

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

Project Title:

ENRTF ID: 102-E2

Redwood and Cottonwood Watershed Historic Air-Photo Georeferencing Project

Topic Area: E2. NR Info Collection/Analysis

Total Project Budget: \$ 64,280

Proposed Project Time Period for the Funding Requested: 3 yrs. July 2013 - June 2016

Other Non-State Funds: \$ 0

Summary:

Project to georeference scanned historic air photography for use with GIS applications and spatial data. Products to be used in land-use management, conservation, habitat, and wetland/shoreland restoration efforts and education.

Name: Douglas Goodrich

Sponsoring Organization: Redwood-Cottonwood Rivers Control Area (RCRCA)

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Location

Region: SW

County Name: Brown, Cottonwood, Lincoln, Lyon, Murray, Pipestone, Redwood, Yellow Medicine

City / Township:

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



Environment and Natural Resources Trust Fund (ENRTF)

2012-2013 Main Proposal

PROJECT TITLE: "Redwood and Cottonwood Watershed Historic Air-Photo Georeferencing Project"

I. PROJECT STATEMENT

Part of the Redwood-Cottonwood Rivers Control Area (RCRCA) and partners includes analysis of conservation efforts and project targeting decisions. Aerial photography is a useful tool in making conservation decisions whether it is for preliminary site assessment, wetland delineations, or for reference in stream restoration efforts. However, most fluvial processes and land-use changes cannot be captured in the course of years and need to be observed and compared over decades to see changes. Digital maps encompassing multiple decades are needed to compare stream bank movement (or non-movement) and land-use changes. In Minnesota, the U.S. Department of Agriculture has provided for the public, digital versions of air photos for use in GIS applications. These photos have been flown and produced nearly every year for the past 10 years. Photography prior to 2002 would need to be georeferenced through a course of methods comparing like landmarks on scanned copies of older air photos to digital aerial photographs. The National Aerial Photography Program (NAPP) did just that for photos flown in 1991 and they are widely used as the "baseline" for wetland delineations. Air photos prior to 1991 aren't readily available for use with GIS data layers. The Minnesota DNR in concert with the University of Minnesota has scanned many of the historic aerial photos flown for the USDA and USGS into a digital format; however few of the photographs have been georeferenced in Minnesota.

This project seeks to collect available and already scanned historic aerial photographs for the Redwood and Cottonwood River watersheds from the 1930's, 1950's and 1960's and georeference them with digital air photos using methods and procedures outlined in college texts and the ArcMap guides for georeferencing air-photos. The goal is to create a mosaic of georeferenced historic photographs through time along the main river corridors of the Redwood and Cottonwood Rivers and work into the other tributaries and remaining watershed as time and funds allow. The material created will be a tool to further analyze the sites of proposed conservation projects, catalog spots for project recommendation (such as wetland restorations), and to be used in conjunction with soil maps and other data layers to create a better picture of the landscape before more intense tiling and ditching ensued. An end result of this project will also be a repository for partners and those seeking historical aerial photos for their own needs. **The project will result in a tool to be used in working toward water quality, habitat restoration, and soil conservation goals.**

OVERALL GOALS:

- *Improve diagnostic tools for prioritizing conservation practice sites in the Redwood and Cottonwood River watersheds.*
- *Updating historical diagnostic material to be used digitally for spatial comparison.*
- *Present historic cartographic information in a format suitable for viewing and inclusion in a greater body of conservation efforts including water quality and habitat management.*
- *Create georeferenced electronic files of maps suitable for access through the Web.*

DIRECT OUTCOMES:

- *Creation of georeferenced historical air photos for use in conservation project site assessment and water quality strategies such as documenting changes in land use, the filling of wetlands, and shoreline changes in the Redwood and Cottonwood watershed region of southwestern Minnesota.*
- *Strengthen local partnerships with conservation districts and watershed professionals to accomplish conservation solutions that work in the Redwood and Cottonwood River watersheds.*

II. DESCRIPTION OF PROJECT ACTIVITIES

Activity: Historic Map Procurement, Analysis Method, and Georeferencing: Budget: \$64,280

This activity will survey public data sources for historic air photos within the RCRCA project area to the extent that they are available. Through an effort by the Minnesota DNR and the University of Minnesota, many of the air photos covering the Redwood and Cottonwood River Watersheds have been scanned and made available to the public through its LandView site. A few of these photos have been

georeferenced already. Georeferencing a photograph is the process of adding spatial coordinates to the image so that it has a relation to the earth's surface by comparing the photo to known coordinates on current digital photographs. This process uses the digital photo as a "form" to "correct" the old air photo for coordinates. RCRCA will collect available and already scanned historic aerial photographs for the Redwood and Cottonwood River watersheds from the 1930's, 1950's, and 1960's, where they exist, and index them to be kept on an on-site server with nightly back-up. Each air-photo covers roughly 6-7 square miles with a file size of 2-3 mb, and each georeferenced file would be roughly 10 mb, so creating enough georeferenced pictures to cover the project area for one time frame (30's, 50's, etc.) would require roughly 3.5 gigabytes of space. The scanned images will be brought into the GIS program ArcMap 9.3 and will be georeferenced by RCRCA staff using current methodology such as in the ArcMap handbook and the like. Partner staff will be used to look over products to advise in areas of interest to be used for referencing the photos and what types of landmarks or ecological areas of interest for areas of concentration. All products will be made available for use on the organizational website or partner websites upon request. This activity will set the groundwork for future interactive map downloads and watershed tours on the organizational web site as well. Such activities will work toward citizen's realization of how changes have affected the watersheds in which they live. All activities in this task will be accomplished by RCRCA staff.

Outcome	Completion Date
<i>1. Obtain set of scanned air-photos to be indexed.</i>	<i>October, 2013</i>
<i>2. Create georeferenced historical air-photos for comparative purposes in the effort of land-use, conservation project, and habitat planning as well as shoreland restorations.</i>	<i>June, 2016</i>
<i>3. Web-page for public and conservation professionals to access GIS ready air photos</i>	<i>June, 2016</i>

III. PROJECT STRATEGY

A. Project Team/Partners

Redwood-Cottonwood Rivers Control Area – (RCRCA): Receiving ENRTF Funds/Providing Matching Funds and Technical Resources: Douglas A. Goodrich-Director, Coordination, reports. Shawn Wohnoutka-Watershed Technician, air-photo procurement, GIS georeferencing, webpage updates.

OTHER Partners: RCRCA JPO organizational partners providing technical assistance and in-kind time for the project. Members of government offices including the Soil and Water Conservation Districts, Environmental, and Planning and Zoning Offices of the eight member counties of RCRCA will review processed maps and provide technical assistance with ensuring the scanned photos and georeferenced maps are available for government and public use on the web. The RCRCA Joint Powers Organization includes the counties of Brown, Cottonwood, Lincoln, Lyon, Murray, Pipestone, Redwood, and Yellow Medicine Counties. Some advice from the MnDNR GIS team may be sought as well.

B. Timeline Requirements

Time requirements would be the sequence of events: 1) Procurement of scanned aerial photographs, 2) Georeferencing aerial photographs, 3) Making georeferenced material available to all interested parties and partners. Phases would be 1) major river corridors, 2) tributaries, 3) and remaining areas of the watershed.

C. Long-Term Strategy and Future Funding Needs

The goal of this project is to georeference historical air photos along the main corridors of the Redwood and Cottonwood Rivers and main tributaries to the rivers. Expanding this effort to the remainder of the watersheds and into the Minnesota River valley would be the next logical step and would be the logical next phase with future funding. Also, the tools created in this project will be used in ranking shoreline and water retention projects in the organization among other uses for local governments.

2012-2013 Detailed Project Budget

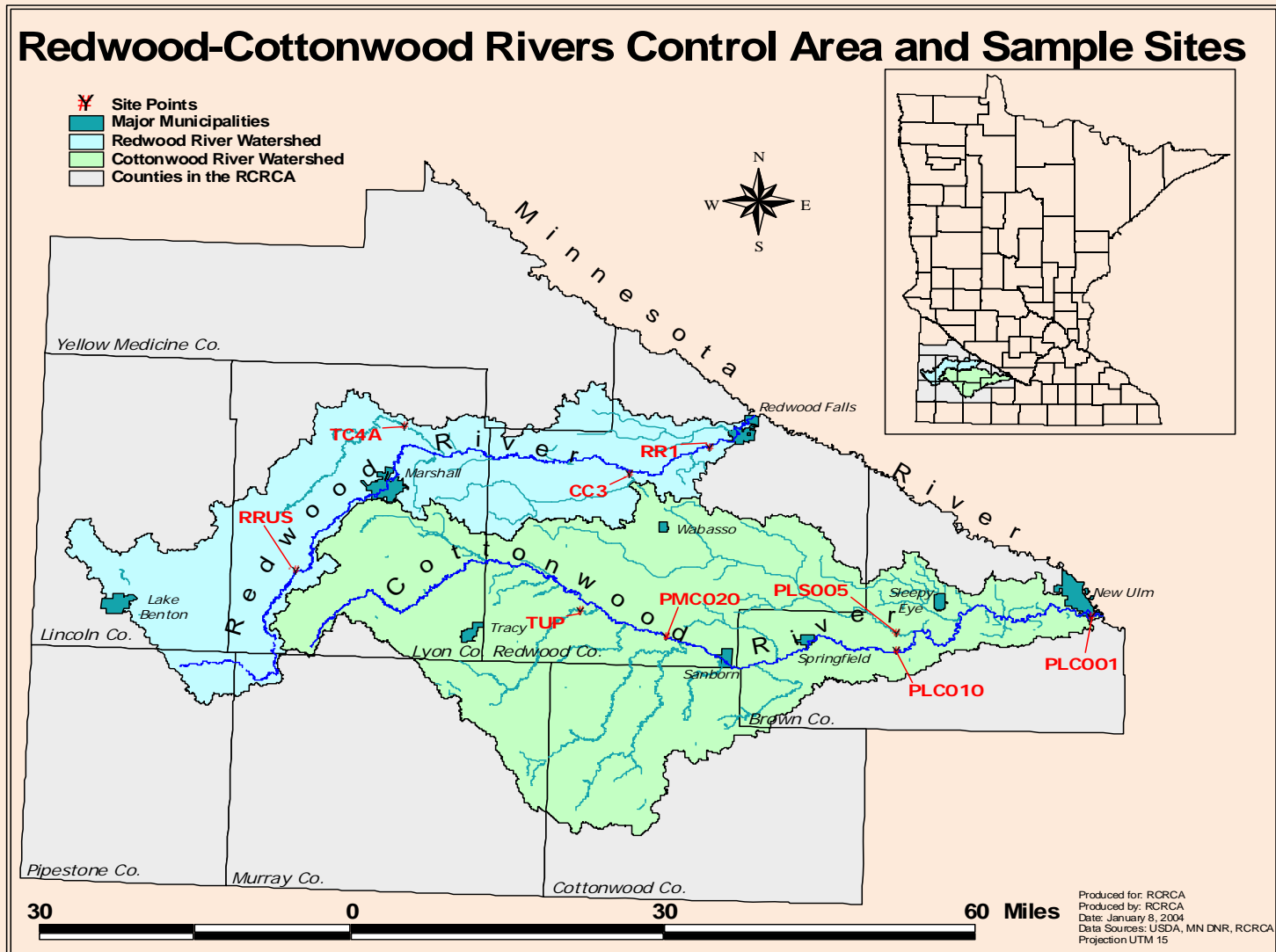
IV. TOTAL ENRTF REQUEST BUDGET (3 years)

<u>BUDGET ITEM</u>	<u>AMOUNT</u>
Personnel:	\$ -
Douglas Goodrich, Director, Project Coordinator and assistance in procurement and review of georeferenced maps: 0.1 FTE, 100% salary, 3 years	\$ 17,480
Shawn Wohnoutka, Watershed Tech., duties to include, air-photo procurement, GIS georeferencing, webpage updates: 0.3 FTE, 100% salary, 3 years	\$ 46,800
TOTAL ENVIRONMENT AND NATURAL RESOURCES TRUST FUND \$ REQUEST =	\$ 64,280

V. OTHER FUNDS

<u>SOURCE OF FUNDS</u>	<u>AMOUNT</u>	<u>Status</u>
Other Non-State \$ Being Applied to Project During Project Period: 33.33% of annual RCRCA organizational appropriation amounts (\$180,000.00 over 3 years)	\$ 60,000	66% Secured, 33% Pending
Other State \$ Being Applied to Project During Project Period: N/A		
In-kind Services During Project Period: Technical assistance and reviewing maps by the county planners and SWCD offices of the eight county members of the RCRCA JPO (Brown, Cottonwood, Lincoln, Lyon, Murray, Pipestone, Redwood, Yellow Medicine).; RCRCA purchasing increased web-server space to accommodate new GIS data and hierarchy created through the project	\$ 20,000	Pending
Remaining \$ from Current ENRTF Appropriation (if applicable): N/A	\$ -	
Funding History: N/A	\$ -	

Redwood-Cottonwood Rivers Project Area



Douglas A. Goodrich, Project Manager:

As the Water Quality Technician and later the Executive Director at the Redwood-Cottonwood Rivers Control Area (RCRCA), Doug Goodrich has coordinated and administrated projects including the organization’s water sampling operations and stream pin studies as well as the Redwood and Brown county Middle MN River streams Diagnostic Study and Redwood and Cottonwood River Turbidity TMDL Reports. His duties include analysis of cooperators participation rates in adopting conservation practices, preparation of timely reports necessary to satisfy grant requirements, conducting research on issues identified by the Board of Directors and diagnostic studies, making recommendations on new program and policy initiatives, providing assistance to local units of government within RCRCA’s jurisdiction in analyzing and solving water related problems, advising the Board of Directors on water management issues as they relate to RCRCA’s goals and objectives, keeping an accurate record of projects funded in association with cooperators in the watershed, as well as updating and maintaining watershed wide implementation plans and diagnostic studies. He brings nearly a decade of water quality planning, conservation knowledge, and project management to the project. He holds a Master’s Degree in Geography and a Bachelor’s Degree in Earth Sciences both from Minnesota State University at Mankato.

Redwood-Cottonwood Rivers Control Area (RCRCA):

RCRCA, established in 1983, is a Joint Powers Organization of eight counties and their Soil and Water Conservation Districts. This JPO structure provides equal representation from both County commissioners and SWCD supervisors. The JPO structure allows multiple agencies to complement each other to better serve the implementation of the proposed project. The structure also provides long-term stability and a decision making body that assists with hiring project staff and the dispersal of grant funds. RCRCA staffs well qualified individuals with proven skills and techniques in many areas to help this project as has been the case for nearly three decades. The organization is able to design and execute BMP implementation projects, analyze and assess areas of priority through GIS mapping and surveying, track and report on progress and findings to be used by other agencies in water plans and reports, and calculate and analyze pollutant loads and flows within the watershed to realize and understand the progress of the project as well as grant facilitation and administration. RCRCA has a proven history backed with an extensive database, long term monitoring program, and an organizational structure that remains supportive and flexible that ensures projects such as the Redwood River Clean Water Project and the Cottonwood River Restoration Project are successful. RCRCA currently holds grants from the Minnesota CWP program, EPAs Clean Water Act Section 319 program, and BWSR administrated technical funds from the clean water tax amendment. In the past, RCRCA had also been funded under the Northwest Foundation and the National Science Foundation. Since 1994, RCRCA has received over \$14 million dollars in grants and loan funds for outreach, monitoring, diagnostics, implementation, and septic loan funds. Currently the organization is working under or overseeing the following Minnesota CWP and Federal Section 319 grants:

- B39161 – “Redwood and Cottonwood Rivers Watershed Conservation and Nutrient Project” 319 - 09 (IMP)
- B42179 – “Redwood River Watershed NPS Reduction Project” 319 – 10 (IMP)
- B33058 – “Cottonwood River Watershed (Lower Minnesota TMDL) Phosphorus Reduction Project” – 09 (IMP)
- B##### - “Cottonwood Streambank Inventory and Prioritization Project” 319 – 11 (IMP)