapids

Fishhook Lake

Lake Belle Taine

Lake George

Wolf Lake

Straight River Basin area defined by Stark and others (1994)

Menahga

OTTER TAIL

Redeye River

Sebeka

WADENA

CASS

a surficial aquifer

ODD

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PROJECT TITLE: Precision Conservation Models - Applications to Working Forest Lands

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St. Paul, MN 55155
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Project Manager Qualifications

Andy Holdsworth is a conservation scientist and manager with eighteen years of natural resource management experience in government, academia, and non-profits. As a science policy coordinator for the Minnesota Department of Natural Resources, he leads projects to advance strategic conservation, performance measurement, and climate change adaptation at the agency. He has lead the development of DNR's Outcomes Tracking System, an agency-wide information system for integrated performance reporting of DNR programs and projects. He co-lead the stakeholder team that developed the strategic plan that lead to the creation of DNR's Minnesota Forests for the Future Program. He has managed several GIS projects to identify priority conservation areas in Minnesota. He served as a lead member of the interagency team that developed Minnesota's first Clean Water Fund Performance Report. He also served on the working group that developed the 25 year funding framework for Minnesota's Outdoor Heritage Fund. He has also published research on forest ecology and management, fire ecology, and invasive species. He received his PhD in Conservation Biology from the University of Minnesota.

Organization Description
The Minnesota Department of Natural Resources' 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.