

Landscape Scale Restoration Project Report



Project Name: GIS Forest Analysis -Rathdrum Aquifer

Funding Year: 2008

Stakeholders

Forest Service Region: USDA Forest Service - R1

Sponsoring Organization: Idaho Dept. of Lands

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Participating Organizations:

Grantee: Idaho Dept. of Lands

Project Funding

Agreement(s): 08-DG-11010000-012

Project Design

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Project Purpose

Water quality is the most critical natural resource issue in Idaho and the West. This cooperative effort between the IDL and local governments will develop/implement a GIS analysis—using CityGreen software and high-resolution satellite imagery—of tree canopy to stormwater mitigation and water conservation and quality in both developed and rapidly developing areas of Kootenai County, ID—an area of ~100 square miles. IDL staff & project partners will also attend a Green Infrastructure workshop to better utilize assessment results in landscape scale planning. Ranking 20th nationally in the rate of population growth, this area sits atop a sole-source aquifer for more than a half-million people in ID/WA. Watersheds that affect/are affected by activities in the project area cover large areas of MT, ID and WA. Both the ID Panhandle National Forest and the IDL Spatial Analysis Project have identified forests adjacent to this project as high priority for restoration projects, and water quality/public drinking water sources were among the top criteria in these analyses. The project will identify vegetative and impervious land cover down to property boundaries, categorized by entire area, local jurisdiction, and land use. The GIS analysis will determine existing—and model future—canopy benefits, provide information for planning, management and education, and will help guide forestry and development activities to maximize public benefits from green infrastructure.

National Themes & Outcomes

Enhance Public Benefits from Private Forests

- Water quality and quantity is protected and enhanced.
- Air quality is improved and energy is conserved.
- Communities plan for and reduce their risks from wildfire.
- The economic benefits and values of trees and forests are maintained and enhanced.
- Wildlife and fish habitat is protected, conserved, and enhanced.
- People are connected to trees and forests and are engaged in environmental stewardship activities.
- Trees and forests are managed and restored to help mitigate and adapt to changing conditions.

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Strategic Issues

Flowing east to west from ID into WA, the Rathdrum Prairie Aquifer covers more than 300 square miles with a recharge area of nearly 700 square miles. Numerous area lakes, streams and drainages provide recharge to the aquifer and contribute to surface water in Lake Coeur d'Alene and the Spokane River. Maintaining water quality and a clean public water supply is identified as a priority within the comprehensive plans for Kootenai and Spokane Counties, and the cities that lie over the aquifer and along the river—including Coeur d'Alene, Post Falls, Hayden, Rathdrum and Spokane. Clean and abundant water is important not just for human water use, but for wildlife, recreation and overall livability—qualities on which the area's economy depends. Forest management organizations are also involved. Over the next three years, the Idaho Panhandle National Forest (IPNF) will complete a number of high priority restoration projects within the Critical Aquifer Recharge Areas (CARA's) and IDL will target private forest owners within the CARA's for Stewardship plans and projects. A significant missing component of these efforts is the use of forests and canopy cover to positively address water quality within the developed and rapidly developing areas of Kootenai County. Due to light, porous soils lying above it, the aquifer is highly vulnerable to contamination, and contamination prevention has been identified as the best strategy for protecting water quality. Though there are many sources of contaminants, the most common are inorganic chemicals generated by normal, everyday activities. For this reason, Spokane County, WA and north Idaho require grassy swales as stormwater filters in all new developments over the aquifer. Through assessment tools such as STRATUM, UFORE and CityGreen, the value of tree canopy to water quality and stormwater control has been well documented, yet trees and forests in developed and developing areas are still viewed primarily as visual amenities. As a result, forested areas are cleared for new developments; new tree plantings are not a component of water quality/ stormwater management in converted farmlands; and vegetative cover continues to be replaced with impervious surfaces.

Collaboration & Partners

Kootenai county and the cities of Coeur d'Alene, Post Falls, Hayden and Rathdrum have pledged to work cooperatively on growth issues. Coordination between these local governments, IDL and the GIS contractor is key to ensure a product that fits the needs and purposes of all partners and provides the desired results. City/county staff, including planners, engineers and foresters, will be involved in planning and oversight of the assessment. Local governments will provide information and datasets such as existing aerial photography, parcel, zoning and land-use boundary files, and existing planimetric data needed for the project. Subsequent to the assessment, project partners will develop prioritized strategic site-specific plans that will utilize tree canopy and green infrastructure to address water quality and stormwater control. One staff person from each city and the county will be invited to join IDL Bureau of Forestry Assistance staff at a green infrastructure workshop presented by the Conservation Fund in spring, 2008. The Panhandle Lakes RC&D will coordinate meetings and bring in desired resources and partners. ID Dept of Environmental Quality and the Panhandle Lakes Health District will provide technical expertise on environmental health and the aquifer relative to the assessment

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Integrated Delivery

CityGreen is a GIS tool that quantifies canopy benefits—including water quality, stormwater mitigation, energy conservation, air quality, and carbon sequestration—using research vetted models. These assessments have been completed in a number of very large metropolitan areas around the country and have established the significant value of forest canopy on a large scale. None, however, have been completed in the inland Northwest. This project will demonstrate this technology as a site specific planning tool across governmental boundaries and quantify the functional value of forests and canopy to water quality, especially in developing areas. One of the tremendous benefits of using GIS is the ability to model future scenarios. What if we increase canopy from 10 to 30% in a specific area—what will the added value be? What will happen if we remove existing canopy while adding more impervious surfaces? How can we accommodate growth and maximize benefits from functional green infrastructure? Through this type of modeling, site specific canopy goals will be established and prioritized, allowing cities and the county to target investments in planting, conservation and infrastructure improvements for maximum benefit. In addition to the analysis and canopy goals, a manual on how local governments, working together, can practically implement and utilize this technology will be developed. Long-range success will be evaluated on how well local jurisdictions work toward achieving prioritized canopy goals, with the software used to model the commensurate impact on water quality. While the focus is on water, the information gained from this project has additional value—helping local governments meet EPA clean air requirements, develop outdoor water-use studies, complete fire risk assessments and for green-space planning. Assessment protocols and reports will be published in hard copy, electronic and online formats, through presentations to cooperators and communities, and at professional meetings. The results of this project will be marketed to, and used as a template for, other areas throughout the state and region on assessment technologies and the quantifiable ecosystem benefits of trees and forests in Idaho.

Influence on Positive Change

This project demonstrates the efficacy of using forest canopy as functional infrastructure, and takes place at the assessment/planning stage. It will be the first time a CityGreen assessment will be completed in the Inland NW and will demonstrate the technology and its use for long-term infrastructure planning. The project is relevant to a wide audience, as many areas in Idaho and the West face similar growth and water issues. By working across a growth area that impacts a county and a number of cities, planning and implementation can be coordinated, increasing effectiveness. As canopy goals are met, benefits to water quality will be realized in both Idaho and Washington. Because of our desire to quantify canopy benefits on public and private lands and use this information to model future scenarios, we will use a GIS-based assessment and analysis tool. The cities and county involved use GIS extensively for natural resource and growth planning. Each has GIS data that will be valuable in the implementation of the analyses. While several assessment programs use similar science-based models to determine the ecosystem values of trees, CityGreen was selected because it is GIS-based. IDL SAP, ID Panhandle National Forest, EPA Region 10 priority watershed and Rathdrum Prairie Aquifer Atlas data were used in prioritizing this location as the project site.

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Accomplishments

Deliverables

Project deliverable include:

- a. High resolution land classification datasets including canopy (broken out by coniferous and deciduous, large trees and small), shrub/scrub, grass/dirt, impervious surfaces (broken out by large parking lots, roads and building footprints).
- b. CITYgreen and energy conservation metrics delivered on a variety of land use and political boundaries.
- c. Models of "what if" scenarios involving different development methodologies and their impact on ecosystem benefits of canopy relative to impervious surfaces.
- d. Presume policy changes in land development ordinances and/or policies that incorporate ecosystem benefit values of canopy in the study area.
- e. Outreach aimed at informing various publics on these benefits, their value and how to maximize their function and utility.

The first three will include quantifiable data/metrics that will inform management and development decisions.

Accomplishments to Date

Utilizing high-resolution aerial photography, the forest canopy (in four classes), impervious surfaces (in three classes), and a shrub/grass layer were captured. This data was then used to complete a high-resolution CITYgreen analysis of ~ 100 square miles over the Rathdrum Prairie aquifer and to model benefits of canopy under different scenarios and develop canopy cover goals. Additionally, an Urban Tree Canopy analysis was completed down to the parcel level. This analysis identified the amount of canopy, impervious and pervious surfaces by area and percentage of total land, number of available planting sites (including those that would provide an energy conservation benefit).

In preparation for the project, nine people attended the Green Infrastructure Workshop in May, 2008, including one person each from the cities of Coeur d'Alene, Post Falls, Hayden, Rathdrum and Kootenai County. Two contractors that helped implement the community forestry program and promote Green Infrastructure projects also attended, as did two IDL staff.

The development of an RFP for the Geospatial contract served as a guide to implementing urban tree canopy and benefits analysis in other areas, and has been used by other Western states in assessments they were planning. Presentations on the project and results have been given to many community groups, two regional GIS conferences, a statewide Horticulture Expo and in many other venues.

Deliverables in Progress

The partners are continuing ongoing efforts to integrate this information into local and regional plans, including energy conservation, air quality and stormwater mitigation.

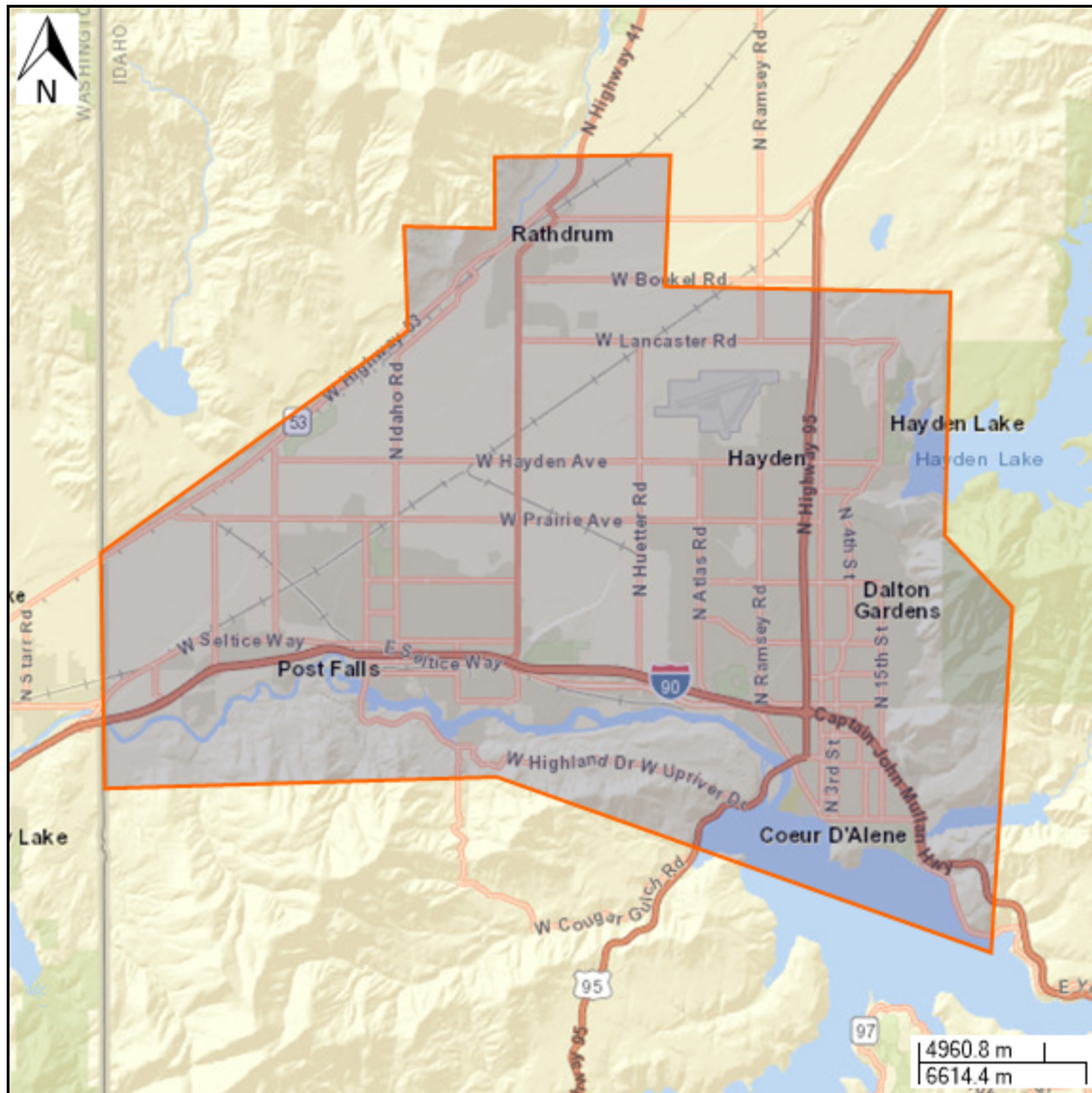
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Challenges

Not all needed datasets at the local level were available.

Impact Area



Information Last Updated

3/31/2015