

Legacy Fund Restoration Evaluations, Fiscal Year 2014



Report to the Minnesota Legislature

Senate Finance Committee, Subcommittee on Legacy
House Environment, Energy and Natural Resources Policy and Finance Committee
House Legacy Finance Division

Lessard-Sams Outdoor Heritage Council
Clean Water Council

Submitted by
Minnesota Board of Water and Soil Resources
Minnesota Department of Natural Resources

Date of Report: April 30, 2015

Legislative Charge

The statutory requirements for this report, as amended in M.L 2011, First Special Session, Ch 6:

Parks and Trails Fund: M.S. 85.53, Subd. 5. Restoration evaluations. The commissioner of natural resources may convene a technical evaluation panel comprised of five members, including one technical representative from the Board of Water and Soil Resources, one technical representative from the Department of Natural Resources, one technical expert from the University of Minnesota or the Minnesota State Colleges and Universities, and two other representatives with expertise related to the project being evaluated. The commissioner may add a technical representative from a unit of federal or local government. The members of the technical evaluation panel may not be associated with the restoration, may vary depending upon the projects being reviewed, and shall avoid any potential conflicts of interest. Each year, the commissioner may assign a coordinator to identify a sample of up to ten habitat restoration projects completed with parks and trails funding. The coordinator shall secure the restoration plans for the projects specified and direct the technical evaluation panel to evaluate the restorations relative to the law, current science, and the stated goals and standards in the restoration plan and, when applicable, to the Board of Water and Soil Resources' native vegetation establishment and enhancement guidelines. The coordinator shall summarize the findings of the panel and provide a report to the chairs of the respective house of representatives and senate policy and finance committees with jurisdiction over natural resources and spending from the parks and trails fund. The report shall determine if the restorations are meeting planned goals, any problems with the implementation of restorations, and, if necessary, recommendations on improving restorations. The report shall be focused on improving future restorations. Up to one-tenth of one percent of forecasted receipts from the parks and trails fund may be used for restoration evaluations under this section.

Outdoor Heritage Fund: M.S. 97A.056, Subd. 10. Restoration evaluations. The commissioner of natural resources and the Board of Water and Soil Resources may convene a technical evaluation panel comprised of five members, including one technical representative from the Board of Water and Soil Resources, one technical representative from the Department of Natural Resources, one technical expert from the University of Minnesota or the Minnesota State Colleges and Universities, and two representatives with expertise in the project being evaluated. The board and the commissioner may add a technical representative from a unit of federal or local government. The members of the technical evaluation panel may not be associated with the restoration, may vary depending upon the projects being reviewed, and shall avoid any potential conflicts of interest. Each year, the board and the commissioner may assign a coordinator to identify a sample of up to ten habitat restoration projects completed with outdoor heritage funding. The coordinator shall secure the restoration plans for the projects specified and direct the technical evaluation panel to evaluate the restorations relative to the law, current science, and the stated goals and standards in the restoration plan and, when applicable, to the Board of Water and Soil Resources' native vegetation establishment and enhancement guidelines. The coordinator shall summarize the findings of the panel and provide a report to the chair of the Lessard-Sams Outdoor Heritage Council and the chairs of the respective house of representatives and senate policy and finance committees with jurisdiction over natural resources and spending from the outdoor heritage fund. The report shall determine if the restorations are meeting planned goals, any problems with the implementation of restorations, and, if necessary, recommendations on improving restorations. The report shall be focused on improving future restorations. Up to one-tenth of one percent of forecasted receipts from the outdoor heritage fund may be used for restoration evaluations under this section.

Clean Water Fund: M.S. 114D.50, Subd. 6. Restoration evaluations. The Board of Water and Soil Resources may convene a technical evaluation panel comprised of five members, including one technical representative from the Board of Water and Soil Resources, one technical representative from the Department of Natural Resources, one technical expert from the University of Minnesota or the Minnesota State Colleges and Universities, and two representatives with expertise related to the project being evaluated. The board may add a technical representative from a unit of federal or local government. The members of the technical evaluation panel may not be associated with the restoration, may vary depending upon the projects being reviewed, and shall avoid any potential conflicts of interest. Each year, the board may assign a coordinator to identify a sample of up to ten habitat restoration projects completed with clean water funding. The coordinator shall secure the restoration plans for the projects specified and direct the technical evaluation panel to evaluate the restorations relative to the law, current science, and the stated goals and standards in the restoration plan and, when applicable, to the Board of Water and Soil Resources' native vegetation establishment and enhancement guidelines. The coordinator shall summarize the findings of the panel and provide a report to the chairs of the respective house of representatives and senate policy and finance committees with jurisdiction over natural resources and spending from the clean water fund. The report shall determine if the restorations are meeting planned goals, any problems with the implementation of restorations, and, if necessary, recommendations on improving restorations. The report shall be focused on improving future restorations. Up to one-tenth of one percent of forecasted receipts from the clean water fund may be used for restoration evaluations under this section.

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Executive Summary

This report was produced in response to state law directing the Department of Natural Resources and Board of Water and Soil Resources to convene an expert Panel to evaluate restoration projects completed with Clean Water Land and Legacy Funds. This model of independent expert review and direct engagement with project managers is unique and provides “value added” benefit to the restoration work of the Legacy Funds. The Agencies plan to use this process to improve conservation outcomes across the State. This report describes seven restoration program / grant evaluations, consisting of 18 individual project sites. Projects sites were evaluated by habitat restoration experts, predominantly separate from the Panel, with knowledge of local habitat types and restoration practice. As directed in statute, projects are evaluated relative to:

the law, current science, and the stated goals and standards in the restoration plan.

The Panel and program coordinator determined that all projects were implemented in compliance with applicable appropriation laws and reporting requirements for each Fund. All projects used practices within the scope of current science.

Statute also directs the Panel to:

determine if the restorations are meeting planned goals, any problems with the implementation of restorations, and if necessary, make recommendations on improving restorations

All projects were determined to have the potential to meet specific planned goals with prescribed management. The Panel identified some problems with implementation that may limit project effectiveness. Project managers have independently taken corrective measures where concerns regarding implementation have arisen.

Based on review of projects over the initial three years of evaluations (2012-2014), the Panel has made four recommendations for improving future restorations:

New in fiscal year 2014

- Improved Design Criteria for Lakeshore Projects

Continuing from previous reports

- Improved Documentation
- Improved Restoration Training Statewide
- Evaluation Process Improvement

This report outlines the basis for these recommendations, actions to address them and how their implementation will be tracked in the Recommendations section (p. 14). The success of implementing actions to improve restoration practice will be presented in future reports.

Introduction

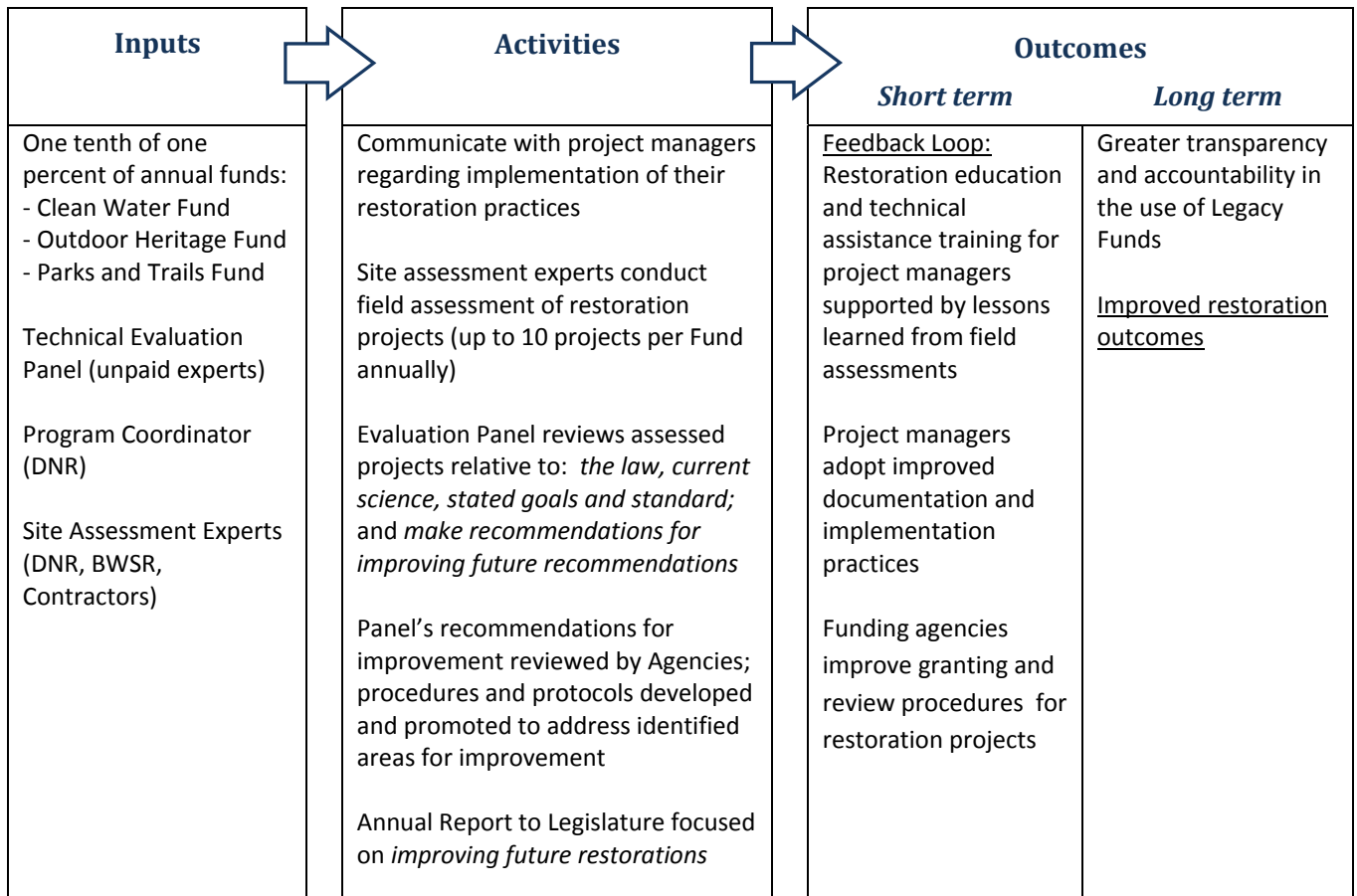
State law (M.L. 2011, First Special Session, Ch. 6) directs the Department of Natural Resources (DNR) and Board of Water and Soil Resources (BWSR) to conduct evaluations of habitat restoration projects funded by the Clean Water Fund (M.S. 114D.50), Outdoor Heritage Fund (M.S. 97A.056), and Parks and Trails Fund (M.S. 85.53). BWSR is the responsible agency for Clean Water Fund restoration evaluations, DNR is the responsible agency for Parks and Trails Fund evaluations and DNR and BWSR are jointly responsible for Outdoor Heritage Fund restoration evaluations. DNR and BWSR (Agencies) have elected to combine the administration and reporting for the three statutory requirements in a single Legacy Fund Restoration Evaluation program. The law directs BWSR and DNR to convene for each of the three funds a restoration evaluation Panel (Panel) containing at least five technical experts who will evaluate a sample of up to 10 restoration projects annually. Evaluation reports are directed to determine whether restorations are meeting planned goals, identify problems with implementation and, if necessary, provide recommendations for improving future restorations.

In 2011 an interagency team created a process guidance document for implementing the combined evaluation effort (http://www.lsohc.leg.mn/materials/resource_doc_plan/Rest_Eval_Program_Legacy.pdf). This document provides the operational basis to conduct the work outlined in this report. The program coordinator in collaboration with the Panel and agencies staff will update the process documents as needed, to reflect the further development and refinement of the program. Fiscal year 2014 was the third year that restoration evaluations have been conducted. To date, evaluations have been completed on 54 projects, this is roughly 25% of the projects currently in the eligible pool for restoration evaluation.

The Agencies goal is to improve conservation outcomes across the State through the evaluation process. A logic model outlining the basic “theory of change” for achieving improved outcomes through the evaluation process is shown on the following page. The logic model also provides a high level basis for evaluating the evaluation program’s effectiveness. The evaluation program’s method of independent expert review and direct engagement with project managers is unique and provides a “value added” benefit to the restoration work of the Legacy Funds. Working collaboratively with project managers to identify gaps and capture lessons learned from restoration implementation, the Agencies plan to use this valuable information to enhance future work through restoration training and technical assistance.

Program Logic Model

“Theory of change” for achieving improved outcomes through the evaluation process



Evaluation Process

This section provides a series of tables outlining the restoration evaluation program process and activities. These include the roles and responsibilities of program participants, project evaluation methods and an overview of Legacy Fund attributes and requirements.

Roles and Responsibilities

Evaluation Panel

Statute directs the evaluation Panel to:

- Evaluate restorations relative to the law, current science, and the stated goals and standards in the restoration plan
- Provide findings on the evaluations, determining whether restorations are meeting planned goals, identify problems with implementation of restorations and, provide recommendations on improving restorations

Members of the Restoration Evaluation Panel are unpaid technical experts. The Panel was chosen to fulfill the statutory requirements for agency representation and to provide a balance of needed expertise. To the extent practicable, Panel members have specific expertise in prairie/grassland, forest, wetland, or aquatic ecosystems and habitat restoration techniques, so that at least one panel member will have proficiency related to any project being evaluated. The panel may seek advice and assistance from others including Site Assessors with additional expertise to help the panel in its work.

Members were selected from a pool of recommendations submitted by agency staff and other partner organizations. Appointed Panel members are asked to serve terms spanning at least two fiscal years. As statute permits, a sixth member from a federal agency was chosen to provide additional expertise and perspective to the evaluation process. Panel members serving during Fiscal Years 2012 and 2013 are shown below.

| Panel Composition | | |
|--|-----------------------|------------------|
| Statutory Direction | Member | Affiliation |
| a. one technical representative from BWSR | a. Carol Strojny | MN BWSR |
| b. one technical representative from DNR | b. Chris Weir-Koetter | MN DNR Parks |
| c. one technical expert from the U of M or MNSCU | c. Sue Galatowitsch | U of MN |
| d. two representatives with expertise related to the project being evaluated | d. Greg Berg | Stearns Co. SWCD |
| e. may add a technical representative from a unit of federal or local government | d. Greg Hoch | MN DNR Wildlife |
| | e. Mark Oja | USDA NRCS MN |

Program Coordinator

The program coordinator is responsible for coordinating site assessments, program administration and managing the work of the Panel and affiliated staff for the three Funds. The coordinator is directed in Statute to:

- Identify a sample of up to ten habitat restoration projects completed with funding from the Parks and Trails, Outdoor Heritage, and Clean Water Funds
- Secure restoration plans for selected projects
- Summarize the findings of the Panel
- Provide reports to the legislature

The Coordinator also leads efforts to facilitate and document continuous improvement in restoration practice. To facilitate these efforts, the Coordinator delivers Panel recommendations to the Agencies, project managers and partner organizations, then works with the Panel and Agencies to identify actions and provide guidance for implementing improved methods. The coordinator tracks, evaluates and reports on the progress and effectiveness of improvement actions. The Agencies have assigned a single coordinator to ensure consistency in program implementation. A proportionate amount of the three Legacy Funds is used to support the coordinator position and a memorandum of understanding (MOU) between the Agencies guides cooperative support for this position. The coordinator position is currently housed in DNR's Ecological and Water Resources Division.

Site Assessors

The site assessors are responsible for conducting the site evaluations and providing the results of the assessments, in collaboration with the Program Coordinator, to the Panel for evaluation. Site assessors are selected based on knowledge of restoration applications in the given project habitat type and project location. Site assessors work closely with the coordinator in assessing project plan materials, conducting site evaluations, and participate in discussion with the Panel to ensure queries are adequately addressed. Site assessors may be State agency staff, LGU or Federal agency staff or a private contractor. Services provided by the site assessors are negotiated through the use of contracts, State Interagency Agreements, or work assignments.

Project Managers

Project managers responsible for implementation are expected to actively participate in the restoration evaluation process. Project managers work with the program coordinator to provide the necessary project background information. Project managers are also expected to attend the site evaluations when possible to not only identify project work sites for the site assessors, but to provide important project context, and answer any questions that may arise.

Project manager affiliations vary between Funds and projects. It is necessary to acknowledge the diversity of managing organizations and the scope and focus of their practice when evaluating project implementation. Project managers for the three Legacy Fund restoration projects may include, but are not limited to the affiliations below:

| Clean Water Fund | Outdoor Heritage Fund | Parks and Trails Fund |
|---|--|---|
| <ul style="list-style-type: none"> - Soil and Water Conservation District (SWCD) manager or technician - Watershed District (WD) staff - Watershed Management Organization (WMO) staff - County Water Resource or Environmental Services staff - City Water Resource staff | <ul style="list-style-type: none"> - State agency staff (DNR, BWSR) - Federal agency staff (USFWS) - County conservation and land management staff - Watershed District staff - Non-governmental wildlife organizations | <ul style="list-style-type: none"> - MN DNR Parks and Trails resource management staff - Three Rivers Park District (via Met Council appropriation) - Outstate park managers, when/if restoration projects are implemented |

Evaluation Methods

Project Selection

The program coordinator chose projects as a representative sample of habitat types and geographic distribution. Project habitat types featured in this report include one stream, eight lakeshores, two wetlands, 3 grasslands and four savanna/grassland projects. Projects with the following criteria were considered eligible for selection:

- Manipulation of a substantially degraded site with the goal of returning the site's natural/historic ecological structure and/or function (e.g. Conversion of an agricultural field to native prairie vegetation; break tile or plug ditch to flood historic wetland)
- Statement of "restoration", "reconstruction", "re-establishment" or "re-creation" in the project description

The number of projects selected was in relative proportion to each Fund's appropriation to restoration evaluations. The projects described include three Clean Water Fund grants with nine project sites, three Outdoor Heritage Fund program appropriations with eight project sites and two Parks and Trails Fund projects. All eight grants and appropriations featured in this report funded restoration activities at multiple dispersed project sites. A smaller subsample of project sites was typically evaluated.

Site Assessments

DNR, BWSR and the Panel developed a process that provides for meaningful evaluation of project effectiveness while keeping the process as simple and consistent as possible. The project evaluation process engages project managers to the extent possible in conducting site visits and communicating lessons learned from project implementation. The Agencies and the Panel believe that facilitating an inclusive evaluation process with project managers will increase the transfer of knowledge between field practitioners and the Agencies and ultimately improve restoration outcomes.

A standardized Site Evaluation Form was developed by the Agencies and the Panel to provide essential project information and answer the key evaluation requirements as directed by law. This form describes site assessors' observations regarding project effectiveness, estimated outcomes based on current conditions and application of current science. The effectiveness of this form will be assessed and improved in future years based on feedback from the Panel, site assessors and project managers.

Projects were evaluated by site assessors who are not affiliated with the respective projects. Sites were assessed by visual inspection of the project's structural components and plant materials. All projects evaluated are in early establishment or still being implemented due to the recentness of the Legacy Funds. Restored plant communities may take several years or even decades to mature. Evaluations are based on observations of the present and projected conditions of specific project site relative to the project goals. Assessments of these discrete project sites do not represent an overall evaluation of the larger program or Fund.

Restoration science is continually evolving. Current state of the art practice is an area of ongoing discussion between practitioners, researchers, government agencies and stakeholders. Site assessors and the Panel evaluate projects for implementation of methods commonly considered to be within the range of current science based restoration practices. Observations by field assessors are summarized in individual project evaluations, Appendix I.

Legacy Fund Attributes and Requirements

Legacy Fund Attributes and Appropriation Laws Applicable to Restoration Projects

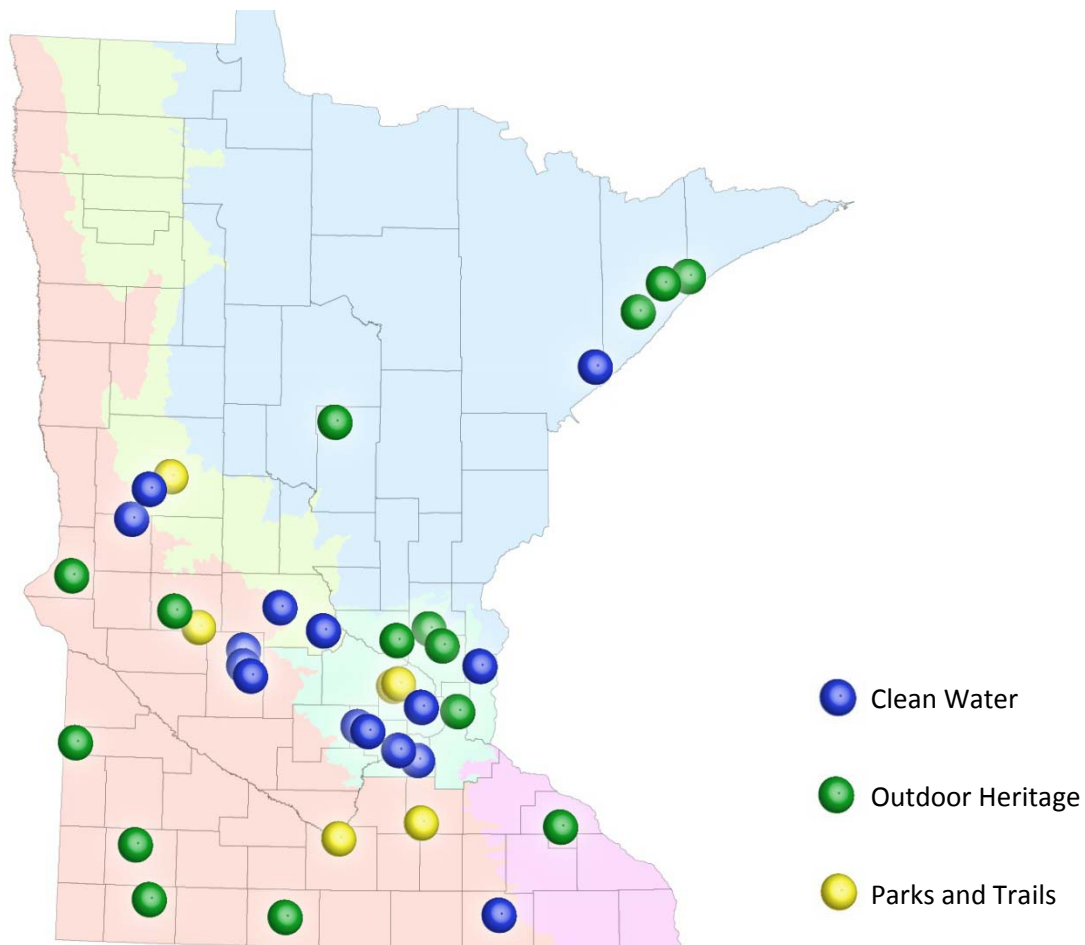
Each of the three Legacy Funds has a distinct focus on restoration projects directed by the Fund’s purpose. Each Fund also has specific requirements pertaining to restoration projects.

| | Clean Water | Outdoor Heritage | Parks and Trails |
|--|---|--|--|
| Fund Purpose | <i>protect, enhance, and restore water quality in lakes, rivers, and streams and protect groundwater from degradation</i> | <i>restore, protect, and enhance wetlands, prairies, forests, and habitat for fish, game, and wildlife</i> | <i>support parks and trails of regional or statewide significance</i> |
| Primary Restoration Goal | Restore water quality | Restore specific wildlife habitat types | Ecological restoration of specific habitat types |
| Guidance for project types and locations | Local water management plan, TMDL Implementation plans, or Watershed Restoration and Protection Strategies | Statewide or national wildlife habitat plans | State or Regional Park natural area management plans |
| Funding source for restoration projects | Competitive grants administered by BWSR | Direct appropriation to project manager. Recommended by Outdoor Heritage Council | - MN DNR appropriation: resource management - Met Council appropriation: Three Rivers Park District |
| Requirements for restoration projects | MS 114D.50 Subd. 4. (a) <i>include measurable outcomes, as defined in section 3.303, subdivision 10, and a plan for measuring and evaluating the results. A project must be consistent with current science and incorporate state-of-the-art technology.</i> | Fiscal Years 2010 & 2011 projects in this report are subject to M.L 2009, Chapter 172, Article 1, Section 2. Subd. 10. and M.L 2010, Chapter 361, Article 1, Section 2. Subd. 9. This includes: - Plant vegetation and sow seed of ecotypes native to Minnesota. - Ecological restoration and management plan (MS 97A.056. Subd. 13. (c)(d), shown in Appendix II (p. 87) | MS 85.53 Subd. 2 <i>include measurable outcomes, as defined in section 3.303, subdivision 10, and a plan for measuring and evaluating the results. A project or program must be consistent with current science</i> |

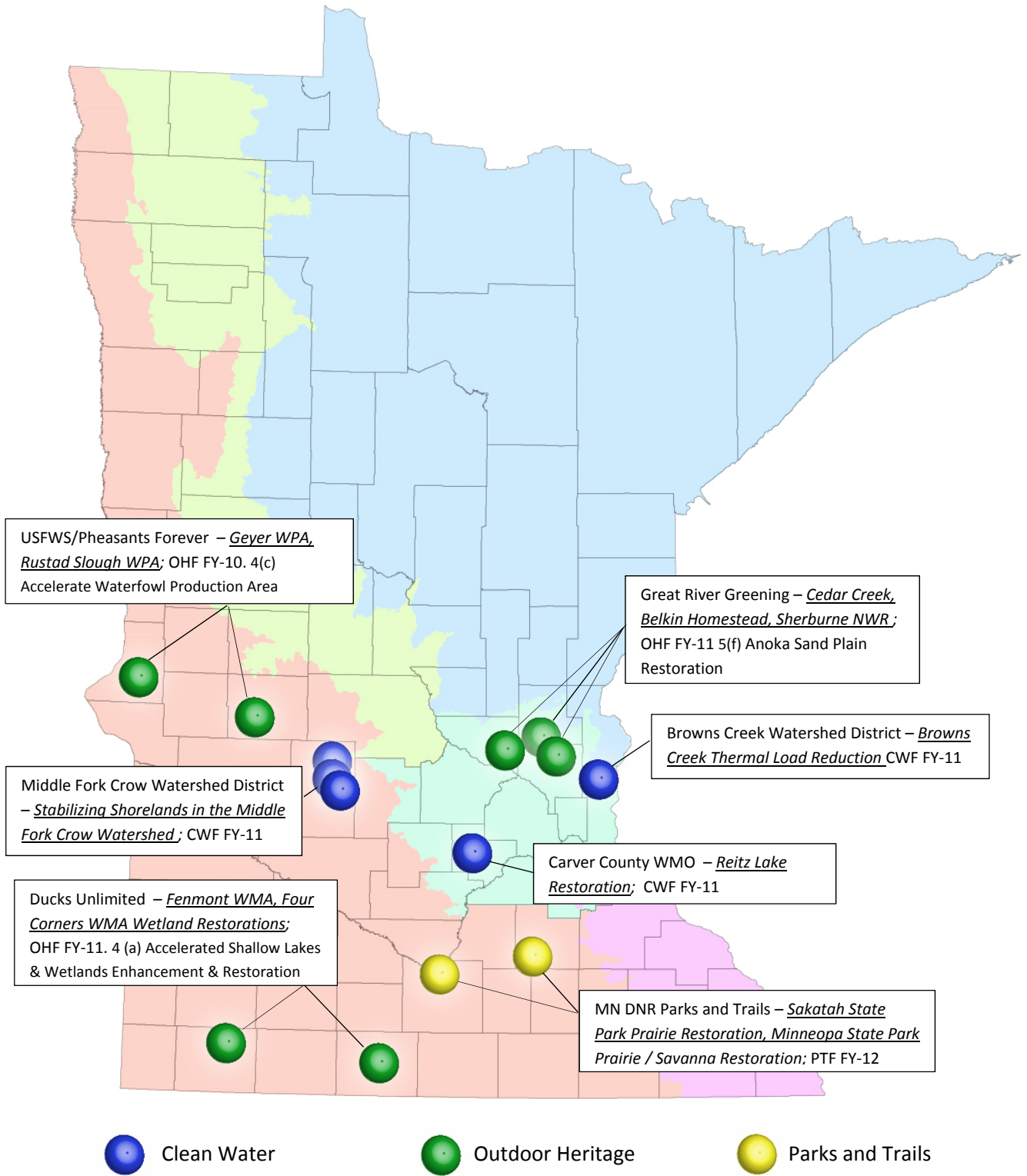
Projects Evaluated - Locations

Projects are selected for evaluation to provide a representative sample of project habitat types and geographic areas of the State. Within a given year, a completely representative sample may not be possible. The number of projects selected for each Fund is proportional to the funding available for restoration evaluation activities. The proportions are adjusted as funding levels change.

| Project Pool / Projects Evaluated | | | | |
|--|-------------|--|------------------|-----------|
| | Clean Water | Outdoor Heritage | Parks and Trails | All Funds |
| Projects evaluated; this report | 9 | 8 | 2 | 19 |
| Projects evaluated; reported to date | 26 | 23 | 5 | 54 |
| Restoration Projects in evaluation program pool. Funded M.L. 2009 to M.L. 2013 | 114 | 43 restorations (A subset of 489 enhancements may be included in the future) | 32 | 189 |



54 projects evaluated to date (A single dot may represent more than one project site)



Location of projects featured in this FY-2014 report. Background color delineates Outdoor Heritage Fund Planning Sections.

Evaluation Summary

As directed in statute, projects are evaluated relative to: *the law current science and stated goals*. Statute also directs the Panel to determine: *problems with the implementation*. A high level assessment of these criteria is presented in this section. Detailed project evaluations are provided in Appendix I (p. 23).

The Law

The program coordinator verified and the Panel concurred that all projects evaluated in this report were completed in compliance with applicable appropriation laws. Each of the three Legacy Funds has specific requirements pertaining to restoration projects (Fund Requirements p. 9).

Clean Water Fund projects are directed to include measureable outcomes and a plan for measuring and evaluating results. They must also be consistent with current science and incorporate state-of-the-art technology. The Panel determined that all nine projects reviewed have complied with statutory requirements for presenting planned measurable outcomes and planning to evaluate results. Project managers provide planned measureable outcomes in standard reporting to BWSR. Measureable outcomes are typically presented in the form of a modeled pollutant load reduction. Evaluation of the project results is fulfilled by routine, uniform inspections conducted by local project management staff at regular intervals (typically annual). Inspection forms are kept on file by project managers.

Outdoor Heritage Fund restoration projects included in this report were implemented with fiscal year 2010 and 2011 appropriations and are subject to Minnesota Laws of 2009 (Chapter 172, Article 1, Section 2. Subd. 10. Project Requirements), and Minnesota Laws of 2010 (Chapter 361, Article 1, Section 2. Subd. 9). These laws direct all project implementers to plant vegetation and sow seed of ecotypes native to Minnesota to the extent possible. Restoration projects must also provide an ecological restoration and management plan per MS 97A.056. Subd. 13. (c)(d), shown in Appendix II (p. 87). All projects reviewed in this report have documented planting plans and seed lists to support fulfillment of plant material requirements. The program coordinator verified and the Panel concurred, that all Outdoor Heritage Fund projects reviewed provided and have on file planning and implementation documentation consistent with requirements for a restoration and management plan.

Parks and Trails Fund projects are required to be consistent with current science, include measurable outcomes, and have a plan for measuring and evaluating results. The two MN DNR Parks and Trails projects reviewed complied with statutory requirements for presenting measurable outcomes as reported in acres of specific upland habitat types restored. Ongoing evaluation of project results is fulfilled through the project manager's documentation of ongoing monitoring and adaptive management activities.

Current Science

Practices implemented were within the range of current science based restoration practices for the given project type. Restoration science is continually evolving and current state of the art practice is an area of ongoing refinement and discussion between practitioners, researchers, government agencies and stakeholders. Individual project site evaluations for each Fund are presented in Appendix I, p. 23

Stated Goals

All projects reviewed were determined to have the potential to meet stated project goals if prescribed management is implemented as planned. It will take several years of monitoring by project managers to determine if longer term outcomes will be achieved. The Panel noted deficiencies in the clarity and detail of specific goals for some projects. Guidance for improving the clarity of goals is provided in the recommendation for improved documentation (p. 17).

Problems with Implementation

The majority of projects had no significant problems with implementation. These projects employed accepted controls to monitor and manage projects towards desired outcomes, in acknowledgment of typical challenges faced by restoration projects. The panel noted problems with the implementation of some projects that may limit their effectiveness. Specific issues pertained to Clean Water Fund lakeshore projects on private properties:

- Inadequate site preparation and management to control invasive species.

Proper site preparation and management to control problem invasives is vital for successful outcomes for planting projects. In one instance, desirable Sandbar Willow was removed and Reed Canary Grass was inadequately treated with herbicide for site preparation. This site also did not receive post planting management per maintenance agreement. Project managers have taken steps to work with the property owner to maintain the project per maintenance plan agreement. Further engagement by project managers will be needed to ensure compliance and a positive outcome for this site.

- Project effectiveness limited by site features such as walls and patios.

The panel felt that some projects were implemented in a way that impeded their benefit as a restoration. Specific issues were the concurrent installation of walls at the top of slope and other hard structures that increased impermeable surface, narrowed the inland depth of the buffer planting and reduced interception of upland runoff (Note: Clean Water funds were not used for structural amenities). One of the managing watershed districts is looking to amend their shoreline agreement policy to no longer fund projects where walls or other discretionary hard structures are installed simultaneously.

Recommendations for Improving Future Restorations

Statute for restoration evaluations directs the Panel to determine:

any problems with the implementation of restorations , and if necessary, recommendations on improving restorations.

The emphasis of reporting is also directed in statute.

The report shall be focused on improving future restorations.

The Panel provided one new recommendation based on evaluations in this report and previous reports. Updates and implementation plans are provided for three continuing areas for improvement identified in prior reports.

New Recommendation

Improved Design Criteria for Lakeshore Projects

The Panel recommends that project managers establish consistent minimum design criteria as guidance for lakeshore projects. These improved criteria will enable project managers to more effectively select projects that will provide a minimum level of benefit toward funding goals.

This recommendation applies to all Legacy Funds where lakeshore projects are engaged. The basis for this recommendation is primarily observations from Clean Water Fund lakeshore restorations in this report and previous reports. Deficiencies observed include:

- Insufficient scale: shoreline buffer narrower than recommended landward width based on current science; the Panel felt this did not provide adequate scale to fully benefit project goals
- Inadequate site preparation and maintenance: desirable vegetation removal, insufficient treatment of invasive vegetation
- Less than optimum siting: Lack of connection to or interception of upland runoff due to topographic constraints; concurrent placement of impervious surface in the shoreline zone

The Panel felt that this recommendation was important to address the need for consistent performance for publicly funded projects. While lakeshore projects evaluated are primarily small voluntary best practice implementations, they do highlight a specific area for improvement where viable solutions are available.

Projects that site assessors and the Panel assessed to have achieved greater benefits shared the following attributes:

- designed at a scale to provide significant water quality and habitat benefits based on current science.
- sited based on a clear need (gully erosion, bank erosion) and/or strategically positioned in the landscape (to intercept an appreciable area of upland runoff with a disturbed landcover type, several times larger than the property or project site).

The Panel identified existing local government and State programs that have effectively used minimum design criteria and achieved successful outcomes and abundant participation (examples on following page). Implementation of minimum criteria, such as a native vegetation buffer of at least 75% of the shoreline length and at least 25 feet landward of the Ordinary High Water Level, provide a more appropriate example for promoting social adoption of natural shoreline practices and a greater level of support for achieving larger restoration goals. Bioengineering practices that rely primarily on vegetation and natural materials for shoreline stabilization should also be considered first priority techniques whenever practicable.

Design criteria should be established by project managers to accommodate local, regional and site conditions and specific project types, such as upland runoff buffer or shoreline habitat restorations. Adaptability to specific conditions and constraints is vital to ensuring effective guidance.

The following recommendation outline was developed for improving restoration outcomes through design criteria.

| | |
|----------------------------|---|
| Recommendation | Establish and improve criteria for the design of lakeshore restoration projects |
| Goal | Achieve consistent high level of performance from publicly funded lakeshore restorations |
| Who takes action | Project managers |
| Action | <ul style="list-style-type: none"> - Establish minimum design criteria based on programmatic goals and local conditions; integrate with existing direction for shoreline restoration from TMDL or local water plan. Utilize guidance from state agencies and area technical assistance staff to identify appropriate criteria. - Specify minimum design criteria in lakeshore BMP agreements (between LGU project managers and landowners) - Promote the value / technical need for established criteria - Utilize improved criteria when recruiting and screening potential projects |
| Improvement tracking | <ul style="list-style-type: none"> - Agencies include questions regarding design criteria in project managers surveys |
| Indicators of improvement | <ul style="list-style-type: none"> - Project managers establish or codify minimum design criteria (timeframe to be developed) |
| Measurement of improvement | <ul style="list-style-type: none"> - Projects are implemented utilizing new design criteria (timeframe to be developed) |

Below are examples of design criteria integrated into organizational policy that have proved viable and successful for ensuring best practice implementation.

Stearns County SWCD Board Policy for Shoreland Projects

All shoreland restoration projects are required to have a native buffer in existence or planted as part of an approved Stearns County SWCD plan. The native buffer on the property shall require at least 75% of the shoreline length, with a maximum traffic area of no more than 25 feet along the shoreline. Properties in public and commercial ownership can be given exception to this policy, but will have to adhere to having a 75% buffer of native vegetation on the length of shoreline owned. Public and commercial properties will have to provide a needs and suitability request for a larger traffic area to the SWCD Board. Traffic area is defined as any area not containing a majority of native vegetation, ie: mowed grass, areas with retaining walls, steps, paths, buildings, other topographic alterations or man made structures. The existing and new buffer areas shall extend at least 25 feet landward of the Ordinary High Water Level of the lake/river or to the top of the nearest slope (12% steepness or more) whichever is greater. This shall be applied to the watercourse of all properties where projects are proposed and implemented.

Minnesota DNR - Division Of Fisheries And Wildlife, Aquatic Habitat Program Shoreland Grant Application Information

Projects on private properties will have at least 75% of the frontage restored with an adjacent buffer zone that is at least 25 ft deep/wide. The focus of these projects must be on reestablishing habitat for fish and wildlife using locally native riparian and aquatic vegetation, wood and natural structures to provide in lake habitat, and/or fluvial geomorphology based restoration in streams. Projects that include the use of rock riprap instead of bioengineering for stabilization or permanent wave breaks will not be funded. Funds can be used for materials needed to reestablish aquatic habitat including: native trees, shrubs, plants and seeds, temporary biodegradable toe protection and erosion control fabric, mulch, herbicide to treat invasive species on site, labor to design, install and maintain project, labor to implement appropriately designed stream and river restorations, temporary biodegradable wave breaks and temporary fencing for keeping out foot traffic or herbivores (geese/muskrats) from the site. If projects are implemented in a manner different from the approved plan, without prior approval for the changes by the DNR Authorized Representative, the entire grant may be terminated and no future payments made.

Continued Recommendation

Improved Documentation

First made in 2012, this recommendation appeared in the Fiscal Year 2012 and 2013 reports. The Panel believes proper documentation is critical for understanding, tracking and achieving successful restorations. To achieve a consistent base level of documentation the Panel recommends that the Agencies work to improve documentation through targeted trainings and grant guidance for project managers. As a preliminary step, the program coordinator in collaboration with Agency staff developed a basic template and example of project data (Appendix II p. 87). Progress in promotion and adoption of documentation best practices will be tracked by the program coordinator. Recommendations and guidance for improved documentation will be updated in future reports. The table below outlines recommendation steps and tracking.

| | |
|-------------------------|---|
| Recommendations | <ul style="list-style-type: none"> - Consistently document restoration project data in a simple accessible format. - Designate one project partner to permanently store project data. |
| Goal | Enable current and future project managers and funding organizations to readily access and understand essential components of a restoration project. |
| Attributes and benefits | <ul style="list-style-type: none"> - Provides managers and stakeholders with consistent assumptions - Links clear project goals to desired outcomes - Allows for the effective tracking of progress towards desired outcomes and directing future actions through easily observable, quantifiable measures - Facilitates improved communication of lessons learned to benefit future projects - Provides a basis to evaluate outcomes and determine if projects are strategic conservation investments |
| Basis / Context | <ul style="list-style-type: none"> - Consistent documentation of essential planning and implementation data is a prerequisite of effective projects. Many Legacy Fund restoration projects included thorough documentation - Panel noted gaps in achieving a consistent level of documentation - Shortcomings observed: <ul style="list-style-type: none"> o Project specific goals were not always clear. In some cases, implemented actions were considered to be goals. While implemented actions were typically adequately documented, the actions taken were often not explicitly linked to the overall goal(s) of the funding. o Plans lacked easily observable, quantifiable measures for managers to readily gauge project success post installation. |
| Who takes action | Funding Agencies -> Project managers |

| | |
|----------------------------|--|
| Actions Taken | <ul style="list-style-type: none"> - Project documentation template and example project data showing how essential planning and implementation documentation could be displayed is provided in Appendix II p. 87 and Appendix III p. 93. - Evaluation program review of project data for all evaluated projects and engagement with project managers regarding vital components of project plans |
| Actions Planned | <ul style="list-style-type: none"> - Integrate improved documentation topics into existing trainings: BWSR Academy, others as appropriate - Integrate improved documentation guidance into grant reporting materials |
| Improvement tracking | <ul style="list-style-type: none"> - Agencies and the Panel will establish a check list of key project data. Site assessors and the program coordinator will assess evaluated project plans and rate the overall performance of project documentation based on established criteria. This is intended to be a non-punitive formative assessment of project documentation to identify and direct future documentation needs in practice and trainings. |
| Indicators of improvement | <ul style="list-style-type: none"> - Project managers adopt improved documentation methods - Evaluation program and new project managers observe improved practices and are able to readily access and understand site specific project data - Project managers/partners have clear understanding of who will retain project information and where it will be stored |
| Measurement of improvement | <ul style="list-style-type: none"> - Number/percent of project plans evaluated that meet established documentation criteria |

Continued Recommendation

Improved Restoration Training

This recommendation appeared in the Fiscal Year 2012 and 2013 reports. The panel believes continued development and implementation of training is essential for improving restoration practice and project outcomes. To date, it has recommended that the following areas be targeted:

- Improved documentation
- Improved application of design criteria
- Improved guidance for challenging project types including streams and lakeshores

Based on these recommendations, the program coordinator in collaboration with the Agencies and Panel will identify specific opportunities to develop and disseminate trainings. The Agencies will track and report progress in integrating evaluation recommendations and lessons learned into new and existing trainings. The table below outlines the improved training recommendation and tracking framework.

| | |
|-----------------|---|
| Recommendation | Continue and bolster statewide efforts to disseminate restoration best practices to meet the needs of restoration practitioners. |
| Goal | Improve restoration practice through improved targeted training directed by evaluation findings |
| Basis / Context | <ul style="list-style-type: none">- Compiling and disseminating current science based restoration practices and showcasing exemplar challenges and successes from the field is critical to improving practice.- The types of funded projects and the community of restoration practitioners throughout the State are diverse. Trainings must be appropriate and adaptable to meet the needs of these diverse projects and practitioners.- Training must also be able to reach disperse outstate managers through digital means or local technical support. A suite of formal classroom, peer to peer and field based experiential learning settings should be employed as appropriate to meet training needs. |

| | |
|----------------------------|--|
| Existing trainings | <p>Effective formal trainings currently exist in Minnesota, including:</p> <ul style="list-style-type: none"> - Restoring Minnesota: Five online training components and associated field training sessions to support dissemination and application of restoration best practices are available through the Ecological Restoration Training Cooperative coordinated by the University of Minnesota in partnership with MN DNR, BWSR and MN Department of Transportation (http://cce.umn.edu/Restoring-Minnesota). This program is designed to support foundational restoration skills and knowledge for a wide array of practitioners including professional staff, technicians and community members by sharing the best available knowledge from research and practice. - BWSR Academy: State of the art training in technical and operational restoration practices is provided by the annual BWSR Academy training (http://www.bwsr.state.mn.us/academy/). This training provides usable technical skills, to primarily local government staff, for implementing restoration projects and administering programs funded by BWSR grant programs. |
| Who takes action | Agencies, evaluation program/Panel |
| Actions Taken | <ul style="list-style-type: none"> - Program coordinator has established key areas of practices to be highlighted in training materials based on evaluation findings and recommendations: <ul style="list-style-type: none"> o Project documentation o Application of design criteria o Challenging project types: streams, lakeshores |
| Actions Planned | <ul style="list-style-type: none"> - Panel and program coordinator 1) compare needs identified from evaluations with existing training content 2) identify gaps and opportunities for targeted trainings - Evaluation program prepares practice case studies designed to support restoration technical trainings - Integrate evaluation program findings and recommendations into existing trainings. <ul style="list-style-type: none"> o BWSR Academy: BWSR is committed to ensure Panel recommendations are conveyed to LGUs and technical trainings supporting recommendations are included. |
| Improvement tracking | <ul style="list-style-type: none"> - Agencies and the Panel establish protocol for tracking how and when evaluation program guidance is utilized in trainings |
| Indicators of improvement | <ul style="list-style-type: none"> - Recommendations and lessons learned from evaluations are integrated into new and existing trainings - Agencies observe improved utilization of guidance from evaluation program, directed by trainings. |
| Measurement of improvement | <ul style="list-style-type: none"> - Utilization measured using standard project manager surveys (e.g. BWSR Performance Review and Assistance Program) |

Continued Recommendation

Evaluation Process Improvement

The Panel has made related recommendations to improve the evaluation process. They are:

- (1) Conduct follow-up (multi-year) site evaluations on a subset of the projects (FY12 report)
- (2) Conduct project case studies and (3) track factors for success (FY13 report)

The Panel believes the restoration evaluation program should implement these strategic process improvements to better document long-term restoration outcomes and be successful in achieving its stated goal of improving future restorations. Progress made in these three areas will be tracked and presented in future reports. The table below provides an outline of recommendations and anticipated actions.

| | |
|------------------|--|
| Recommendation | <p>Make strategic operational improvements to the restoration evaluation process:</p> <p>Recommended Fiscal Year 2012</p> <ul style="list-style-type: none"> - Follow-up site evaluations <p>Recommended Fiscal Year 2013</p> <ul style="list-style-type: none"> - Case studies - Track factors of success |
| Goal | Effectively accomplish statutory goals and contribute to improvement in restoration outcomes |
| Basis / Context | <p>Reach and impact of current/previous program methods could be improved through the following actions:</p> <ul style="list-style-type: none"> - Follow-up site evaluations will further inform the accuracy of initial site assessments and can be used to recalibrate field assessment methods. - Case studies will inform future restoration practice and policy through trainings - Tracking factors of success will illuminate key components and indicators to guide future policy and practice. |
| Who takes action | Agencies, Panel |
| Actions Taken | - Follow-up site evaluations: Five sites evaluated in 2012 were revisited in 2013 |

| | |
|-----------------------------------|---|
| <p>Actions Planned</p> | <ul style="list-style-type: none"> - Follow-up site evaluations: Track critical aspects of project effectiveness by selecting a subset of previously evaluated projects for follow up evaluations. It is anticipated that two or more sites will be revisited per Fund each year. - Case studies: Examine the process, decision making and outcomes of selected projects to best learn from challenges and successes in implementation. Case studies will be included as appendices in future restoration evaluation reports. They may also be used to support technical assistance guidance and restoration trainings. It is anticipated that at least two in-depth case studies of projects and/or practices will be produced annually. The program coordinator will work with the Panel and Agencies to determine effective mechanisms and formats for highlighting projects and practices for target audiences. - Track factors of success: Track environmental, social and operational factors that influence restoration success. Factors such as public and private landownership, environmental extremes, type of implementing organization, high level plan guidance, plan documentation, field monitoring protocols, project manager turn over and shifts in state of the art restoration techniques should be assessed. Within ten years, trends and indicators of project success and areas for improvement should emerge as the sample of evaluated projects becomes larger. Findings should be compiled and disseminated by the evaluation program coordinator to help guide future restoration planning and management. |
| <p>Improvement tracking</p> | <ul style="list-style-type: none"> - Follow-up site evaluations: Number of revisits and key revisit findings documented - Case studies: Number of case studies, distribution and survey of utilization documented - Tracking factors of success: Follow up survey of evaluated project managers will provide essential data on project success and associated organizational and operational factors. Findings of an initial survey of factors influencing Legacy restoration projects is anticipated to be presented in 2017, based on findings from the first five years of the evaluation program. |
| <p>Indicators of improvement</p> | <ul style="list-style-type: none"> - Recommendations implemented |
| <p>Measurement of improvement</p> | <ul style="list-style-type: none"> - Follow-up site evaluations: Two projects revisited for each Fund annually - Case studies: Two case studies completed annually - Tracking factors of success: Follow up survey of evaluated projects completed. Survey results, trends and patterns are presented in report. |

Appendix I: Project Site Evaluations

Clean Water Fund, Fiscal Year 2011 Brown's Creek Thermal Load Reduction

Project Sponsor: Brown's Creek Watershed District
Project Partners: Oak Glen Golf Course
Grant Period: January 2011 – December 2012
Contact: Karen Kill, (651) 275-1136, karen.kill@mnwcd.org

Total grant: \$210,000
Leveraged funds: \$110,000

Project Narrative

Brown's Creek is the namesake of Brown's Creek Watershed District (BCWD) and a designated metro trout stream. But in recent years the stream hasn't been home to as many trout and cold-water insects as we would hope. The creek is too warm and too muddy.

Brown's Creek Watershed District has partnered with Oak Glen Golf Course to restore 1,300 linear feet of Brown's Creek as it flows through the golf course adding more than two acres of native buffer along the stream bank. This project began in 2011 with a \$210,000 Clean Water Fund grant. After the project is complete in June 2012, Brown's Creek will be six degrees cooler on the warmest days, bringing the water temperature from lethal to tolerable and thus increasing the stream's ability to support trout reproduction.



Board of Water and Soil Resources

Evaluation Summary

This project significantly improved stream habitat and restored a functional riparian zone to a highly degraded 1300 foot reach of Brown's Creek. This site posed significant challenges to achieving an effective stream restoration; most notably being bounded by an active golf course. The project designers worked closely with the golf course operators to develop a plan that enabled continued golfing and maximized ecological benefits. The designer's chose to not manipulate the cross section of the stream. This provides a learning opportunity for a passive approach to stream restoration. One year post installation the riparian planting was well established. The stream was responding to the stable buffer plantings by deepening and narrowing the channel. These changes will be beneficial, both for fish habitat and for water temperatures important in a trout stream.

Panel Comments / Recommendations:

- Approach allows the stream to “do the work” in determining its shape
- Good design within the constraints of a golf course; rock boarder provides a clear indicator of restoration edge for golf course maintenance crews

- Very good plant establishment; maintenance agreement with reputable vendor indicates successful outcomes for planting



RESTORATION EVALUATION PROGRAM for LEGACY PROJECTS
 Minnesota Board of Water and Soil Resources
 Minnesota Department of Natural Resources



PROJECT EVALUATION FORM

PROJECT BACKGROUND

Project Name: Brown's Creek Thermal Load Reduction

Date of Review: 09/26/2013

Site Assessment Attendees - Reviewers: Brian Nerbonne MN DNR; Dan Shaw BWSR; Greg Larson BWSR; Wade Johnson MN DNR - Project manager: Karen Kill BCWD - Property owners: -

Project Location: County Washington Township/Range/Section S20 T30N R20W

Project Manager / Affiliated organization, Contact: Karen Kill, Administrator Brown's Creek Watershed District

Fund: OHF CWF PTF Fiscal Year Funds – FY 2011 Project Start Date 2011

Predominant Habitat Type: Prairie/Savanna/Grassland Wetland Forest Aquatic

1. Goal(s) of the restoration Restore 1,300 linear feet of Brown's Creek within Oak Glean Golf Course, adding more than two acres of native buffer along the stream bank

Quantifiable objectives of the restoration Reduce water temperture by six degrees F on the warmest days

What plans / record of project decisions / prescription worksheets are available? Where are they located?

2. What is the status of the project? Treatment / establishment phase Post-establishment phase

3. Has the plan or project implementation been modified from the original plan? If yes, why and how? No
 Have alterations in plan or implementation changed the proposed outcomes? -

PROJECT ASSESSMENT

4. Site description (by reviewer): Brown's Creek flows through Oak Glen Golf Course at the project site. The initial condition of the riparian zone had turf grass mowed up to the water's edge, resulting in eroding stream banks. Over time this condition has allowed the stream to widen to the point where water depths were very shallow. Bottom substrate was almost uniformly sand and silt, with very little cover for fish. The wide and shallow stream with no overhanging vegetation created a situation for signifcant warming of the water through this reach, affecting the suitability of this and downstream reaches for trout.

Soils:

Topography:

Hydrology: Brown's Creek Watershed has been altered by development. Historically Brown's Creek likely had very stable flow due to the presence of large wetlands in the headwaters, coarse soils that favor infiltration of precipitation, and significant groundwater contributions to baseflow from springs. Conversion of natural lands to housing and roads has reduced infiltration and increased surface runoff to the stream in parts of the watershed, creating more flashy flows. However, a significant portion of the watershed has been diverted away from the stream in 2001 as a way to avoid stormwater impacts to the stream. This diversion likely has reduced the flashiness of the stream, especially reducing peak flows. The stream may still be adjusting to the change in hydrology and the smaller cross section needed to carry flood flows. This has also likely changed the sediment transport of the system, reducing the competence of the stream to move certain sizes of bedload.

Vegetation (structure, dominant species % cover, invasive species (MN DNR) % cover, other): Turf grass was the dominant plant species prior to restoration with some reed canary grass present along the edge of the stream.

Surrounding conditions (adjacent land use / veg.): Surrounding conditions consisted of golf course and turf grasses

5. Survey methods used (include deliverable format, # of pgs.): Review of project documentation and geomorphology survey; visual inspection.

6. Is the plan based on current science (best management practices, standards, and guidelines)? Plant selection does a good job of balancing the setting with the constraints of the site. Native species suited to a riparian habitat (suited to moisture levels and the need for stabilization) were used, but plants also meet the golf course's needs for maintaining sight lines and attractive appearance. Methods of vegetation installation were consistent with current science and led to a well established plant community. Vegetation maintenance is also following best management practices and has been planned to control invasive species and promote native vegetation establishment. The use of a low boulder wall at the break point between the turf grass of the golf course and the buffer meets several purposes: visual aesthetic that pleases the golf course, prevention of "mower creep" into the buffer, and stepping topography of the buffer down to an appropriate floodplain elevation. The designer's choice to not manipulate the cross section of the stream provides a learning opportunity for a passive approach to stream restoration. The stream has already responded to the more stable buffer, exhibiting both scour and deposition in the streambed that has deepened the stream in several places and narrowed the stream through most of the reach. These changes will be beneficial both for fish habitat and for water temperatures important in a trout stream. The decision not to manipulate previously constructed riffles under two bridges may be a missed opportunity. These riffles consume much of the gradient through the reach; distributing that gradient through the entire reach could have increased the stream's ability to move sediment, resulting in more coarse bottom substrates preferred by aquatic insects and required for trout spawning habitat. Water velocity through the reach could also have been increased, which would reduce the amount of stream warming through the reach.

7. List indicators of project outcomes at this project stage: Plant establishment is impressive for a relatively recent project and few invasive species are present. There is a small amount of reed canary grass but it is being actively treated with herbicide. Narrowing and deepening of the stream channel indicates positive changes for fish habitat and water temperature. It will be interesting to track other outcomes such as water temperature and fish community composition in the future to evaluate the ultimate goals of the project. One unexpected outcome is the increased prevalence of aquatic macrophytes in the stream. This may be the result of filtering of golf courses turf management chemicals by the buffer, changes to bottom substrate, or some other factor. Whatever the cause, the macrophytes are increasing habitat diversity and cover for aquatic organisms.

8. Does the project plan / implementation of the project plan reasonably allow for achieving proposed project outcome(s)? The project appears to be functioning as planned, based on plant establishment and changes in the stream channel. It will be interesting to see if modeled reductions in stream temperature are achieved, or if changes in the fish community result in improved IBI scores and trout abundance. Stated goals such as a reduction of 6 degrees in stream temperature peaks is a lofty goal. The decision not to modify previously constructed riffles at bridge crossings might result in some reduction in overall project benefits, but significant improvements appear that they will be achieved.

9. Are corrections or modifications needed to meet proposed outcomes? Explain.
 The modification of the previously constructed riffles under bridges may further benefit the stream, but the return on investment of undertaking such a modification is questionable given the costs of mobilizing a contractor, working with the golf course to find a time for heavy equipment work that does not conflict with course operation, and the temporary sediment suspension impacts of disturbing the stream channel. I would recommend leaving the project as-is and evaluating the results. Vegetation establishment has been successful at the site. It will be important that reed canary treatment continue to ensure that it does not spread.

10. Has anything been done or planned that would detract from existing or potential habitat? Explain.
 See above.

11. Are proposed future steps, including long-term management, practical and reasonable? Explain .
 The maintenance of the buffer during the establishment period will be handled by Brown's Creek Watershed District, then turned over after 3 years. This should provide ample time for the buffer to establish. Hopefully the golf course continues to contract with an experience company that can appropriately maintain the buffer, rather than undertaking the maintenance themselves with inexperienced staff.

12. Are follow-up assessments needed? Explain. Continued project monitoring by Brown's Creek Water shed District of the stream temperature and physical habitat, and by MN DNR of the fish community, will document whether ultimate goals for the project are achieved.

13. Additional comments on the restoration project. Excellent learning opportunity on passive stream restoration and a good case study for restoring natural stream conditions within a golf course.

PROJECT EVALUATION

The project will:

- a. Likely not meet proposed outcomes
- b. Minimally meet proposed outcomes
- c. Meet proposed outcomes
- d. Likely exceed proposed outcomes
- e. Greatly exceed proposed outcomes

Confidence of outcome determination

- 1. Low
- 2. Medium
- 3. High

Provide an explanation of the reason(s) for the determination. Establishment of the buffer vegetation and the narrowing and deepening of the stream channel suggest that the stream is tending toward conditions that will achieve project goals.

Site Assessor(s) Conducting Site Review: Brian Nerbonne, Dan Shaw

Clean Water Fund, Fiscal Year 2012 Stabilizing Shorelands in the Middle Fork Crow River Watershed

Project Sponsor: Middle Fork Crow River Watershed
Grant Period: January 2012 – December 2014
Contact: Margret Johnson, (320) 796-0888, margaret@mfcrow.org

Clean Water grant: \$120,000
Grant money applied to evaluated projects: \$71,100

Project Narrative

This project contains several activities that will implement effective, shovel ready conservation practices on multiple water bodies. The goal is to reduce the erosion impacting stream bank stability. Three initiatives will be implemented, including the installation of four shoreland restoration/stabilization projects, completion of two stream bank stabilization projects on the Middle Fork Crow River and a rain barrel program. An education program will provide outreach to lake and city residents throughout the Middle Fork Crow River Watershed.



Board of Water and Soil Resources

Evaluation Summary

Four lakeshore restoration projects on three lakes were assessed for this evaluation. All four projects stabilized existing erosion along shorelines. One project on Lake Monongalia stabilized and vegetated 320 linear feet of highly eroded shoreline utilizing multiple bioengineering techniques. These included cedar revetments anchored to the foreshore, biologs staked to the toe, vegetated soil lifts (soil/compost wrapped in degradable blankets), live stakes, brush bundles and geogrid rock wraps in the highest wave energy areas. This site also stabilized the adjacent slope of mature oak forest with coir blanket and native plant plugs. This upslope stabilization extended an average of 40 feet inland of the shoreline. This buffer intercepted and slowed runoff that previously eroded the steep slope. The Lake Monongalia site utilized an appropriate combination of best practices for bioengineered stabilization and functional native plant use. This project benefited from design assistance from the West Central Technical Service Area staff and installation by an experienced restoration contractor.

For three of the projects the Clean Water funds were used for plantings above reinforced riprap. Due to walls at the top of slope and upland topography these three stabilization plantings did not intercept upland runoff from above the planted slope. Retaining walls are no longer accepted by the watershed district in conjunction with shoreline restoration projects, as they increase hard structure, replace the stabilizing and habitat improving capacity of native perennials and shorten the inland depth of the buffer. All three projects showed reasonable establishment of seeded and planted species one year post planting. One site showed greater than 40% cover of invasive grasses and forbs. Targeted invasives control will be needed to attain the planned native planting. These projects provide improved

conditions and potentially support shifting cultural practices towards naturalized shorelines. However, the Panel believed these three projects may have limited benefit for water quality and shoreline habitat. Based on the specified project goals and the early stages of the restorations, these projects were rated as minimally meeting or meeting proposed outcomes. The Panel supports project managers recruiting and pursuing only projects that have best capacity to directly achieve broader restoration goals with these valuable public funds (see Improved Design Criteria p. 14).

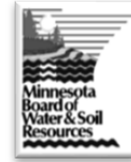
All projects utilized locally native plants for vegetated stabilization. The Panel felt that in some instances plant selection should have given greater consideration to plant longevity and root stabilization capability. In some cases this would direct a higher ratio of perennial grasses and/or shrubs. This issue could be addressed through technical assistance by project managers, area technical assistance providers or appropriate state agency staff experienced with functional attributes of native plants. All projects have a ten year maintenance agreement with the landowner to maintain installed practices. The watershed district is scheduled to conduct annual site monitoring visits for this duration. Adherence to the maintenance plan by landowners and continued engagement by the project managers will be necessary to ensure long term success.

Panel Comments / Recommendations:

- Lake Monongalia provides a good example of coordinated effort leading to best practices in bioengineered stabilization
- In some instances projects would benefit from improved design criteria for sizing (buffer depth), siting and site elements (limiting walls and rock where appropriate), plant material (site appropriateness for specific shorelines)
- Landowners will need to continue to adhere to maintenance agreements to ensure lasting success. Project managers should continue to engage landowners and provide support regarding proper maintenance.



RESTORATION EVALUATION PROGRAM for LEGACY PROJECTS
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PROJECT EVALUATION FORM

PROJECT BACKGROUND

Project Name: Stabilizing Shorelands and Stream Banks... Date of Review: 10/15/2013

Site Assessment Attendees - Reviewers: Carol Strojny BWSR; Wade Johnson MN DNR - Project manager:
Vanessa Glieden Henjum, Middle Fork Crow River Watershed District - Property owners: Bertram

Project Location: County Kandyohi Township/Range/Section T120/R33/S21

Project Manager / Affiliated organization, Contact: Vanessa Glieden Henjum, Middle Fork Crow River Watershed District; 320-796-0888

Fund: OHF CWF PTF Fiscal Year Funds – FY 2011 Project Start Date 2012
Predominant Habitat Type: Prairie/Savanna/Grassland Wetland Forest Aquatic

Goal(s) of the restoration Stabilize the shore, reduce erosion

Quantifiable objectives of the restoration Reductions in phosphorus and sediment

What plans / record of project decisions / prescription worksheets are available? Where are they located?
Watershed District Office: Agreement, project plan and map, cost estimate, maintenance plan.

What is the status of the project? Treatment / establishment phase Post-establishment phase

Has the plan or project implementation been modified from the original plan? If yes, why and how? No

Have alterations in plan or implementation changed the proposed outcomes? -

PROJECT ASSESSMENT

Site description (by reviewer): Diamond Lakeshore; east side of lake, stands of hardstem bulrush offshore; retaining walls and patio rebuilt by landowner. Approximately 900 plugs, 15 shrubs, and 5 trees planted into a 24 x 58 foot area, installed 2012.

Soils: Koronis-Sunburg-Hawick complex, well drained, sandy loams, sandy clay loam, and fine sand loam; disturbed (retaining walls).

Topography: Steep slope (30-50%),

Hydrology: Well drained to water line.

Vegetation (structure, dominant species % cover, invasive species (MN DNR) % cover, other): 80% forbs (60% Rudbeckia hirta) and 20% graminoids (sedges, grasses) from plugs. Trees plants to sides of planted area. Some false indigo planted close to the rip rap - which may spread and become rooted in the rip rap.

Surrounding conditions (adjacent land use / veg.): Residential. Maintained lawn to one side and naturalized vegetation on other side; rip rap both sides of property with retaining walls to same height as project site's walls.

Survey methods used (include deliverable format, # of pgs.): Notes on condition of site and general vegetative characteristics.

Is the plan based on current science (best management practices, standards, and guidelines)? Debatable. Soft engineering practices such as using biologists are generally preferred due to wildlife benefits, affordability, and increased vegetated areas relative to rock. Rock riprap may have been suitable in this case due to the short length of water front, and rock rip rap was used on both sides of the project site. Planted plugs worked out well.

List indicators of project outcomes at this project stage: No evident soil erosion; deep rooted plants established.

Does the project plan / implementation of the project plan reasonably allow for achieving proposed project outcome(s)? Yes

Are corrections or modifications needed to meet proposed outcomes? Explain. Yes - additional grass or grass like plants should be seeded or planted to colonize areas where the black eyed susans potentially fade out in a few years.

Has anything been done or planned that would detract from existing or potential habitat? Explain. No

Are proposed future steps, including long-term management, practical and reasonable? Explain. Yes; additional seed is a good idea; weeding, watering, and invasive management is in the maintenance plan.

Are follow-up assessments needed? Explain. No - the watershed district will be monitoring the site annually for the length of the agreement.

Additional comments on the restoration project. Project manager is recommending a fall seeding of grass species into the slope. Retaining walls are no longer accepted by the watershed district for shoreline restoration projects, as they impede water flow and shorten the width of the buffer.

PROJECT EVALUATION

The project will:

- a. Likely not meet proposed outcomes
- b. Minimally meet proposed outcomes
- c. Meet proposed outcomes
- d. Likely exceed proposed outcomes
- e. Greatly exceed proposed outcomes

Confidence of outcome determination

- 1. Low
- 2. Medium
- 3. High

Provide an explanation of the reason(s) for the determination. Toe of bank is currently stabilized by rock rip rap.

Slope may or may not develop deep rooted vegetation. Currently the dominant species (*Rudbeckia hirta*) is short lived, and a more diverse composition of grasses, sedges, and forbs would be more likely to stabilize the slope and allow infiltration in the long term. The watershed district will be inspecting the site annually for 10 years.

The landowner would prefer to store the dock on the native vegetation planting, which is a discouraged practice by the watershed district.

Site Assessor(s) Conducting Review: Carol Strojny

Stabilizing Shorelands in the Middle Fork Crow River Watershed, Green Lake 1



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PROJECT EVALUATION FORM

PROJECT BACKGROUND

Project Name: Stabalizing Shorelands and Stream Banks...

Date of Review: 10/15/2013

Site Assessment Attendees - Reviewers: Carol Strojny BWSR; Wade Johnson MN DNR - Project manager: Vanessa Glieden Henjum, Middle Fork Crow River Watershed District - Property owners: Lykken

Project Location: County Kandiyohi Township/Range/Section T121 R34 S34

Project Manager / Affiliated organization, Contact: Vanessa Glieden Henjum, Middle Fork Crow River Watershed District; 320-796-0888

Fund: OHF CWF PTF Fiscal Year Funds – FY 2011 Project Start Date 2012

Predominant Habitat Type: Prairie/Savanna/Grassland Wetland Forest Aquatic

14. Goal(s) of the restoration Stabilize the shore, reduce erosion

Quantifiable objectives of the restoration Reductions in phosphorus and sediment

What plans / record of project decisions / prescription worksheets are available? Where are they located?

Watershed District Office: Agreement, project plan , cost estimate, maintenance plan.

15. What is the status of the project? Treatment / establishment phase Post-establishment phase
16. Has the plan or project implementation been modified from the original plan? If yes, why and how? No
Have alterations in plan or implementation changed the proposed outcomes? -

PROJECT ASSESSMENT

17. Site description (by reviewer): Green Lake shoreline; installed in August 2012; about 1633 sq ft seeded to native vegetation; 3-4 feet of rock rip rap on shoreline. Flat edging 1 foot over crest of bank between lawn and native planting.

Soils: Hawick-Estherville complex, well drained; loamy coarse sand to gravelly coarse sand.

Topography: Steep slope (30-50%),

Hydrology: Well drained to water line.

Vegetation (structure, dominant species % cover, invasive species (MN DNR) % cover, other): First year establishment from seed. Volunteer or residual violets and day lilies; virginia bindweed. Annual rye (cover crop) common (20-40%); natives approximately 40% cover - mostly forbs; few willows and red osier dogwood; invasives observed include hoary allysum, clovers (<5%).

Surrounding conditions (adjacent land use / veg.): Maintained lawns, wooded buffers, rock riprap along shore. Residential.

18. Survey methods used (include deliverable format, # of pgs.): Notes on condition of site and general vegetative characteristics.

19. Is the plan based on current science (best management practices, standards, and guidelines)?
Debatable. Soft engineering practices such as using biologists are generally preferred due to wildlife benefits, affordability, and increased vegetated areas relative to rock. Rock riprap may have been suitable in this case due to the short length of water front, and rock rip rap was used on both sides of the project site.

20. List indicators of project outcomes at this project stage: No evident soil erosion; deep rooted plants established.

21. Does the project plan / implementation of the project plan reasonably allow for achieving proposed project outcome(s)? Yes

22. Are corrections or modifications needed to meet proposed outcomes? Explain. No

23. Has anything been done or planned that would detract from existing or potential habitat? Explain.
Yes, dock materials should not be stored in the recently planted native vegetative buffer.

24. Are proposed future steps, including long-term management, practical and reasonable? Explain.
Yes, weeding, watering, and invasive management is in the maintenance plan.

25. Are follow-up assessments needed? Explain. No - the watershed district will be monitoring the site annually for the length of the agreement.

26. Additional comments on the restoration project. The edging at the top of the slope is flat and does not appear to impede water flow downslope. Management plan should be followed to control invasive species. Vegetation appears to be coming in well for the first year. Early in establishment period to determine how well slope will be stabilized.

PROJECT EVALUATION

The project will:

- a. Likely not meet proposed outcomes
- b. Minimally meet proposed outcomes
- c. Meet proposed outcomes
- d. Likely exceed proposed outcomes
- e. Greatly exceed proposed outcomes

Confidence of outcome determination

- 1. Low
- 2. Medium
- 3. High

Provide an explanation of the reason(s) for the determination. The project appears to be establishing well. Concerns of dragging the dock equipment around could result in erosion and promote weedy establishment by disturbing the soil.

Site Assessor(s) Conducting Review: Carol Strojny

Stabilizing Shorelands in the Middle Fork Crow River Watershed, Green Lake 2



RESTORATION EVALUATION PROGRAM for LEGACY PROJECTS
Minnesota Board of Water and Soil Resources
Minnesota Department of Natural Resources



PROJECT EVALUATION FORM

PROJECT BACKGROUND

Project Name: Stabilizing Shorelands and Stream Banks in the Middle Fork Crow... Date of Review:
10/15/2013

Site Assessment Attendees - Reviewers: Carol Strojny BWSR; Wade Johnson MN DNR - Project manager: Vanessa Glieden Henjum, Middle Fork Crow River Watershed District - Property owners: Myers

Project Location: County Kandyohi Township/Range/Section T121 R34 S34

Project Manager / Affiliated organization, Contact: Vanessa Glieden Henjum, Middle Fork Crow River Watershed District; 320-796-0888

Fund: OHF CWF PTF Fiscal Year Funds – FY 2011 Project Start Date 2012

Predominant Habitat Type: Prairie/Savanna/Grassland Wetland Forest Aquatic

27. Goal(s) of the restoration Stabilize the shore, reduce erosion

Quantifiable objectives of the restoration Reductions in phosphorus and sediment

What plans / record of project decisions / prescription worksheets are available? Where are they located?

Watershed District Office: Agreement, project plan and diagram, cost estimate, maintenance plan.

28. What is the status of the project? Treatment / establishment phase Post-establishment phase

29. Has the plan or project implementation been modified from the original plan? If yes, why and how? No

Have alterations in plan or implementation changed the proposed outcomes? -

PROJECT ASSESSMENT

30. Site description (by reviewer): Green Lake shoreline; installed in fall 2012; about 14ft x58ft seeded to native vegetation; rock rip rap on shoreline. Most of retaining wall buried due to limitations to north property and cost.

Soils: Hawick-Estherville complex, well drained; loamy coarse sand to gravelly coarse sand.

Topography: Steep slope (30-50%),

Hydrology: Well drained to water line.

Vegetation (structure, dominant species % cover, invasive species (MN DNR) % cover, other): First year establishment from seed. Fairly weedy vegetation (foxtails 40%) and invasives observed include crown vetch (5%), clovers (20%), scattered thistle (<1%). Sparse natives from seed present this year. Vines including hedge bindweed and Virginia creeper present.

Surrounding conditions (adjacent land use / veg.): Maintained lawns, wooded buffers, rock riprap along shore. Residential.

31. Survey methods used (include deliverable format, # of pgs.): Notes on condition of site and general vegetative characteristics.

32. Is the plan based on current science (best management practices, standards, and guidelines)?

Debatable. Soft engineering practices such as using biologists are generally preferred due to wildlife benefits, affordability, and increased vegetated areas relative to rock. Rock riprap may have been suitable in this case

due to the short length of water front, and rock rip rap was used on both sides of the project site.

33. List indicators of project outcomes at this project stage: No evident soil erosion; deep rooted plants established.

34. Does the project plan / implementation of the project plan reasonably allow for achieving proposed project outcome(s)? Yes

35. Are corrections or modifications needed to meet proposed outcomes? Explain. No

36. Has anything been done or planned that would detract from existing or potential habitat? Explain. No

37. Are proposed future steps, including long-term management, practical and reasonable? Explain. Yes, weeding, watering, and invasive management is in the maintenance plan.

38. Are follow-up assessments needed? Explain. No - the watershed district will be monitoring the site annually for the length of the agreement.

39. Additional comments on the restoration project. Management plan should be followed to control invasive species.

PROJECT EVALUATION

The project will:

- a. Likely not meet proposed outcomes
- b. Minimally meet proposed outcomes
- c. Meet proposed outcomes
- d. Likely exceed proposed outcomes
- e. Greatly exceed proposed outcomes

Confidence of outcome determination

- 1. Low
- 2. Medium
- 3. High

Provide an explanation of the reason(s) for the determination. Weedy and invasive vegetation may be troublesome to control on the steep slopes. Early in establishment period to determine how well slope will be stabilized.

Site Assessor(s) Conducting Review: Carol Strojny



RESTORATION EVALUATION PROGRAM for LEGACY PROJECTS
Minnesota Board of Water and Soil Resources
Minnesota Department of Natural Resources



PROJECT EVALUATION FORM

PROJECT BACKGROUND

Project Name: Stabalizing Shorelands and Stream Banks...

Date of Review: 10/15/2013

Site Assessment Attendees - Reviewers: Carol Strojny BWSR; Wade Johnson MN DNR - Project manager: Vanessa Glieden Henjum, Middle Fork Crow River Watershed District - Property owners: Grossman

Project Location: County Kandyohi Township/Range/Section T121 R34 S10

Project Manager / Affiliated organization, Contact: Vanessa Glieden Henjum, Middle Fork Crow River Watershed District; 320-796-0888

Fund: OHF CWF PTF Fiscal Year Funds – FY 2011 Project Start Date 2012

Predominant Habitat Type: Prairie/Savanna/Grassland Wetland Forest Aquatic

40. Goal(s) of the restoration Stabilize the shore, reduce erosion

Quantifiable objectives of the restoration Reductions in phosphorus and sediment

What plans / record of project decisions / prescription worksheets are available? Where are they located?

Watershed District Office: Agreement, project plan and design plan, cost estimate, vendor management plan with guarantee.

41. What is the status of the project? Treatment / establishment phase Post-establishment phase

42. Has the plan or project implementation been modified from the original plan? If yes, why and how? Yes; soil lifts instead of 3.

Have alterations in plan or implementation changed the proposed outcomes? No

PROJECT ASSESSMENT

43. Site description (by reviewer): Middle Fork Crow River Flowage or Monongalia Lake - about 80 linear feet

and variable buffer, averaging 50 ft . Mature trees present creating broken canopy. Site prepped over summer, installed in fall 2012; brush bundles installed along shoreline, along with geogrid made from wrapped rocks/soil lifts. Site seeded and some plugs planted; shrubs to be planted (live stakes) in spring along slopes and in geogrid.

Soils: Hawick gravelly loamy coarse sand. Well drained.

Topography: Steep slope (20-40%),

Hydrology: Well drained to water line.

Vegetation (structure, dominant species % cover, invasive species (MN DNR) % cover, other):

Construction completed in fall, ground cover sparse - some cover crop has germinated, and plants from plugs going dormant. Buckthorn in small (<2% cover) quantities. Mature and sapling elms, oaks, chokecherry, and ash.

Surrounding conditions (adjacent land use / veg.): Residential wooded buffers; nearby park hosts water ski team practices and shows, which cause large wakes affecting shoreline.

44. Survey methods used (include deliverable format, # of pgs.): Notes on condition of site and general vegetative characteristics.

45. Is the plan based on current science (best management practices, standards, and guidelines)? Yes. bioengineered and engineered shoreline stabilization.

46. List indicators of project outcomes at this project stage: No evident soil erosion; practices appear to be installed as planned.

47. Does the project plan / implementation of the project plan reasonably allow for achieving proposed project outcome(s)? Yes

48. Are corrections or modifications needed to meet proposed outcomes? Explain. No

49. Has anything been done or planned that would detract from existing or potential habitat? Explain. No

50. Are proposed future steps, including long-term management, practical and reasonable? Explain. Yes, weeding, watering, and invasive management is in the vendor's management plan.

51. Are follow-up assessments needed? Explain. No - the watershed district will be monitoring the site annually for the length of the agreement.

52. Additional comments on the restoration project. This site is directly adjacent to the Johnson site.

PROJECT EVALUATION

The project will:

a. Likely not meet proposed outcomes

b. Minimally meet proposed outcomes

c. Meet proposed outcomes

1.

2.

3.

Confidence of outcome determination

Low

Medium

High

- d. Likely exceed proposed outcomes
- e. Greatly exceed proposed outcomes

Provide an explanation of the reason(s) for the determination. The project appears to be establishing well. Confidence is higher given the 3 year management agreement by a reputable vendor, and the enthusiasm of the project manager.

Site Assessor(s) Conducting Review: Carol Strojny

Stabilizing Shorelands in the Middle Fork Crow River Watershed, Lake Monongalia 2



RESTORATION EVALUATION PROGRAM for LEGACY PROJECTS
 Minnesota Board of Water and Soil Resources
 Minnesota Department of Natural Resources



PROJECT EVALUATION FORM

PROJECT BACKGROUND

Project Name: Stabalizing Shorelands and Stream Banks in MF Crow Watershed - Johnson Shoreline
 Monongalia Lake Date of Review: 10/15/2013

Site Assessment Attendees - Reviewers: Carol Strojny BWSR; Wade Johnson MN DNR - Project manager:
 Vanessa Glieden Henjum, Middle Fork Crow River Watershed District - Property owners: . Johnson

Project Location: County Kandyohi Township/Range/Section T121 R34 S10

Project Manager / Affiliated organization, Contact: Vanessa Glieden Henjum, Middle Fork Crow River
 Watershed District; 320-796-0888

Fund: OHF CWF PTF Fiscal Year Funds – FY 2011 Project Start Date
2012

Predominant Habitat Type: Prairie/Savanna/Grassland Wetland Forest Aquatic

53. Goal(s) of the restoration Stabilize the shore, reduce erosion

Quantifiable objectives of the restoration Reductions in phosphorus and sediment

What plans / record of project decisions / prescription worksheets are available? Where are they located?

Watershed District Office: Agreement, project plan and design plan, cost estimate, vendor management plan with guarantee.

54. What is the status of the project? Treatment / establishment phase Post-establishment phase

55. Has the plan or project implementation been modified from the original plan? If yes, why and how? No

Have alterations in plan or implementation changed the proposed outcomes? -

PROJECT ASSESSMENT

56. Site description (by reviewer): Middle Fork Crow River Flowage or Monongalia Lake - about 240 linear feet and variable buffer, averaging 30 ft . Mature trees present creating broken canopy. Site prepped over summer, installed in fall 2012; cedar revetments installed perpendicular to shoreline, biologists with native vegetation, site seeded and some plugs planted; shrubs to be planted (live stakes) in spring along slopes and in biologists.

Soils: Hawick gravelly loamy coarse sand. Well drained.

Topography: Steep slope (20-40%),

Hydrology: Well drained to water line.

Vegetation (structure, dominant species % cover, invasive species (MN DNR) % cover, other):

Construction completed in fall, ground cover sparse - some cover crop has germinated, and plants from plugs going dormant. Lilac, buckthorn and tansy observed in small (<2% cover) quantities. Mature and sapling elms, oaks, chokecherry, and ash.

Surrounding conditions (adjacent land use / veg.): Residential wooded buffers; nearby park hosts water ski team practices and shows, which cause large wakes affecting shoreline.

57. Survey methods used (include deliverable format, # of pgs.): Notes on condition of site and general vegetative characteristics.

58. Is the plan based on current science (best management practices, standards, and guidelines)? Yes. Bioengineered and engineered shoreline slope stabilization.

59. List indicators of project outcomes at this project stage: No evident soil erosion; practices appear to be installed as planned.

60. Does the project plan / implementation of the project plan reasonably allow for achieving proposed project outcome(s)? Yes

61. Are corrections or modifications needed to meet proposed outcomes? Explain. No

62. Has anything been done or planned that would detract from existing or potential habitat? Explain. No

63. Are proposed future steps, including long-term management, practical and reasonable? Explain. Yes, weeding, watering, and invasive management is in the vendor's management plan.

64. Are follow-up assessments needed? Explain. No - the watershed district will be monitoring the site annually for the length of the agreement.

65. Additional comments on the restoration project. This site is directly adjacent to the Gossman site.

PROJECT EVALUATION

The project will:

- a. Likely not meet proposed outcomes
- b. Minimally meet proposed outcomes
- c. Meet proposed outcomes
- d. Likely exceed proposed outcomes
- e. Greatly exceed proposed outcomes

Confidence of outcome determination

- 1. Low
- 2. Medium
- 3. High

Provide an explanation of the reason(s) for the determination. The project appears to be establishing well. Confidence is higher given the 3 year management agreement by a reputable vendor, and the enthusiasm of the project manager.

Site Assessor(s) Conducting Review: Carol Strojny

Clean Water Fund, Fiscal Year 2011 Reitz Lake Restoration

Project Sponsor: Carver County WMO
Partners: Carver County Public Health & Environment, Carver County Soil & Water Conservation District
Grant Period: January 2011 – December 2012
Contact: Greg Aamodt, (952) 835-2078, gaamodt@co.carver.mn.us

Total Grant: \$127,551
Grant money applied to evaluated projects: \$25,700

Project Narrative:

The Reitz Lake restoration project began several years ago when water quality samples showed the lake was impaired. Carver County and residents around the lake took action and began to develop a plan (TMDL) to clean up Reitz Lake.

Once the TMDL study and the associated implementation plan (which helps to target specific projects) were completed, funding was sought to target high priority projects around the Lake. First, direct untreated run-off from a farmed area of approximately 100 acres to the north of the lake will be slowed and filtered before it enters the lake. Next, a wetland on the east side of the lake will be enhanced by adding a sediment basin, filter, and fish barrier that will help to buffer and treat approximately 1900 acres of mixed agricultural land. Finally, several shorelines will be re-vegetated and restored to help buffer surface water run-off from lawns and driveways. It is estimated that as much as 8 tons of sediment and 200 pounds of phosphorus per year will be kept from entering the lake.

On-going throughout this two year process (and beyond) the County and volunteers from the lake community will continue to monitor the lake's water quality to track the progress of our activities in the lakeshed. These efforts will be watched to see if they are helping the lakes clarity and/or impacting the invasive carp and weeds (curly leaf pondweed & milfoil) that are also factors in the lake's poor condition.



Board of Water and Soil Resources

Evaluation Summary

This grant funded the installation of several projects targeted at improving water quality entering Reitz Lake: An iron enhanced filtration basin, a set of artificial floating wetlands in the inlet channel and four residential shoreline buffers. The four shoreline sites were visited for evaluation in May 2012 during site preparation and again in July 2013 during establishment. The four project sites are private residential lakeshores. These property owners were identified by SWCD staff as those on Reitz Lake willing to

participate in shoreline restoration activities. All of the properties were experiencing some degree of shoreline erosion from upland runoff and/or wave action. This has been exacerbated in recent years by fluctuating lake levels. All four shorelines were installed per contractor's plans approved by the conservation district. Sites were prepared by cutting, burning or herbiciding existing undesired vegetation. Native perennial species were planted per plan.

Two projects (Reitz Lake 2 & 4 evaluations) replaced existing turf grass at the shoreline with native garden beds. These projects applied appropriate site preparation of two herbicide applications. An appropriate diversity of native plants plugs were planted. Plant establishment has progressed acceptably and plant beds have been appropriately weeded and maintained with guidance from SWCD staff. One project installed biologs at the shoreline to prevent further shoreline erosion. The other did not secure the shoreline and has experienced approximately one foot of further shoreline loss since the project was installed. This is primarily attributed to significant fluctuations in lake level during that time. It appears that the "raingarden" integrated into the native garden may also have exacerbating shoreline erosion due to the shallow seep of water emerging at the eroding shoreline. This project also installed a patio between the native gardens that may offset some of the project's restoration benefits as well (patio installation did not utilize clean water funds). These projects utilized 50-75% of the properties shoreline width and extended 10-15 feet inland from the shore. The Panel felt that practices such as these should be encouraged for private shoreline owners as alternatives to turf grass. However at this scale they provide minimal contribution to water quality and should be considered lower priority for investment of public Clean Water funds.

One project (Reitz Lake 3 evaluation) site stabilized a ravine and replaced turf with natives above existing riprap. This project captures runoff from greater than 4+ acres during heavy rain events. This stormwater flow is concentrated through a ravine on the property that formerly intensified shoreline erosion problems. This project is well sited for upland runoff interception, utilizing a series of vegetative and structural techniques (rock checks and raingarden) to slow down and soak up upland runoff to the extent possible. The scale of the project also provided significant benefit, extending more than 100 feet from the shoreline up the ravine. Some mature trees were cleared during site preparation; primarily Green Ash; to allow adequate space for remaining mature trees and increased sunlight for establishment of ground layer perennials. The Panel emphasized the value of retaining as many large trees as possible for the combined benefits of woody root stabilization and rainfall interception.



Another project (Reitz Lake 1 evaluation) cleared existing Reed Canary Grass and Sandbar Willows (herbicide and burning), stabilized the shoreline toe with biologs and planted native plugs. In 2013, one year post installation, biologs were secure and stabilized the shore. However, the planted area was 95% Reed Canary with scattered native plugs. Site preparation for invasive Reed Canary was inadequate and attempts to remove Sandbar Willow are considered unfavorable given their shoreline stabilizing capacity. The Panel considered the upland planting portion of this site to not be an improvement over previous conditions, given the setback of willows and persistent dominance of Reed Canary. Project managers have taken steps to work with the absentee property owner to maintain the project per

maintenance plan agreement. Further engagement by project managers will be needed to ensure compliance and a positive trajectory for this site.

Panel Comments / Recommendations:

- Project managers applied a logical prioritization for addressing water quality stressors in the Reitz Lake watershed: 1) Intercept agricultural runoff; iron enhanced sediment basin, engineered wetland nutrient capture above the inlet channel 2) naturalize upland shorelands to the extent practicable. Three of the four shoreline practices installed have the capacity to provide some water quality and habitat restoration benefits.
- Project effectiveness (water quality and habitat) could have been improved by application of improved screening and minimum design criteria (See Recommendation for Improved Design Criteria pg 14)

Reitz Lake Shoreline 1

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|--|---|--|
|  | <p>RESTORATION EVALUATION PROGRAM for LEGACY PROJECTS Minnesota Board of Water and Soil Resources Minnesota Department of Natural Resources</p> |  |
| PROJECT EVALUATION FORM | | |
| <hr/> PROJECT BACKGROUND <hr/> | | |
| Project Name: 1 - 8855 Reitz Lake Rd, (Vegetation clearing and Biolog shoreline reinforcement) | | Date of Review: 07/23/2013 |
| Site Assessment Attendees - Reviewers: John Hiebert, Wade Johnson - MN DNR, Dan Shaw, BWSR - Project manager: Seth Bosart - Carver SWCD 952-466-5264 wforbord@co.carver.mn.us ; Tim Sundby - Carver Co Land and Water, 952-361-1816 tsundby@co.carver.mn.us - Property owners: _ | | |
| Project Location: County Carver Township/Range/Section Laketown Township; Sections 19,20 | | |
| Project Manager / Affiliated organization, Contact: Greg Aamodt, 952-361-1804, gaamodt@co.carver.mn.us; (Will Forbrod, | | |
| Fund: OHF <input type="checkbox"/> CWF <input checked="" type="checkbox"/> PTF <input type="checkbox"/> | Project Start Date (Fiscal Year): 20 11 | |
| Predominant Habitat Type: Prairie/Savanna/Grassland <input type="checkbox"/> Wetland <input type="checkbox"/> Forest <input type="checkbox"/> Aquatic <input checked="" type="checkbox"/> | | |

1. Goal(s) of the restoration "To improve Reitz Lake's water quality by reducing the nutrient load entering the lake by installing a water retention/filtration structure on the north side of the lake, enhancing/restoring a wetland on the east side and installing four Shoreline restorations."

What plans / record of project decisions / prescription worksheets are available? Where are they located?
Carver SWCD: "Reitz Lake Restoration Evaluation .docx" 07/17/2012; MN Native Landscapes (contracted installer) "Restoration Guidelines" 05/10/2012

2. Is habitat restoration a primary or secondary objective of the project? Primary Secondary
3. What is the status of the project? Treatment / establishment phase Post-establishment phase
4. Has the plan or project implementation been modified from the original plan? Yes No
If yes, why and how? Plan specifications still in process

Have alterations in plan or implementation changed the proposed outcomes? Yes No
If yes, how?

PROJECT ASSESSMENT

5. Site description (by reviewer): John Hiebert
Soils:
Topography: Large flat area, with mowed turf grass, areas was wet during inspection and appears to flood regularly, above this area is a more steeply sloped area where the home is located. The areas that were selected for restoration are areas where the landowners have manicured turf grass to the water's edge. All of the properties are experiencing shoreline erosion from wave action which is impacted by this type of land use..
Hydrology: Area is flat and appears to frequently flood.
Vegetation (structure, dominant species % cover, invasive species (MN DNR) % cover, other): The yard is primarily flat with a mowed turf grass lawn down to the lake with Yellow Nut Sedge growing in the lawn . The two areas where the native vegetation was planted contained reed canary, upland weeds, turf grass and willow species that had been treated with herbicide and burned. At the OHW mark there is some erosion present and coir fiber biologs have been installed. On the adjacent properties willows and other trees have been left to grow to the edge and in these places there appears to be less erosion present. No emergent vegetation is present in front of the property though some white water lilies are growing, showing that wave action in this area is not excessive. The erosion issues seem to be exacerbated by treating the native vegetation, primarily willows and replacing it with turf grass. The center of the property has a dock and has turf grass growing to the edge; there is evidence of geese utilizing these areas.
Surrounding conditions (adjacent land use / veg.): Mostly turf grasses adjacent to the site, upland of these areas are forested urban lots with homes
6. Survey methods used (include deliverable format, # of pgs.): visual assessment

7. Is the plan based on current science (best management practices, standards, and guidelines)? Yes No Describe for yes or no. This project is trying to address shoreline erosion and nutrient issues by installing a native buffer along with stabilizing the shoreline using bioengineering techniques, which can help address this, however the scope and manner that the project was installed limit the value of the project. To adequately address this issue it would be preferred to increase the width and depth of the buffer to maximize the nutrient uptake on the site and discourage geese from utilizing the site. The area directly upland of the restoration area is mowed turf grass that frequently floods so it would be very suitable to widen the buffer into this area or to restore it as a riparian wetland/sedge meadow.

8. List indicators of project outcomes at this project stage: Site prep /herbicide invasives control was initiated to reduce invasive competition during planting establishment. Native planting was reported to have been completed at the time of inspection. Project site is dense Reed Canary Grass 95% cover; Native plantings (plugs) installed are sparsely interspersed and are difficult to locate. This indicates that 1)invasives control measures taken for site preparation (herbicide and burning) were not effective 2) the native plantings will not persist to an appreciable degree. Coir fiber biolog appears secure and durable for stabilizing shoreline toe.

9. Does the project plan / implementation of the project plan reasonably allow for achieving proposed project outcome(s)? Yes No Explain. This project attempts to address nutrient runoff by stabilizing the shoreline using coir fiber logs and doing a native vegetation restoration, with these actions as part of the process to improve water quality for Reitz Lake. However, there are a variety of other larger issues within the watershed that have been identified as the primary cause of the water quality issues in Reitz Lake; if these watershed issues are not addressed than shoreline projects alone will not be enough to make a significant change in the water quality of Reitz Lake. In addition, the width of this project is not sufficient to reduce nutrient runoff from the site and much of the erosion is caused by the removal of native vegetation and water level fluctuations not by wind action, as water lilies are growing in front of the site. Very few of the planted native plugs were found growing in the planted buffer (marsh milkweed, boneset, blue vervain and prairie cord grass). Reed canary grass had returned and was dominating the site, <95% cover. The willow species that were their previously removed as site prep for this project are beginning to return to the site. By letting the native willows return, as they are on other undeveloped properties on the lake, and widening the buffer behind this riparian area it would increase the value of this project for improving water quality in Reitz Lake. Lake.ke.

10. Are corrections or modifications needed to meet proposed outcomes? Yes No
If yes, explain. They could expand the depth and width site to improve nutrient uptake and address runoff volumes from the house. It would also help keep geese from their yard and reduce their droppings from entering the lake. Because of the presence of geese on site they will need to fence the site to ensure predation on seedlings from geese does not impact the restoration. I would also encourage the use of native trees and shrubs on the project as that is what is growing on adjacent naturalized shorelines. It may be difficult to get native prairie grasses and forbs to become established in this area with the presence of reed canary grass and willows and encouraging the willows to grown along the water's edge and planting native trees and shrubs behind may provide the best chance for success on this project. If some native grasses and forbs are desired, they should be planted behind any tree and shrubs adjacent to the lake. Upland to the restoration project, it would be a good idea to convert some of the large turf grass area to a wet meadow area to increase habitat and water quality benefits to the lake.

11. Has anything been done or planned that would detract from existing or potential habitat? Yes No

If yes, explain. The removal of native willows was probably not the best approach to the project, but reed canary grass was already present on the site and the willows are returning on their own

12. Are proposed future steps, including long-term management, practical and reasonable? Explain. Their maintenance plan states that all practices that are installed will be tracked and followed by County and Soil and Water staff. Yearly inspections and maintenance of the structures will be based on the NRCS technical standards and any corrective actions needed will be documented and followed up on. Additionally, landowners taking part in any of the programs will sign a form outlining that the practice will be maintained for a minimum of 10 years. They will probably need more than yearly visits to assess the site especially during the first years after installation and the landowner needs to be part of assessing and maintaining the site. Geese are also a potential issue on the site.

13. Are follow-up assessments needed? Yes No If yes, explain. This project has been installed and the trajectory based on the original design plan does not look promising. However, if they would modify the approach using native shrubs and trees at the riparian zone and look at expanding the project with transitional native species, it could get back on track to meet its goals. Follow-up visits will be necessary to assess if any native vegetation has been able to become established and if there are any continuing issues with erosion or geese on site.

14. Additional comments on the restoration project.

PROJECT EVALUATION

The project will:

- a. Likely not meet proposed outcomes
- b. Minimally meet proposed outcomes
- c. Meet proposed outcomes
- d. Likely exceed proposed outcomes
- e. Greatly exceed proposed outcomes

Confidence of outcome determination

- 1. Low
- 2. Medium
- 3. High

Provide an explanation of the reason(s) for the determination. The goal is to improve the water quality of Reitz Lake by reducing nutrient loads to the lake and while this individual project may succeed at reducing some nutrient loads on this site, it may not be enough to have a significant impact on water quality of the lake.

Site Assessor(s) Conducting Site Review: John Hiebert



RESTORATION EVALUATION PROGRAM for LEGACY PROJECTS
Minnesota Board of Water and Soil Resources
Minnesota Department of Natural Resources



PROJECT EVALUATION FORM

PROJECT BACKGROUND

Project Name: 2 - 8775 Reitz Lake Rd, Shoreline restoration (Shoreline Buffer Planting 2/3 of shoreline)

Site Assessment Attendees - Reviewers: John Hiebert, Wade Johnson - MN DNR, Dan Shaw, BWSR - Project manager: Seth Bosart - Carver SWCD 952-466-5264 wforbord@co.carver.mn.us ; Tim Sundby - Carver Co Land and Water, 952-361-1816 tsundby@co.carver.mn.us - Property owners:

Date of Review: 07/23/2013

Project Location: County Carver Township/Range/Section Laketown Township; Sections 19,20

Project Manager / Affiliated organization, Contact: Greg Aamodt, 952-361-1804, gaamodt@co.carver.mn.us; (Will Forbrod,

Fund: OHF CWF PTF

Project Start Date (Fiscal Year): 20 11

Predominant Habitat Type: Prairie/Savanna/Grassland Wetland Forest Aquatic

1. Goal(s) of the restoration "To improve Reitz Lake's water quality by reducing the nutrient load entering the lake by installing a water retention/filtration structure on the north side of the lake, enhancing/restoring a wetland on the east side and installing four Shoreline restorations."

Quantifiable objectives of the restoration

What plans / record of project decisions / prescription worksheets are available? Where are they located?
Carver SWCD: "Reitz Lake Restoration Evaluation .docx" 07/17/2012; MN Native Landscapes (contracted installer) "Restoration Guidelines" 05/10/2012

2. Is habitat restoration a primary or secondary objective of the project? Primary Secondary

3. What is the status of the project? Treatment / establishment phase Post-establishment phase

4. Has the plan or project implementation been modified from the original plan? Yes No
If yes, why and how?

Have alterations in plan or implementation changed the proposed outcomes? Yes No

If yes, how?

PROJECT ASSESSMENT

5. Site description (by reviewer): John Hiebert

Soils: Lester-Kilkenny Clay loams

Topography: Gently sloping shoreline to lake

Hydrology: The areas that were selected for restoration are areas where the landowners have manicured turf grass to the water's edge. All of the properties are experiencing shoreline erosion from runoff, fluctuating water levels and wave action which is impacted by this type of urban land use.

Vegetation (structure, dominant species % cover, invasive species (MN DNR) % cover, other): The yard is primarily turf grass on a gently sloping turf lawn down to the lake. The two areas where the native vegetation has been planted have had the turf grass removed with herbicide. Berms were constructed to divert water through the restored areas. The center of the property has a small beach and dock and has turf grass growing to a cement edging with eroding sand on the lake side of this edging and there is evidence of geese utilizing the beach and the mowed grass areas. A seating area has been constructed since the restoration project was installed and it is located next to the restoration area and adjacent to the water's edge and this area has impervious surface and stairs that slope toward the lake. At the OHW mark there is some erosion present, and below this area is a band of primarily sand/silt substrate. On one end of the property there is some emergent vegetation present (primarily cattails).

Surrounding conditions (adjacent land use / veg.): Ag within the watershed along with impervious surfaces and residential turf grass lawns on properties adjacent to the site.

6. Survey methods used (include deliverable format, # of pgs.): visual assessment

7. Is the plan based on current science (best management practices, standards, and guidelines)?

Yes No Describe for yes or no. This project is trying to address a long term erosion and nutrient issue. To adequately address this issue it would be preferred to increase the width and depth of the buffer to maximize the nutrient uptake on the site and discourage geese from utilizing the site. In addition it would be preferred to address the nutrient runoff issues farther up into the watershed rather than at the lakeshore, however there currently are no opportunities to address this issue farther up in the watershed for this particular site.

8. List indicators of project outcomes at this project stage: Site prep / herbicide invasives control was completed to reduce invasive competition during planting establishment. The native plants have been installed and were growing well so the installation of the project appears to have gone well and was being taken care of at the time of inspection, however the scope/scale and layout of the site limits its effectiveness.

9. Does the project plan / implementation of the project plan reasonably allow for achieving proposed project outcome(s)? Yes No Explain. The project attempts to address nutrient runoff by doing shoreline restoration and would be part of the process to improve water quality for Reitz Lake. However there are a variety of other larger issues within the watershed that may be the primary cause of the water quality issues in Reitz Lake and if these watershed issues are not addressed than shoreline projects will not be enough

to make a significant change in the water quality of Reitz Lake.

10. Are corrections or modifications needed to meet proposed outcomes? Yes No

If yes, explain. They could expand the depth and width of the project site to improve nutrient uptake and address runoff volumes from the house. It would also help keep geese from their yard and reduce their droppings from entering the lake. Because of the presence of geese on site they will need to fence the site to ensure predation on seedlings from geese does not impact the restoration. They should encourage the native emergent vegetation on-site to expand. I would also encourage the use of native trees and shrubs on the project as that is what is growing on adjacent naturalized shorelines. The installed berms deflect some, but not all of the runoff to the restoration areas; the restoration areas are so small relative to the amount of runoff that its value is limited in relation to water quality improvements. Some seepage was observed at the waters edge in the restoration site and shows that water maybe flowing through the restoration site into the lake at the shoreline and Exacerbating shoreline erosion. A rain garden higher up on the site would be a better approach to capture runoff on this site in addition to the shoreline buffers. The addition of the impervious surface adjacent to the restoration site and the fact that other runoff can reach the lake through this area and by overland flow over the turf grass limits the value of these restorations.

11. Has anything been done or planned that would detract from existing or potential habitat? Yes No

If yes, explain. The addition of the impervious surface seating area directly adjacent to the resoration area will limit use of restoration area by wildlife.

12. Are proposed future steps, including long-term management, practical and reasonable? Yes No

If no, explain. Their maintenance plan states that all practices that are installed will be tracked and followed by County and Soil and Water staff. Yearly inspections and maintenance of the structures will be based on the NRCS technical standards and any corrective actions needed will be documented and followed up on. Additionally, landowners taking part in the program have signed a form outlining that the practice will be maintained for a minimum of 10 years. They will probably need more than yearly visits to assess the site especially during the first years after installation and the landowner needs to be part of assessing and maintaining the site. Geese are also a potential issue on the site.

13. Are follow-up assessments needed? Yes No If yes, explain. This project is just becoming established and follow-up visits will be necessary to assess if the native vegetation is able to continue to establish and overcome weed issues and if there are any issues with erosion or geese on site.

14. Additional comments on the restoration project.

PROJECT EVALUATION

The project will:

- a. Likely not meet proposed outcomes
- b. Minimally meet proposed outcomes
- c. Meet proposed outcomes
- d. Likely exceed proposed outcomes
- e. Greatly exceed proposed outcomes

Confidence of outcome determination

- 1. Low
- 2. Medium
- 3. High

Provide an explanation of the reason(s) for the determination. The goal is to improve the water quality of Reitz Lake by reducing nutrient loads to the lake and while this individual project may succeed at reducing some nutrient loads on this site, it may not be enough to have a significant impact on water quality of the lake.

Site Assessor(s) Conducting Site Review: John Hiebert

Reitz Lake 3



RESTORATION EVALUATION PROGRAM for LEGACY PROJECTS
Minnesota Board of Water and Soil Resources
Minnesota Department of Natural Resources



PROJECT EVALUATION FORM

PROJECT BACKGROUND

Project Name: 3 - 8715 Reitz Lake Rd, Shoreline restoration (Shoreline restoration / Gully erosion)

Site Assessment Attendees - Reviewers: John Hiebert, Wade Johnson - MN DNR, Dan Shaw, BWSR - Project manager: Seth Bosart - Carver SWCD 952-466-5264 wforbord@co.carver.mn.us ; Tim Sundby - Carver Co Land and Water, 952-361-1816 tsundby@co.carver.mn.us - Property owners:

Date of Review: 07/23/2013

Project Location: County Carver Township/Range/Section Laketown Township; Sections 19,20

Project Manager / Affiliated organization, Contact: Greg Aamodt, 952-361-1804, gaamodt@co.carver.mn.us; (Will Forbrod,

Fund: OHF CWF PTF

Project Start Date (Fiscal Year): 20 11

Predominant Habitat Type: Prairie/Savanna/Grassland Wetland Forest Aquatic

1. Goal(s) of the restoration "To improve Reitz Lake's water quality by reducing the nutrient load entering the lake by installing a water retention/filtration structure on the north side of the lake, enhancing/restoring a wetland on the east side and installing four Shoreline restorations."

Quantifiable objectives of the restoration

What plans / record of project decisions / prescription worksheets are available? Where are they located?
Carver SWCD: "Reitz Lake Restoration Evaluation .docx" 07/17/2012; MN Native Landscapes (contracted

installer) "Restoration Guidelines" 05/10/2012

2. Is habitat restoration a primary or secondary objective of the project? Primary Secondary
3. What is the status of the project? Treatment / establishment phase Post-establishment phase
4. Has the plan or project implementation been modified from the original plan? Yes No
If yes, why and how?
- Have alterations in plan or implementation changed the proposed outcomes? Yes No
If yes, how?

PROJECT ASSESSMENT

5. Site description (by reviewer): John Hiebert
Soils: Lester-Kilkenny Clay loams
Topography: Steeply sloped shoreline with gully erosion
Hydrology: Runoff from over 4 acres is concentrated through a gully and is exacerbating the shoreline erosion problems
Vegetation (structure, dominant species % cover, invasive species (MN DNR) % cover, other): Adjacent to gully on the slope down to the lake there is a mix of native and non-native forbs, grasses and trees and horticultural plants such as Day Lillies/hostas. The area itself has now become well vegetated post installation. The area between the gully and the lake is a flat and vegetated with turf grass, with a well vegetated rain garden installed between the end of the gully and the shoreline. The shoreline at the waters edge has been rip-rapped and has no vegetation present in it but in the aquatic zone in front of the rip-rap there are some clumps of reed canary grass and further off shore there are a few clumps of water lilies and bulrush present.
Surrounding conditions (adjacent land use / veg.): see above
6. Survey methods used (include deliverable format, # of pgs.): visual assessment
7. Is the plan based on current science (best management practices, standards, and guidelines)?
Yes No Describe for yes or no. This project is trying to address a long term erosion issue, it would prefered to address this issue farther up into the watershed rather than on the slope above the lake it empties into and the adjacent shoreline area, however there currently are no opportunities to address this issue farther up in the watershed.
8. List indicators of project outcomes at this project stage: Site prep /herbicide invasives control was completed successfully to reduce invasive competition during planting establishment. Trees were removed adjacent to the gully to improve light penetration and increase plant growth but this may not have been necessary with the large number of shade tolerant native species that could have grown without removing the trees. The native vegetation was planted in the rain garden and was growing well, less natives were present on the hill adjacent to the gully and this had a lot of daylilies and hosta present which do not have deep roots. Ideally more deeprooted natives should be established on the slope

9. Does the project plan / implementation of the project plan reasonably allow for achieving proposed project outcome(s)? Yes No Explain. The projects addressing the gully erosion site and the 3 other shoreline restoration sites are part of the process to improve water quality for Reitz Lake. However there are a variety of other larger issues within the watershed that may be the primary cause of the water quality issues in Reitz Lake and if these watershed issues are not addressed than these shoreline projects will not be enough to make a significant change in the water quality of Reitz Lake.

10. Are corrections or modifications needed to meet proposed outcomes? Yes No
If yes, explain. I would like to see more native vegetation planted along the shoreline beyond the rain garden site, specifically in the area between the slope and the lake. I would also like to see some vines and shrubs planted in the rip-rap itself, things such as live staked willows/dogwood and Virginia creeper to increase filtration of water before it enters the lake. I was also concerned about some of the tree removal on the slope, which was done to increase sunlight to allow more vegetation to grow on the slope. There are plenty of native shrubs such as Downy Arrowhead, chokecherry, wild black current, red berried elder leatherwood, Red Osier and Pagoda Dogwood, and native plants that would grow in shade such as: Large leaf Aster, Virginia Waterleaf, Zigzag golden rod, Pennsylvania sedge, Sprengel's sedge, white snake root, wild ginger and Woodland Phlox. I am concerned that removing trees in the ravine may actually somewhat destabilize the slope and only serve to improve site lines for the home. I would encourage more deep rooted native plants and shrub species to be planted on the gully slope; daylilies and hosta present do not have deep roots to hold the soil as opposed to many native alternatives.

11. Has anything been done or planned that would detract from existing or potential habitat? Yes No If yes, explain. Main concern was with the tree removal to increase palnt growth. I would recommend not removing any more native trees.

12. Are proposed future steps, including long-term management, practical and reasonable? Yes No If no, explain. Their maintenance plan states that all practices that are installed will be tracked and followed by County and Soil and Water staff. Yearly inspections and maintenance of the structures will be based on the NRCS technical standards and any corrective actions needed will be documented and followed up on. Additionally, landowners taking part in any of the programs will sign a form outlining that the practice will be maintained for a minimum of 10 years. They will probably need more than yearly visits to assess the site especially during the first years during establishment and the landowner needs to be part of assessing and maintaining the site. Again I would stress planting more shade tolerant native plants and shrubs on the slope of the hill to further stablizie the site and the planting in the areas around the rain garden and within the rip-rap.

13. Are follow-up assessments needed? Yes No If yes, explain. This project has just been installed and follow-up visits will be necessary to assess if the rock checks and rain garden are sufficient to slow down water enough to reduce erosion. It will be also important to see if the native vegetation in the rain garden and along the slope in the understory has been able to stay established with the high velocity of water present.

14. Additional comments on the restoration project.

PROJECT EVALUATION

The project will:

a. Likely not meet proposed outcomes

1.

Confidence of outcome determination

Low

- | | | | |
|-------------------------------------|-------------------------------------|-----------|-------------------------------------|
| b. Minimally meet proposed outcomes | <input type="checkbox"/> | 2. Medium | <input checked="" type="checkbox"/> |
| c. Meet proposed outcomes | <input checked="" type="checkbox"/> | 3. High | <input type="checkbox"/> |
| d. Likely exceed proposed outcomes | <input type="checkbox"/> | | |
| e. Greatly exceed proposed outcomes | <input type="checkbox"/> | | |

Provide an explanation of the reason(s) for the determination. The goal is to improve the water quality of Reitz Lake by reducing sediment and nutrient loads to the lake and while this individual project may succeed at reducing sediment and nutrient loads on this site, it may not be enough to have a significant impact on water quality of the lake.

Site Assessor(s) Conducting Site Review: John Hiebert

Reitz Lake 4



RESTORATION EVALUATION PROGRAM for LEGACY PROJECTS
 Minnesota Board of Water and Soil Resources
 Minnesota Department of Natural Resources



PROJECT EVALUATION FORM

PROJECT BACKGROUND

Project Name: 4 - Hidden Bay Ln, Shoreline restoration (Shoreline Buffer Planting, Biologs)

Site Assessment Attendees - Reviewers: John Hiebert, Wade Johnson - MN DNR, Dan Shaw, BWSR - Project managers: SEth Bosart - Carver SWCD 952-466-5264 wforbord@co.carver.mn.us ; Tim Sundby - Carver Co Land and Water, 952-361-1816 tsundby@co.carver.mn.us - Property owners: Private Residence

Date of Review: 07/23/2013

Project Location: County Carver Township/Range/Section Laketown Township; Sections 19,20

Project Manager / Affiliated organization, Contact: Greg Aamodt, 952-361-1804, gaamodt@co.carver.mn.us; (Will Forbrod,

Fund: OHF CWF PTF

Project Start Date (Fiscal Year): 20 11

Predominant Habitat Type: Prairie/Savanna/Grassland Wetland Forest Aquatic

- Goal(s) of the restoration "To improve Reitz Lake's water quality by reducing the nutrient load entering the lake by installing a water retention/filtration structure on the north side of the lake,

enhancing/restoring a wetland on the east side and installing four Shoreline restorations."

Quantifiable objectives of the restoration

What plans / record of project decisions / prescription worksheets are available? Where are they located?
Carver SWCD: "Reitz Lake Restoration Evaluation .docx" 07/17/2012; MN Native Landscapes (contracted installer) "Restoration Guidelines" 05/10/2012

2. Is habitat restoration a primary or secondary objective of the project? Primary Secondary
3. What is the status of the project? Treatment / establishment phase Post-establishment phase
4. Has the plan or project implementation been modified from the original plan? Yes No
If yes, why and how?
- Have alterations in plan or implementation changed the proposed outcomes? Yes No
If yes, how?

PROJECT ASSESSMENT

5. Site description (by reviewer): John Hiebert
Soils:
Topography: Sloped hillside running down to flat mowed area adjacent to lake.
Hydrology: The areas that were selected for restoration are areas where the landowners have manicured turf grass to the water's edge. All of the properties are experiencing shoreline erosion from runoff and wave action which is impacted by this type of land use.
Vegetation (structure, dominant species % cover, invasive species (MN DNR) % cover, other): The yard is primarily turf grass gently sloping down to the lake. The area where the native vegetation was planted has had the turf grass and reed canary grass treated with herbicide. At the OHW mark there is some erosion present, and below this area is a band of primarily sand/silt substrate. In front of the site are a thick bed of water lilies which show sthe area does not get a lot of wind or wave action. The erosion the occurs appears to be due to fluctuating water levels. There has been some area of rock and cinder block placed along one edge of the shoreline. On one end of the property there is some emergent vegetation present (primarily cattails) and on the other edge there were some sedges and clumps of reed canary grass. The center of the property, adjacent to the restorations site, has an area for a small dock and has turf grass growing to the edge; there is evidence of geese utilizing these areas. There is also a sand volleyball court above the restoration area.
Surrounding conditions (adjacent land use / veg.): Mostly turf grasses adjacent to the site, upland of these areas along the slope of the hill, the site is vegetated with native grasses forbs and native and ornamental trees.
6. Survey methods used (include deliverable format, # of pgs.): visual assessment
7. Is the plan based on current science (best management practices, standards, and guidelines)?
Yes No Describe for yes or no. This project is trying to address limited shoreline erosion and nutrient issues by installing a native buffer along the shoreline. To adequately address this issue it would be preferred

to increase the width and depth of the buffer to maximize the nutrient uptake on the site and discourage geese from utilizing the site.

8. List indicators of project outcomes at this project stage: Site prep / herbicide invasives control was completed to reduce invasive competition during planting establishment and native vegetation had been planted in the restoration areas.

9. Does the project plan / implementation of the project plan reasonably allow for achieving proposed project outcome(s)? Yes No Explain. The project attempts to address nutrient runoff by installing a native vegetation buffer along a portion of the shoreline as part of the process to improve water quality for Reitz Lake. However there are a variety of other larger issues within the watershed that may be the primary cause of the water quality issues in Reitz Lake and if these watershed issues are not addressed than shoreline projects alone will not be enough to make a significant change in the water quality of Reitz Lake. The hillside area above this site is well vegetated and will remove much of the nutrients that may runoff down this hill. In the immediate area around the restoration site (near the shoreline) is a flat mowed turf grass area. This smaller area may provide some nutrient runoff to the lake and this project will assist in removing some of this, however its overall contribution to the issues impacting Reitz Lake appear to be small. To improve the nutrient uptake in this area, the length and width of the buffer should be increased. There is some limited erosion on site, which is caused by the removal of native vegetation and water level fluctuations not by wind action, as water lilies are growing thickly in front of the site.

10. Are corrections or modifications needed to meet proposed outcomes? Yes No
If yes, explain. They could expand the depth and width site to improve nutrient uptake and address runoff volumes from the house. It would also help keep geese from their yard and reduce their droppings from entering the lake. Because of the presence of geese on site they will need to fence the site to ensure predation on seedlings from geese does not impact the restoration. It appears that it was difficult to get native prairie grasses and forbs to become established in the restoration site. Potential reasons for this are the presence of geese, fluctuating water levels, competition from weed species and reed canary grass. The restoration site had few native and other plants present in it other than scattered sedges and transitional grasses/rushes with exposed silty soil. It appears that this site becomes inundated frequently and that more transitional/aquatic tolerant plants should be planted in this site to encourage establishment. Further diligence with maintenance and supplemental planting on the site and continued control of Reed Canary Grass is also needed to ensure a successful rproject. I would also encourage the use of native trees and shrubs on the project as that is what is growing on adjacent naturalized shorelines. Planting these at edge of the project that is away from the dock would not impact any view corridors. Encouraging the willows to grown at the edge of the property behind the cattail area would also assist in nutrient removal.

11. Has anything been done or planned that would detract from existing or potential habitat? Yes
No If yes, explain.

12. Are proposed future steps, including long-term management, practical and reasonable? Yes
No If no, explain. Their maintenance plan states that all practices that are installed will be tracked and followed by County and Soil and Water staff. Yearly inspections and maintenance of the structures will be based on the NRCS technical standards and any corrective actions needed will be documented and followed up on. Additionally, landowners taking part in any of the programs will sign a form outlining that the practice will be maintained for a minimum of 10 years. They will probably need more than yearly visits to assess the site especially during the first years after installation since reed canary grass may be an issue, and the landowner

needs to be part of assessing and maintaining the site. Geese are also a potential issue on the site.

13. Are follow-up assessments needed? Yes No If yes, explain. This project is relatively new and in the establishment phase, and follow-up visits will be necessary to assess if the native vegetation is able to become established and if there are any continuing issues with erosion or geese on site.

14. Additional comments on the restoration project.

PROJECT EVALUATION

The project will:

- a. Likely not meet proposed outcomes
- b. Minimally meet proposed outcomes
- c. Meet proposed outcomes
- d. Likely exceed proposed outcomes
- e. Greatly exceed proposed outcomes

Confidence of outcome determination

- 1. Low
- 2. Medium
- 3. High

Provide an explanation of the reason(s) for the determination. The goal is to improve the water quality of Reitz Lake by reducing nutrient loads to the lake and while this individual project may succeed at reducing some nutrient loads on this site, it may not be enough to have a significant impact on water quality of the lake.

Site Assessor(s) Conducting Site Review: John Hiebert

Outdoor Heritage Fund, Fiscal Year 2011 Fenmont WMA Wetland Restoration

Project Sponsor: MN DNR, Ducks Unlimited

Project Managers: Ricky Lien, ricky.lien@state.mn.us

Jon Schneider, jschneider@ducks.org

Accomplishment Plan: http://www.lsohc.leg.mn/FY2011/accomp_plan/4a.pdf

Total Appropriation: MN DNR \$1,463,000. DU \$5,042,000.

Applied to evaluated projects: Fenmont WMA \$170,000 Four Corners WMA \$140,000

ML 2010 Appropriation Language

Laws of Minnesota 2010, Chapter 361, Article 1, Section 2, Subd. 4. (a) Accelerated Shallow Lake and Wetland Enhancement and Restoration Program. \$6,505,000 in fiscal year 2011 is to the commissioner of natural resources to assess, enhance, and restore shallow lake and wetland habitats, to acquire land in fee or through permanent conservation easements for shallow lake program restoration, and to provide stewardship for acquired easements in cooperation with Ducks Unlimited, Inc. Of this appropriation, \$1,463,000 is for the Department of Natural Resources agency program acceleration and \$5,042,000 is for an agreement with Ducks Unlimited, Inc. A list of proposed projects, describing the types and locations of land acquisitions, restoration projects, and enhancement projects, must be provided as part of the required accomplishment plan. The commissioner of natural resources must agree in writing to each acquisition, restoration project, and enhancement project. The accomplishment plan must include an easement stewardship plan. All restorations must comply with subdivision 9, paragraph (b).

Evaluation Summary

Two wetland restoration sites were assessed in October 2013: Fenmont WMA in Nobles County and Four Corners WMA in Martin County.

The Fenmont WMA site restored wetland hydrology to a 39 acre basin using a water control structure. The adjustable control structure allows wildlife managers to manipulate water levels to optimize habitat for target wetland obligate species, primarily waterfowl. Additionally water level control allows managers to inhibit rough fish (Carp) through drawdowns and undesirable plants (Reed Canary Grass) by prolonged inundation. This type of hydrologic restoration is consistent with current science regarding wetland habitat restoration. The upland areas of Fenmont WMA have been restored to native grassland (with other funds) and provide a beneficial habitat transition and connectivity between the wetland and surrounding uplands. Prior to the hydrologic restoration, the low wet areas surrounding the wetland were dominated by Reed Canary Grass. These areas were repeatedly treated with Glyphosate herbicide to suppress the living plants. These treatments were conducted in accordance with established science based protocols for Reed Canary control in wetland restoration site preparation (generally accepted reference in BWSR guidance http://www.bwsr.state.mn.us/native_vegetation/planting-maintenance-recs.pdf). In spring of 2012 the wet perimeter zones of the wetland were seeded with a diverse native wetland seed mix. Approximately half of the seeded species were observed along the wetland



perimeter during the site visit walk through in October 2013. Despite appropriate measures to control Reed Canary surrounding the wetland this aggressive grass continues to dominate vegetative cover due to existing seed bank and continued inflow of seed from contributing ditch channels. DNR area wildlife managers continue to manage Reed Canary Grass with glyphosate application. Managers should continue to monitor and manage the vegetation communities to maximize habitat value and minimize Reed Canary monoculture.

The Four Corners WMA project restored wetland hydrology to five formerly drained wetland basins totaling 27 acres. Hydrologic restoration was achieved through the installation of 5 inline (subsurface) water control structures (agri-drains) connected to existing tile lines and construction of 3 earthen embankments. Survey and engineering design work was completed by Ducks Unlimited. Drawdowns and intensive water level management will be used on the basins to provide an optimal balance of wildlife habitat and water quality, as directed by area wildlife managers. Upland areas disturbed during construction were seeded with local ecotype grasses and forbs. Wetland areas were left unseeded to allow wetland vegetation regrowth from the natural seed bank. These basins have the potential to develop into dense hybrid cattail that would lower waterfowl habitat value. DNR Area Wildlife managers should monitor and manage vegetation in the naturally re-vegetated wetlands to avoid cattail monoculture.

Panel Comments / Recommendations:

- Good examples of adaptive controls for managing wetland hydrologic restoration (Fenmont: outlet control structure; Four Corners: Agri-drains and existing tile lines). Projects are beneficial for hydrologic restoration in heavily agriculturally drained landscape.
- Area managers should monitor success of wetland seeding (Fenmont) and quality of naturalized wetland vegetation (Four Corners) and manage towards optimal habitat conditions

Fenmont WMA wetland restoration

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|---|---|---|
|  | <p>RESTORATION EVALUATION PROGRAM for LEGACY PROJECTS Minnesota Board of Water and Soil Resources Minnesota Department of Natural Resources</p> |  |
| PROJECT EVALUATION FORM | | |
| <hr style="border: 1px solid black;"/> | | |
| PROJECT BACKGROUND | | |
| <hr style="border: 1px solid black;"/> | | |
| <p>Project Name: OHF FY-11 4(a) Fund Accelerated Shallow Lake and Wetland Enhancement and Restoration: Fenmont WMA Wetland Restoration</p> | | <p>Date of Review: 10/02/2013</p> |

Site Assessment Attendees - Reviewers: Greg Larson BWSR; Wade Johnson MN DNR - Project manager: Josh Kavanagh DU, Matt Weegman DU; Wendy Krueger MN DNR (Former Slayton Area Wildlife Manager), John Beech MN DNR (Slayton Area Wildlife Tech) - Property owners: MN DNR WMA

Project Location: County Nobles Township/Range/Section T 104N R 42W S 1

Project Manager / Affiliated organization, Contact: Jon Schnieder DU, Ricky Lien MN DNR

Fund: OHF CWF PTF Fiscal Year Funds – FY 2011 Project Start Date 2011

Predominant Habitat Type: Prairie/Savanna/Grassland Wetland Forest Aquatic

1. Goal(s) of the restoration Restore shallow lake and wetland habitat

Quantifiable objectives of the restoration Restore wetland hydrology to a 39 acre basin via water control structure

What plans / record of project decisions / prescription worksheets are available? Where are they located?

Complete plans and project records are available from DNR and and DU staff

2. What is the status of the project? Treatment / establishment phase Post-establishment phase

3. Has the plan or project implementation been modified from the original plan? If yes, why and how? No

Have alterations in plan or implementation changed the proposed outcomes? No

PROJECT ASSESSMENT

4. Site description (by reviewer): Greg Larson

Soils: Loamy calcareous glacial till. Hydric soil-dominated flats, depressions and swales comprise about 40 percent of the site.

Topography: Gently rolling 0-6 percent slopes dominate the uplands.

Hydrology: A near-surface water table dominate lower-lying landscape. The restored shallow lake is a flow-through wetland system predominantly sourced by a stream. Overland flow augments the stream.

Vegetation (structure, dominant species % cover, invasive species (MN DNR) % cover, other): BWSR wetland emergent mix planted 1.0 feet below to 1.5 feet above normal pool elevation. Uplands being restored to native prairie. There are minimal invasives except in drawdown area. Despite aggressive control, RCG persists. See point 13.

Surrounding conditions (adjacent land use / veg.): Extensively drained cropland; corn and soybean production

5. Survey methods used (include deliverable format, # of pgs.): Meander survey, focusing on the more challenging areas of the site with regard to vegetative establishment ,and maintenance and observations

from the control structure.

6. Is the plan based on current science (best management practices, standards, and guidelines)? Yes, outlet control structure to restore/manage wetland hydrology.

7. List indicators of project outcomes at this project stage: (a) hydrology has been stabilized through the control structure and (b) vegetation is becoming established with special attention given to areas where RCG persists

8. Does the project plan / implementation of the project plan reasonably allow for achieving proposed project outcome(s)? Yes

9. Are corrections or modifications needed to meet proposed outcomes? Explain. No

10. Has anything been done or planned that would detract from existing or potential habitat? Explain. No

11. Are proposed future steps, including long-term management, practical and reasonable? Explain. Yes

12. Are follow-up assessments needed? Explain. No

13. Additional comments on the restoration project. Managers of this project faced significant challenges to the long-term integrity of this project. Examples: (1) To accept this project, adjacent landowners demanded rerouting of tile lines around the project. This action could potentially reduce hydrology to the pool but could also reduce nitrogen input. (2) The control structure is designed to allow drawdown of the pool. In this case, the extent and duration of drawdown presents a trade-off between the benefits of drawdown (desiccation of sediments) to marsh ecology and control of carp versus reestablishment of RCG. These challenges are typical of those faced by proponents of wetland restoration in heavily drained agriculture-dominated landscapes. The managers of this project have considered the tradeoffs and have implemented adaptive management to provide a reasonable balance. Carp control is being achieved and RCG is being controlled to the extent that the viable forb population is being maintained. Managers are to be commended for initiating water quality monitoring.

PROJECT EVALUATION

The project will:

- a. Likely not meet proposed outcomes
- b. Minimally meet proposed outcomes
- c. Meet proposed outcomes
- d. Likely exceed proposed outcomes
- e. Greatly exceed proposed outcomes

Confidence of outcome determination

- 1. Low
- 2. Medium
- 3. High

Provide an explanation of the reason(s) for the determination. The managers of this project have considered many "what ifs" and have developed appropriate adaptive management strategies. All projects have trade-offs, and this project is no exception. Post-establishment maintenance of OHF projects must be

funded from general operating funds. To minimize long-term maintenance costs, it is incumbent on managers to be successful in the establishment phase. This prosecution of this project suggests a high likelihood of successful establishment with minimal long term maintenance.

Site Assessment Lead(s) Conducting Site Review (Signature Required): Greg Larson

Four Corners WMA wetland hydrology restoration



RESTORATION EVALUATION PROGRAM for LEGACY PROJECTS
Minnesota Board of Water and Soil Resources
Minnesota Department of Natural Resources



PROJECT EVALUATION FORM

PROJECT BACKGROUND

Project Name: OHF FY-11 4(a) Fund Accelerated Shallow Lake and Wetland Enhancement and Restoration:
Four Corners WMA Wetland Restorations Date of Review: 10/02/2013

Site Assessment Attendees - Reviewers: Greg Larson BWSR; Wade Johnson MN DNR - Project manager:
Josh Kavanagh DU, Matt Weegman DU; Randy Markl MN DNR (Windom Area Wildlife Manager) - Property
owners:

Project Location: County Martin Township/Range/Section T 103N R 32W S 31

Project Manager / Affiliated organization, Contact: Jon Schneider DU jschneider@ducks.org; Ricky Lien
MN DNR Ricky.Lien@state.mn.us

Fund: OHF CWF PTF Fiscal Year Funds – FY 2011 Project Start
Date 2011

Predominant Habitat Type: Prairie/Savanna/Grassland Wetland Forest Aquatic

1. Goal(s) of the restoration Restore shallow lake and wetland habitat

Quantifiable objectives of the restoration Restore wetland hydrology to six basins totaling 27 acres via
breaking historic draintile and controlling waterlevels with 'Agri drains'

What plans / record of project decisions / prescription worksheets are available? Where are they
located?

Complete plans and project records are available from DNR and and DU staff

2. What is the status of the project? Treatment / establishment phase Post-establishment phase



3. Has the plan or project implementation been modified from the original plan? If yes, why and how?
No

Have alterations in plan or implementation changed the proposed outcomes? No

PROJECT ASSESSMENT

4. Site description (by reviewer): Greg Larson

Soils: Loamy calcareous glacial till. Hydric soil-dominated flats, depressions and swales comprise about 20 percent of the site.

Topography: Gently rolling 0-6 percent slopes dominate the uplands.

Hydrology: A near-surface water table dominates lower-lying landscape. The restored shallow lake and wetlands are predominantly sourced by overland flow and the near surface water table. The use of agri-drain control structures greatly aids control of hydrology.

Vegetation (structure, dominant species % cover, invasive species (MN DNR) % cover, other): A wetland seed mix was not used. The managers relied on native seed bank. They used Big Bluestem sparingly as it is aggressive and tends to outcompete facultative hydrophytes. Uplands being restored to native prairie. There are minimal invasives. Foxtail is commonly found on more recently established areas. This is not a concern as older established areas show a dominance of native vegetation.

Surrounding conditions (adjacent land use / veg.): Extensively drained cropland; corn and soybean production

5. Survey methods used (include deliverable format, # of pgs.): Meander survey with emphasis on wetland to non-wetland transition.

6. Is the plan based on current science (best management practices, standards, and guidelines)? Yes, restored wetland hydrology with adaptive controls (agri-drains) for modifying hydrology

7. List indicators of project outcomes at this project stage: (a) hydrology has been restored by numerous control structures and (b) vegetation is becoming established with special attention given to areas where RCG and hybrid cattail persists.

8. Does the project plan / implementation of the project plan reasonably allow for achieving proposed project outcome(s)? Yes

9. Are corrections or modifications needed to meet proposed outcomes? Explain. No

10. Has anything been done or planned that would detract from existing or potential habitat? Explain. No

11. Are proposed future steps, including long-term management, practical and reasonable? Explain. Yes

12. Are follow-up assessments needed? Explain. No

13. Additional comments on the restoration project. Managers have made innovative use of water control

structures. In addition to restoring hydrology per se', water levels of individual basins can be regulated. In addition to enhancing hydrology, managers can use water level control to manage vegetation. To control hybrid cattail, managers are considering grazing, baling, burning and herbicide.

PROJECT EVALUATION

The project will:

- a. Likely not meet proposed outcomes
- b. Minimally meet proposed outcomes
- c. Meet proposed outcomes
- d. Likely exceed proposed outcomes
- e. Greatly exceed proposed outcomes

Confidence of outcome determination

- 1. Low
- 2. Medium
- 3. High

Provide an explanation of the reason(s) for the determination. Post-establishment maintenance of OHF projects must be funded from general operating funds. To minimize long-term maintenance costs, it is incumbent on managers to be successful in the establishment phase. The execution of this project suggests a high likelihood of successful establishment with minimal long term maintenance. Managers have employed adaptive management to meet challenges of this project.

Site Assessment Lead(s) Conducting Site Review (Signature Required): Greg Larson

| |
|--|
| Outdoor Heritage Fund, Fiscal Year 2010 Accelerate the Waterfowl Production Area Program in Minnesota |
|--|

Project Sponsor: US Fish and Wildlife Service / Pheasants Forever
Project Managers: Jim Leach USFWS, Matt Holland Pheasants Forever
Accomplishment Plan: http://www.isohc.leg.mn/FY2010/accomp_plan/4c.pdf

Total Appropriation: \$5,600,000
Applied to evaluated projects: \$

ML 2009 Appropriation Language

Laws of Minnesota 2009, Ch. 172, Art. 1, Sec. 2, Subd. 4c Accelerate the Waterfowl Production Area Program in Minnesota. \$5,600,000 in fiscal year 2010 is to the commissioner of natural resources for an agreement with Pheasants Forever or successor to acquire and restore wetland and related upland habitats, in cooperation with the United States Fish and Wildlife Service and Ducks Unlimited, Inc. or successor to be managed as waterfowl production areas. A list of proposed acquisitions and a list of proposed projects, describing the types and locations of restorations, must be provided as part of the required accomplishment plan.

Evaluation Summary

Two restoration projects were assessed in October 2014: Rustad Slough WPA in Pope County and Geyer WPA in Traverse County. As noted in the program accomplishment plan, these projects are guided by several regional wildlife habitat plans. Both projects applied current best practices to restore grassland nesting cover adjacent to wetlands. Rustad converted 80 acres of cropland to native grassland cover. Geyer removed 11 acres of trees and converted 70 acres of undesirable vegetation (brome and weedy trees) to diverse native grassland cover. Tree removal on this site was a best practice to reduce predation of grassland nesting birds. Both of these projects displayed very good results with two years of establishment, including a high density of forbs and low percent cover of weedy invasives.

Panel Comments / Recommendations

- Good treatment for the habitat type and goals
- Managers will need to stay on top of woody invasives to maintain targeted grassland habitat; may need to post treat Siberian Elm etc. versus burning regime



RESTORATION EVALUATION PROGRAM for LEGACY PROJECTS
Minnesota Board of Water and Soil Resources
Minnesota Department of Natural Resources



PROJECT EVALUATION FORM

PROJECT BACKGROUND

Project Name: Rustad Slough WPA Restoration

Date of Review: 10/7/2014

Site Assessment Attendees - Reviewers: Hoch - Project manager: talked to Mead Klavetter, USFWS manager, before/after site visit - Property owners: USFWS

Project Location: County Pope Township/Range/Section T 123N R40W S24

Project Manager / Affiliated organization, Contact: PF / USFWS

Fund: OHF CWF PTF Fiscal Year Funds – FY 10 Project Start Date 2010
Predominant Habitat Type: Prairie/Savanna/Grassland Wetland Forest Aquatic

1. Goal(s) of the restoration Retore / Reconstruct high diversity grassland

Quantifiable objectives of the restoration

What plans / record of project decisions / prescription worksheets are available? Where are they located?
seed list housed with USFWS

2. What is the status of the project? Treatment / establishment phase Post-establishment phase
3. Has the plan or project implementation been modified from the original plan? If yes, why and how? No
Have alterations in plan or implementation changed the proposed outcomes? -

PROJECT ASSESSMENT

4. Site description (by reviewer): Hoch

Soils: Mesic

Topography: flat

Hydrology:

Vegetation (structure, dominant species % cover, invasive species (MN DNR) % cover, other): restored prairie with minor amounts of invasive species (<3%)

Surrounding conditions (adjacent land use / veg.): ag fields

5. Survey methods used (include deliverable format, # of pgs.): Spent 30 minutes walking at site recording all forb and grass species seen.
6. Is the plan based on current science (best management practices, standards, and guidelines)? Yes. Seeded appropriate species and diversity into soybean stubble. Veg establishment managed through selective mowing and spot treatment for invasives.
7. List indicators of project outcomes at this project stage: Structure of the vegetation was good: structural heterogeneity; interspersed with areas of lower density of grass. Density of forbs, 50% cover in most areas, were very good. There were some species on the list I couldn't find, but the site is still young and I expect these species to show up/become more abundant in the near future. This looked to be very good habitat for migratory birds, pollinators, and other wildlife. There was a low cover of invasives, especially thistles, for a relatively recent reconstruction.
8. Does the project plan / implementation of the project plan reasonably allow for achieving proposed project outcome(s)? Yes
9. Are corrections or modifications needed to meet proposed outcomes? Explain. No
10. Has anything been done or planned that would detract from existing or potential habitat? Explain. No
11. Are proposed future steps, including long-term management, practical and reasonable? Explain. Yes
12. Are follow-up assessments needed? Explain. No
13. Additional comments on the restoration project. I was very happy with the structure of the planting as well as the density of the forbs.

PROJECT EVALUATION

The project will:

- | | |
|--------------------------------------|-------------------------------------|
| a. Likely not meet proposed outcomes | <input type="checkbox"/> |
| b. Minimally meet proposed outcomes | <input type="checkbox"/> |
| c. Meet proposed outcomes | <input type="checkbox"/> |
| d. Likely exceed proposed outcomes | <input checked="" type="checkbox"/> |
| e. Greatly exceed proposed outcomes | <input type="checkbox"/> |

Confidence of outcome determination

- | | |
|-----------|-------------------------------------|
| 1. Low | <input type="checkbox"/> |
| 2. Medium | <input type="checkbox"/> |
| 3. High | <input checked="" type="checkbox"/> |

Provide an explanation of the reason(s) for the determination. Everything looked good at this site. Good forb:grass ratio, relatively low invasive species cover, 3-5% cover, for this point in the reconstruction. All that needs to be done now is long-term maintenance with fire.

Site Assessor(s) Conducting Site Review: Greg Hoch



RESTORATION EVALUATION PROGRAM for LEGACY PROJECTS
Minnesota Board of Water and Soil Resources
Minnesota Department of Natural Resources



PROJECT EVALUATION FORM

PROJECT BACKGROUND

Project Name: Geyer WPA

Date of Review: 10/7/2014

Site Assessment Attendees - Reviewers: Greg Hoch - Project manager: talked to Mead Klavetter, USFWS manager, before/after site visit - Property owners: USFWS

Project Location: County Traverse Township/Range/Section T 125N R46W S31/32

Project Manager / Affiliated organization, Contact: PF / USFWS

Fund: OHF CWF PTF Fiscal Year Funds – FY 10 Project Start Date 2010

Predominant Habitat Type: Prairie/Savanna/Grassland Wetland Forest Aquatic

1. Goal(s) of the restoration Enhance grassland nesting cover by removing hostile habitat through tree removal and high diversity planting

Quantifiable objectives of the restoration Restore/Reconstruct a high diversity grassland, per seeding

What plans / record of project decisions / prescription worksheets are available? Where are they located? contracts and seed list housed with USFWS

2. What is the status of the project? Treatment / establishment phase Post-establishment phase
3. Has the plan or project implementation been modified from the original plan? If yes, why and how? No
Have alterations in plan or implementation changed the proposed outcomes? -

PROJECT ASSESSMENT

4. Site description (by reviewer): Hoch

Soils: Mesic

Topography: flat

Hydrology:

Vegetation (structure, dominant species % cover, invasive species (MN DNR) % cover, other): restored prairie with minor amounts of invasive species (<3%)

Surrounding conditions (adjacent land use / veg.): ag fields

5. Survey methods used (include deliverable format, # of pgs.): Spent 30 minutes walking at site recording all

forb and grass species seen. Trees and stumps were completely removed, site was lightly disced. I could not see sign of old homesite / woodlot on the site.

6. Is the plan based on current science (best management practices, standards, and guidelines)? Yes. Brome field and shelter belt trees cleared with Bulldozer; shallow disced; seed drilled with appropriate diversity mix; continued spot mowing for invasives; future buring rotation for maintenance.

7. List indicators of project outcomes at this project stage: There was no evidence of the trees that had been removed (burn piles, burn scars), the stumps had all been pushed out making walking safer and future management activities easier. The site had been disced smooth and seeded with native grasses and forbs. (70-80% few species early sucesion will be differnet) There was not a super high diversity of forbs visible at the site yet, but the density of forbs was quite impressive. This will provide excellent pollinator habitat in the future. This is especially important as much of the site is still in the brome monoculture from when the area was purchased. There was some thistle at the site, the the thistle patches had been mown at ~10 inches to remove the seedheads. As the restoration continues to mature, the thistles will be outcompeted.

8. Does the project plan / implementation of the project plan reasonably allow for achieving proposed project outcome(s)? Yes. Tree removal, cropping and seeding allow for achieving outcomes

9. Are corrections or modifications needed to meet proposed outcomes? Explain. No

10. Has anything been done or planned that would detract from existing or potential habitat? Explain. No

11. Are proposed future steps, including long-term management, practical and reasonable? Explain. Yes. Just needs periodic fires.

12. Are follow-up assessments needed? Explain. No

13. Additional comments on the restoration project. I was very happy with the soils at the site (smooth for having cleared trees with bulldozers; needs to be clear and relatively smooth for using mowing equipment and spray equipment). After walking around the site I couldn't find any evidence of the homesite or woodlot.

PROJECT EVALUATION

The project will:

- a. Likely not meet proposed outcomes
- b. Minimally meet proposed outcomes
- c. Meet proposed outcomes
- d. Likely exceed proposed outcomes
- e. Greatly exceed proposed outcomes

Confidence of outcome determination

- 1. Low
- 2. Medium
- 3. High

Provide an explanation of the reason(s) for the determination. Everything looked good at this site. Good forb density (70-80% cover was seeded for bs) will likely see more species as restoration matures, other species will continue to express themselves) . Some thistles present, as would be expected, FWS is actively controlling them. All that needs to be done now is long-term maintenance with fire.

Site Assessor(s) Conducting Site Review: Greg Hoch

Outdoor Heritage Fund, Fiscal Year 2011 Anoka Sand Plain Restoration and Enhancement

Project Sponsor: Great River Greening
Project Managers: Wayne Ostlie

Accomplishment Plan: http://www.lsohc.leg.mn/FY2011/accomp_plan/5f.pdf

Total Appropriation: \$747,000
Applied to evaluated projects:

ML 2010 Appropriation Language

Laws of Minnesota 2010, Ch. 361, Art . 1, Sec. 2, Subd. 5(f) \$747,000 in fiscal year 2011 is to the commissioner of natural resources for an agreement with Great River Greening to restore and enhance habitat on public property in the Anoka Sand Plain in Anoka, Chisago, Isanti, Benton, Washington, Morrison, and Sherburne Counties. All restorations must comply with subdivision 9, paragraph (b).

Evaluation Summary

Four restoration and enhancement projects from the Anoka Sand Plain Restoration appropriation were assessed in October 2013. Great River Greening (GRG) collaborated with four separate land management agencies on each of these projects. All four of the projects reviewed applied current science based best practices to support the restoration of rare Oak Savanna habitats on the Anoka Sand Plain.

At the Cedar Creek Ecosystem Reserve Outdoor Heritage funds were used to accelerate the restoration of remnant Oak Savanna habitats. Activities were directed by ongoing management plans for the Reserve. The use of Outdoor Heritage funds at Cedar Creek enabled the use of current science based practices of herbicide and mechanical removal that had not been previously utilized here for woody invasive suppression. Cedar Creek's work plan for these sites provides an exemplary description of activities, timeline, intended outcomes and assessment measures. An excerpt from Cedar Creek's work plan is shown in Appendix III p.93. Ongoing plans for prescribed fire regime combined with woody invasives control provides a high likelihood of achieving planned outcomes.

GRG partnered with Isanti County Parks at Beklin Homestead WMA to restore Oak Savanna habitat. Burr Oak seedlings were planted into an existing restored grassland and tree guards put in place to prevent herbivory. Seedling success rate was greater than 80% within two years of planting. This good success rate and ongoing monitoring and management for woody invasives indicates movement towards successful outcomes.

At Sherburne National Wildlife Refuge Outdoor Heritage funds were used to support US Fish and Wildlife Service's ongoing Oak Savanna restoration and enhancement efforts. This included herbicide and tree and brush removal on over 200 acres. These areas are also being actively managed with fire to enhance and maintain oak savanna habitat. Tree and shrub removal from this funding has met the



targets for canopy cover. Plans for prescribed fire and future herb layer plantings and seedings will help maintain the oak savanna structure of the project area.

At Rice Lake State Natural Area tree thinning, invasive control (herbicide) and prescribed fire was used to open the tree canopy to replicate tree density of dry oak savanna communities. Plant communities in the project area have responded well to these best practices.

Panel Comments / Recommendations

- All projects:
 - Basis and direction for project work founded on existing regional and site specific habitat management plans. This guidance provides an essential foundation for effective site work.
 - Good combination of site treatments (thinning, herbicide, fire, targeted planting) to achieve target habitats
 - Woody invasive encroachment is an ongoing threat to maintaining the savanna structure for all sites. Existing management plans indicate follow up monitoring and management will maintain restored/enhanced oak savannas.

Anoka Sand Plain Restoration and Enhancement - Cedar Creek Site Evaluation

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|--|---|---|
|  | <p>RESTORATION EVALUATION PROGRAM for LEGACY PROJECTS Minnesota Board of Water and Soil Resources Minnesota Department of Natural Resources</p> |  |
| PROJECT EVALUATION FORM | | |
| <hr/> PROJECT BACKGROUND <hr/> | | |
| Project Name: OHF FY-11 5(f) Anoka Sand Plain Restoration and Enhancement | | Date of Review: |
| 10/25/2013 | | |
| Site Assessment Attendees - Reviewers: Mark Cleveland MN DNR; Wade Johnson MN DNR - Project manager: Jeff Corney, University of Minnesota - Property owners: University of Minnesota Cedar Creek Ecosystem Science Reserve | | |
| Project Location: County Anoka/Isanti Township/Range/Section T 34 N R23W Sections 25, 26, 27, 34, 35 | | |

Project Manager / Affiliated organization, Contact: Jeff Corney, University of Minnesota

Fund: OHF CWF PTF Fiscal Year Funds – FY 2011 Project Start Date 2011

Predominant Habitat Type: Prairie/Savanna/Grassland Wetland Forest Aquatic

1. Goal(s) of the restoration Enhance prairie and savanna recovery through control of invasive species and reintroduction of fire as a natural disturbance factor.

Quantifiable objectives of the restoration Able to evaluate presence and extent of invasives post treatment. Site was mapped before current enhancement activities.

What plans / record of project decisions / prescription worksheets are available? Where are they located?
"Cedar Creek Work Plan", Cedar Creek Planning and Land Management Maps, and "Cedar Creek Ecosystem Science Reserve (CCESR) Comprehensive Savanna/Prairie Restoration Program (Prescribed Burning and Woody Invasive Species Control)"

2. What is the status of the project? Treatment / establishment phase Post-establishment phase
3. Has the plan or project implementation been modified from the original plan? If yes, why and how? No
Have alterations in plan or implementation changed the proposed outcomes? NA

PROJECT ASSESSMENT

4. Site description (by reviewer): Mark Cleveland
Soils: sand and sandy loam
Topography: level to gently rolling
Hydrology: upland ridges.
Vegetation (structure, dominant species % cover, invasive species (MN DNR) % cover, other): former pasture, old field and grazed woodlands. Native mesic and dry prairie, and former oak savanna communities have red oak, pin oak, hazel, and other woody species encroachment. Red oak and hazel dominant the scrub layer. Native grasses and a few native forbes (such as prairie bush clover) from seed bank are approaching 50% cover in prairie areas. Smooth brome and kentucky bluegrass are still dominant species. Woody invasive species control efforts have focused on European buckthorn, black locust, Siberian elm and Asian honeysuckle. Additional management efforts have focused on red oak and hazel in project areas.
Surrounding conditions (adjacent land use / veg.): open land and exurban development. Farmed field and residential vegetation including managed lawns
5. Survey methods used (include deliverable format, # of pgs.): site visit included site conditions evaluation.
6. Is the plan based on current science (best management practices, standards, and guidelines)? yes
Prescribed fire to achieve different fire effects is incorporated through the scheduling of both spring and fall burns. The use of herbicide to prevent resprouting and coresponding early seed production of scrub and small

tree species fits as a BMP. For an additional measure of success for this type of project, before and after photo points would be a useful way to document qualitative results. Live stem densities along preselected transects would be a useful quantitative measure. The sites are part of a monitoring program which is repeated every five years that will catch both the "before" and post project vegetation data.

7. List indicators of project outcomes at this project stage: % cover of scrub layer in enhancement areas should be less than at the project inception. Follow up surveys of invasive species with mapped project areas.
8. Does the project plan / implementation of the project plan reasonably allow for achieving proposed project outcome(s)? Yes
9. Are corrections or modifications needed to meet proposed outcomes? Explain. As mentioned above, communicating project successes would be enhanced by use of documenting results with multiple photo points.
10. Has anything been done or planned that would detract from existing or potential habitat? Explain. High levels of resprouting of red oak family tree seedlings will require additional fire application and possibly either basal bark or foliar herbicide applications to prevent enhancement sites from becoming dominated by a single age stand of red oak which would create a good deal of shade for non-shade tolerant grasses and forbes. The current level of native species in some of the old field areas may take many years to become the dominant. There is also a need to increase forbe and grass species diversity. Interseeding from local seed sources would be helpful in this regard.
11. Are proposed future steps, including long-term management, practical and reasonable? Explain. Increase plant community native species diversity, keep applying prescribed fire to woodland and brushland areas to maintain open plant communities. Monitoring invasive species control areas and mapping new and existing locations.
12. Are follow-up assessments needed? Explain. followup prescribed fire will continue to weaken the red oak that dominates some of the project area. Evaluating the site after the next round of fire will be helpful in assessing fire affects. This is outside of the current grant but would still be worth while.
13. Additional comments on the restoration project. Prioritizing Cedar Creek's future projects for habitat and native plant community enhancements should build on the current project accomplishments. Once work has been started on a project site, that and adjacent sites are likely (though not always) to be the best locations for futrue enhancement projects.

PROJECT EVALUATION

The project will:

- a. Likely not meet proposed outcomes
- b. Minimally meet proposed outcomes
- c. Meet proposed outcomes
- d. Likely exceed proposed outcomes
- e. Greatly exceed proposed outcomes

Confidence of outcome determination

1. Low
2. Medium
3. High

Provide an explanation of the reason(s) for the determination. As explained above, an appropriate prescribed fire regime combined with woody invasives control provides a high likelihood of achieving planned outcomes.

Site Assessor(s) Conducting Site Review: Mark Cleveland 10/29/13

Anoka Sand Plain Restoration and Enhancement - Beklin Homestead WMA Evaluation



RESTORATION EVALUATION PROGRAM for LEGACY PROJECTS
Minnesota Board of Water and Soil Resources
Minnesota Department of Natural Resources



PROJECT EVALUATION FORM

PROJECT BACKGROUND

Project Name: OHF FY-11 5(f) Anoka Sand Plain Restoration and Enhancement Date of Review: 10/02/2013

Site Assessment Attendees - Reviewers: Mark Cleveland MN DNR; Wade Johnson MN DNR - Project manager: Barry Wendorf, Isanti County Parks - Property owners: Isanti County Parks

Project Location: County Isanti County Township/Range/Section T N R W S

93°16'20.49"W 45°35'47.715"N

Project Manager / Affiliated organization, Contact:

Fund: OHF CWF PTF Fiscal Year Funds – FY 2011 Project Start Date 2011

Predominant Habitat Type: Prairie/Savanna/Grassland Wetland Forest Aquatic

1. Goal(s) of the restoration restore forty five acres of open field into native oak savanna

Quantifiable objectives of the restoration site will have approximately 25 mature trees per acre and 10 to 50 % total canopy cover

What plans / record of project decisions / prescription worksheets are available? Where are they located?
"Becklin Homestead Oak Savanna Restoration and Management" flyer and "Becklin Homestead Oak Savanna Ecological Restoration and Management Plan, Nov. 2009"

2. What is the status of the project? Treatment / establishment phase Post-establishment phase

3. Has the plan or project implementation been modified from the original plan? If yes, why and how? No
Have alterations in plan or implementation changed the proposed outcomes? NA

PROJECT ASSESSMENT

4. Site description (by reviewer): Mark Cleveland
Soils: Zimmerman loamy fine sand and fine sand and Isanti mucky loam fine sand
Topography: nearly level upper river terrace
Hydrology: upland terrace above the Rum River. Well drained.
Vegetation (structure, dominant species % cover, invasive species (MN DNR) % cover, other): native prairie grass plantings dominated by Big and Little Bluestem and Indian Grass with light forbes component. Includes planted loca; sources burr oak seedlings, which are the focus of this enhancement.
Surrounding conditions (adjacent land use / veg.): Adjacent remnant white pine stands to the south and floodplain forest (FFn67) along the banks for the Rum River to the north.
5. Survey methods used (include deliverable format, # of pgs.): site walk through and vegetation evaluation
6. Is the plan based on current science (best management practices, standards, and guidelines)? yes
7. List indicators of project outcomes at this project stage: Monitoring of seedling survival to achieve burr oak density of 25 mature Burr oaks per acre after five years
8. Does the project plan / implementation of the project plan reasonably allow for achieving proposed project outcome(s)? yes.
9. Are corrections or modifications needed to meet proposed outcomes? Explain. Current level of tree survival is good. There should be contingencies if there was a significant change in survival rate. Follow up plantings and possible maintenance plan should be considered, if there was a high tree mortality event. The desired future condition of Oak Savanna on this site is a good fit for the soils mapped on this site. Once established it should fit well on the landscape with adjacent oak dominated woodlands, flood plain forest and white pine stand. If the oaks are managed at the higher density suggested in the plan, it may mitigate the high level of edge habitat present before the project. This would create a stronger wooded corridor along the Rum River.
10. Has anything been done or planned that would detract from existing or potential habitat? Explain. It would be worth giving some consideration as to management options in the pine areas and the open field between them. Sandy soils are present through out this area and restoration of the old field to pine or pine and oak communities would lessen fragmentation in this part of the Becklin Homestead County Park.
11. Are proposed future steps, including long-term management, practical and reasonable? Explain. Future thinning to achieve tree densities noted in the plan can begin in the decade. While the seedlings are showing good adaptation, but if drought conditions occur in the next few year, the project manager should consider supplemental watering. Maintaning good recordsof goals and management actions will help keep the project on track in the future.
12. Are follow-up assessments needed? Explain. Resurvey to assess survival rate of seedlings. Monitor site for invasive species presence.

13. Additional comments on the restoration project. During the plant establishment period, prescribed fire management should be avoided. Mowing upland areas should be used.

PROJECT EVALUATION

The project will:

- a. Likely not meet proposed outcomes
- b. Minimally meet proposed outcomes
- c. Meet proposed outcomes
- d. Likely exceed proposed outcomes
- e. Greatly exceed proposed outcomes

Confidence of outcome determination

- 1. Low
- 2. Medium
- 3. High

Provide an explanation of the reason(s) for the determination. Current site conditions should remain stable and level of tree seedling survival is very good. Seedlings appear to be adapting to the site well. Overall plant installation appears to be done well.

Site Assessor(s) Conducting Site Review: Mark Cleveland

Anoka Sand Plain Restoration and Enhancement - Sherburne National Wildlife Refuge Evaluation



RESTORATION EVALUATION PROGRAM for LEGACY PROJECTS
 Minnesota Board of Water and Soil Resources
 Minnesota Department of Natural Resources



PROJECT EVALUATION FORM

PROJECT BACKGROUND

Project Name: Rice Lake Oak Savanna Restoration Project OHF FY-11 5(f) Anoka Sand Plain Restoration and Enhancement
 Date of Review: 11/5/2013

Site Assessment Attendees - Reviewers: Mark Cleveland MN DNR; Wade Johnson MN DNR - Project manager: Tony Hewitt, Sherburne National Wildlife Refuge - Property owners: US Fish and Wildlife Service

Project Location: County Sherburne County Township/Range/Section T 35 N R 27 W Section 26

45°29'33.187"N 93°39'47.681"W

Project Manager / Affiliated organization, Contact: Todd Rexine, Great River Greening

Fund: OHF CWF PTF Fiscal Year Funds – FY 2011 Project Start Date 2011

Predominant Habitat Type: Prairie/Savanna/Grassland Wetland Forest Aquatic

1. Goal(s) of the restoration Control of woody and invasive species over 245 acres. Previous management of the project site has included mechanical thinning of tree and scrub species.

Quantifiable objectives of the restoration

What plans / record of project decisions / prescription worksheets are available? Where are they located?
"Rice Lake Oak Savanna Restoration Project , August 2011" "Working Definition of "Oak Savanna" for Restoration Efforts at Sherburne NWR" "Sherburne NWR Comprehensive Conservation Plan, 2005"

2. What is the status of the project? Treatment / establishment phase Post-establishment phase
3. Has the plan or project implementation been modified from the original plan? If yes, why and how? No
Have alterations in plan or implementation changed the proposed outcomes? NA

PROJECT ASSESSMENT

4. Site description (by reviewer): Mark Cleveland
Soils: Zimmerman fine sand, Lino loamy fine sand, and Seelyeville/Markey Muck complex
Topography: level to gently rolling. gentle slope down to Rice Lake and the associated drainage.
Hydrology: uplands are well drained. Soils are satuated or ponded and poorly drained around Rice Lake.
Vegetation (structure, dominant species % cover, invasive species (MN DNR) % cover, other): Canopy in upland areas has been
Surrounding conditions (adjacent land use / veg.):
5. Survey methods used (include deliverable format, # of pgs.): site walk through and vegetation evaluation
6. Is the plan based on current science (best management practices, standards, and guidelines)? yes
7. List indicators of project outcomes at this project stage: Measures of both pre project and post project Canopy cover and basal area per acre are measured. Target communities with specific canopy and basal stem measures are Oak Savanna, Barrens Oak Savanna and Oak Woodland-Brushland. Ranges for these communities are found in the "Working Definition of "Oak Savanna" for Restoration Efforts at Sherburne NWR"

8. Does the project plan / implementation of the project plan reasonably allow for achieving proposed project outcome(s)? yes.
9. Are corrections or modifications needed to meet proposed outcomes? Explain. Follow up prescribed fire and selective use of herbicide will be needed to control resprouting from deciduous trees and shrubs. The ground layer in some areas will need additional native species plantings, which is part of the long range plans for these areas.
10. Has anything been done or planned that would detract from existing or potential habitat? Explain. Using local seed source plant materials will be important for site resilience. Management of non local genotype grasses and forbes should be included in the next stage of this restoration.
11. Are proposed future steps, including long-term management, practical and reasonable? Explain. Future thinning using prescribed fire, chemical or mechanical methods(or best a combination of these methods), may need to be considered as remaining trees respond to different growing conditions and plant recruitment from the seed bank changes. Avoiding heavy fuel buildups and preventing the reestablishment of heavy brush components are integral to the long term success of this project. Regular prescribed fire should applied to the project site.
12. Are follow-up assessments needed? Explain. Follow up evaluations will be worth while but for the purpose of this funding cycle, this evaluation the project has met restoration goals.
13. Additional comments on the restoration project. In areas where there may have been non local genotype material used, ground or herb layer restoration may include herbicide treatments that would also remove these plants.

PROJECT EVALUATION

The project will:

- a. Likely not meet proposed outcomes
- b. Minimally meet proposed outcomes
- c. Meet proposed outcomes
- d. Likely exceed proposed outcomes
- e. Greatly exceed proposed outcomes

Confidence of outcome determination

1. Low
2. Medium
3. High

Provide an explanation of the reason(s) for the determination. The scale of tree and shrub removal has met the canopy cover basal area targets and the planned prescribed fire and future herb layer plantings and seedings should help maintain the oak savanna structure of the project area.

Site Assessor(s) Conducting Site Review: Mark Cleveland



RESTORATION EVALUATION PROGRAM for LEGACY PROJECTS
Minnesota Board of Water and Soil Resources
Minnesota Department of Natural Resources



PROJECT EVALUATION FORM

PROJECT BACKGROUND

Project Name: OHF FY-11 5(f) Anoka Sand Plain Restoration and Enhancement; Rice Lake SNA Date of Review: 10/02/2013

Site Assessment Attendees - Reviewers: Mark Cleveland MN DNR; Wade Johnson MN DNR - Project manager: Great River Greening - Property owners: Minnesota Department of Natural Resources, Division of Ecological and Water Resources, Scientific and Natural Areas Program

Project Location: County Sherburne County Township/Range/Section T 35 N R 29 W S1/2 of the NW 1/4 of Section 11

Project Manager / Affiliated organization, Contact: Wanye Ostlie, Great River Greening

Fund: OHF CWF PTF Fiscal Year Funds – FY 2011 Project Start Date 2011

Predominant Habitat Type: Prairie/Savanna/Grassland Wetland Forest Aquatic

1. Goal(s) of the restoration restoration of 80 acres of oak savanna habitat through removal of invasive trees/shrubs, planting old fields and distrubed areas with native seed collected on site, and prescribed fire.

Quantifiable objectives of the restoration % cover in the East and Central Work Units

What plans / record of project decisions / prescription worksheets are available? Where are they located? "Rice Lake SNA Project Goals and Objectives" and "Rice Lake Savanna SNA Management Plan, June 1996" which is also refeered to as a management brief

2. What is the status of the project? Treatment / establishment phase Post-establishment phase

3. Has the plan or project implementation been modified from the original plan? If yes, why and how? No

Have alterations in plan or implementation changed the proposed outcomes? NA

PROJECT ASSESSMENT

4. Site description (by reviewer): Mark Cleveland
Soils: Zimmerman fine sand and two small inclusions of wetland soils (Seelyeville and Markey Muck)
Topography: nearly level upper river terrace
Hydrology: Glacial outwash deposits. Well drained.
Vegetation (structure, dominant species % cover, invasive species (MN DNR) % cover, other): 60 acres of dry bur oak savanna with native grass and flower understory (UPs14)
Surrounding conditions (adjacent land use / veg.): Planted white pine stands , peat dominated wetlands and oak wodlands. Irrigated croplands along south boundary and west of project site.
5. Survey methods used (include deliverable format, # of pgs.): site walk through and vegetation evaluation
6. Is the plan based on current science (best management practices, standards, and guidelines)? yes
7. List indicators of project outcomes at this project stage: Earlier tree removal as part of biomass project is visible only through the presence of stumps. Purpose of tree removal was to open the tree canopy to replicate tree density target for dry oak savanna communities. Tree density and % cover are measurable.
8. Does the project plan / implementation of the project plan reasonably allow for achieving proposed project outcome(s)? yes.
9. Are corrections or modifications needed to meet proposed outcomes? Explain. The plant community in the project area has responded well to tree removal, invasives control and prescribed fire application. Some native woody species (especially quaking aspen and red oak) have responded to management by suckering and resprouting after cutting and fire. The limited use of herbicide may be necessary to insure long term success of the project. To date only non native woody species have been treated on the site.
10. Has anything been done or planned that would detract from existing or potential habitat? Explain. If current adjacent land use changes or additional residential units are built nearby, site management option including prescribed fire could become less frequent and allow for woody invasion to reoccur.
11. Are proposed future steps, including long-term management, practical and reasonable? Explain. Extending the same management practices to the western third of the property could enhance the work already completed and create a larger contiguous block of the uncommon dry oak savanna (UPs14).
12. Are follow-up assessments needed? Explain. For the purpose of this project cycle, the project has met the stated goals and objectives.
13. Additional comments on the restoration project. Long term management of the site is required to maintain the improved current conditions. Additional tree density management, prescribed fire and local source seeding of native wildflowers and grasses should further enhance the work already completed.

PROJECT EVALUATION

The project will:

- a. Likely not meet proposed outcomes
- b. Minimally meet proposed outcomes
- c. Meet proposed outcomes
- d. Likely exceed proposed outcomes
- e. Greatly exceed proposed outcomes

Confidence of outcome determination

- 1. Low
- 2. Medium
- 3. High

Provide an explanation of the reason(s) for the determination. Thinning was effective in opening up the pre project dense tree canopy. Woody invasive species control was effective in the East and Central Work Areas. Prescribed fire appears to have generated a good response from native grasses and forbes.

Site Assessor(s) Conducting Site Review: Mark Cleveland

**Parks and Trails Fund, Fiscal Year 2010
Sakatah State Park, Prairie Restoration**

Project Sponsor: MN DNR, Division of Parks and Trails
Project Managers: Molly Tranel Nelson, Resource Specialist

Evaluation Summary

This project restored crop field and old pasture areas to a reconstructed native prairie community. Sixty acres were seeded into existing, relatively weed free, row crop fields in 2011. The practice of establishing a weed free grassland restoration site by seeding into herbicide resistant crop fields is an accepted best practice for prairie reconstruction. A small pasture and cattle pass contiguous with the cropped fields were also seeded. In 2014 the former cropped fields displayed a good diversity and high percent cover of the seeded mix. The pasture and cattle pass had significant cover of thistle and other weedy species. This area is being managed through mowing and spot herbicide. Overall the prairie reconstruction was successful and appears on a positive trajectory with prescribed maintenance. This project site is contiguous with existing forested areas of Lake Sakatah State Park and will provide good habitat connectivity and heterogeneity of habitat types.

Panel Comments / Recommendations

- Pasture/cattle pass area should have been thoroughly herbicide treated prior to seeding; this area will need to be intensively managed (mow, spot herbicide) or entirely herbicided and reseeded
- Good forethought for long-term project phases and management; oak savanna transition along forested borders



RESTORATION EVALUATION PROGRAM for LEGACY PROJECTS
Minnesota Board of Water and Soil Resources
Minnesota Department of Natural Resources



PROJECT EVALUATION FORM

PROJECT BACKGROUND

Project Name: Sakatah State Park, Prairie Restoration

Date of Review: 09/12/2014

Site Assessment Attendees - Reviewers: Paul Bockenstedt, Stantec Inc; Wade Johnson MN DNR - Project manager: Molly Tranel Nelson - Property owners: MN DNR State Parks

Project Location: County Rice Township/Range/Section S30/23NW, T109N, R22W

Project Manager / Affiliated organization, Contact: Molly Tranel Nelson, Regional Resource Specialist
MN DNR Parks and Trails, molly.tranel@state.mn.us

Fund: OHF CWF PTF Fiscal Year Funds – FY 12 Project Start Date 2012
Predominant Habitat Type: Prairie/Savanna/Grassland Wetland Forest Aquatic

1. Goal(s) of the restoration To restore crop field and old pasture areas to reconstructed native prairie community supporting a mix of cool and warm season native grasses.

Quantifiable objectives of the restoration Restoration to at least B/C quality and sustain to this level

What plans / record of project decisions / prescription worksheets are available? Where are they located?
MN DNR PAT staff provided a full set of background documents related to site planning, restoration design, implementation activities, and anticipated near-term future management activities.

2. What is the status of the project? Treatment / establishment phase Post-establishment phase
3. Has the plan or project implementation been modified from the original plan? If yes, why and how? No
Have alterations in plan or implementation changed the proposed outcomes? NA

PROJECT ASSESSMENT

4. Site description (by reviewer): Site includes a mix of former cropped and pastured ground on a generally north-facing, rolling slope. The site includes pre-existing nonnative, cool season dominate pasture, as well as several pre-existing grasses waterways within former crop fields.

Soils: Loam in upland areas, hydric clay loam in swales/wetland areas

Topography: Moderately rolling, with a general north-facing aspect to the landscape

Hydrology: mesic upland, with wet-mesic swales and sideslope swale/wet meadow wetlands

Vegetation (structure, dominant species % cover, invasive species (MN DNR) % cover, other): Current cover is approximately 85% native plant species. Nonnative plant cover consists of a mix of nonnative pasture grasses, early successional weed species, as well perennial, nonnative plants. The perennial, nonnative plants occur as scattered plants and well as patches (e.g. Canada thistle, smooth brome, and similar). Overall, invasive, nonnative plant cover is low and within reason for a restoration at this stage of development. MN DNR PAT staff are actively managing patches of invasive, nonnatives through mowing as desirable native plants continue to increase their presence at the site.

Surrounding conditions (adjacent land use / veg.): Adjacent land use (land cover) is primarily park (remnant forest/restored prairie) on the west, north and east sides. The south side, across Highway 60 is primarily rowcrop agriculture

5. Survey methods used (include deliverable format, # of pgs.): Targeted meander survey with documentation of plants species and estimated cover, including natives and invasive, nonnative species.
6. Is the plan based on current science (best management practices, standards, and guidelines)? yes

7. List indicators of project outcomes at this project stage: Appropriate establishment of native grasses and flowers for this stage of the restoration process. Limited cover of invasive, nonnative weeds
8. Does the project plan / implementation of the project plan reasonably allow for achieving proposed project outcome(s)? Yes
9. Are corrections or modifications needed to meet proposed outcomes? Explain. No, continued implementation of customary best practices for restoration should result in a successful, long-term outcome
10. Has anything been done or planned that would detract from existing or potential habitat? Explain. No
11. Are proposed future steps, including long-term management, practical and reasonable? Explain. Yes
12. Are follow-up assessments needed? Explain. Not outside of customary regular monitoring and Adaptive Management Planning conducted by MN DNR Parks Resource Specialist and other PAT staff.
13. Additional comments on the restoration project. The rate of development/native establishment at this site is somewhat behind what might typically be encountered. However, this delayed establishment in all likelihood is a result of weather and other factors outside of the control of the restoration staff implementing this restoration. The goal of achieving a prairie restoration that meets MN Biological Survey standards of a B/C quality rank prairie is lofty, but achievable over time within the level of maintenance effort that is customarily practiced within MN DNR Parks & Trails.

PROJECT EVALUATION

The project will:

- a. Likely not meet proposed outcomes
- b. Minimally meet proposed outcomes
- c. Meet proposed outcomes
- d. Likely exceed proposed outcomes
- e. Greatly exceed proposed outcomes

Confidence of outcome determination

1. Low
2. Medium
3. High

Provide an explanation of the reason(s) for the determination. The rate of development/native establishment at this site is somewhat behind what might typically be encountered. However, this delayed establishment in all likelihood is a result of weather and other factors outside of the control of the restoration staff implementing this restoration. The goal of achieving a prairie restoration that meets MN Biological Survey standards of a B/C quality rank prairie is lofty, but achievable over time within the level of maintenance effort that is customarily practiced within MN DNR Parks & Trails.

Site Assessor(s) Conducting Site Review: Paul Bockenstedt (Stantec Consulting Services Inc)

**Parks and Trails Fund, Fiscal Year 2010
Minneopa State Park, Prairie Restoration**

Project Sponsor: MN DNR, Division of Parks and Trails
Project Managers: Molly Tranel Nelson, Regional Resource Specialist

Evaluation Summary

Minneopa State Park is being managed to enhance current remnant prairie and oak savannas. These management activities are taking place within 350 acres of the Park being prepared for a Bison enclosure. Parks and Trails Fund is being used here for removal of trees and brush from remnant prairie and savanna, as well as conversion of adjacent old fields to prairie. Accepted best practices for prairie regeneration and woody suppression are being applied, including burning, annual removal and herbicide. These treatments are making clear progress enhancing/restoring target dry prairie and savanna communities. Introduction of Bison grazing as the primary source of woody control could potentially reduce progress made on woody shrub suppression (especially Sumac). Monitoring plots and protocols for pre and post bison vegetation are in place. Monitoring data will be tracked to inform future management of the plant communities and Bison herd.

Panel Comments / Recommendations

- Project is on track; using sound practices to suppress woody vegetation
- Site should be closely monitored when Bison are introduced to preserve the plant communities



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Minnesota Board of Water and Soil Resources
Minnesota Department of Natural Resources



PROJECT EVALUATION FORM

PROJECT BACKGROUND

Project Name: Minneopa State Park, Prairie/Savanna Restoration Date of Review: 09/12/2014

Site Assessment Attendees - Reviewers: Paul Bockenstedt, Stantec Inc; Wade Johnson MN DNR - Project manager: Molly Tranel Nelson - Property owners: MN DNR State Parks

Project Location: County Blue Earth Township/Range/Section S 17/NE 21, T108 N, R27W

Project Manager / Affiliated organization, Contact: Molly Tranel Nelson, Regional Resource Specialist
MN DNR Parks and Trails, molly.tranel@state.mn.us

Fund: OHF CWF PTF

Fiscal Year Funds – FY 12-13

Project Start Date

2012

Predominant Habitat Type: Prairie/Savanna/Grassland Wetland Forest Aquatic

1. Goal(s) of the restoration Enhance current remnant prairie and oak savanna areas, convert old fields to prairie, and prevent further loss of prairie and savanna to woody invasion at Minneopa State Park. (as stated by MN DNR PAT Resource Specialist)

Quantifiable objectives of the restoration (as stated by MN DNR PAT Resource Specialist) If monitoring efforts demonstrate a switch from exotic cool season grass dominance to warm season native grass dominance that would be an indicator of success. An increase in native grassland indicator species during monitoring would also be a sign of success. Comparison of historic aerial photos to present ones could demonstrate if further prairie is lost to trees.

What plans / record of project decisions / prescription worksheets are available? Where are they located?
MN DNR PAT Resource Specialist provided substantial background information. This information will be kept on file with other review documents, as well as permanently being on file with MN DNR PAT Regional Resource Specialist

2. What is the status of the project? Treatment / establishment phase Post-establishment phase
3. Has the plan or project implementation been modified from the original plan? If yes, why and how? No
Have alterations in plan or implementation changed the proposed outcomes? NA

PROJECT ASSESSMENT

4. Site description (by reviewer): The project area lies on a nearly level ground on a historic terrace of the Glacial River Warren. The site is characterized by thin topsoil over slightly fractured, moderately permeable bedrock. The site vegetation is comprised of a mix of nonnative pasture grasses, recently colonizing pioneering tree and shrub species and remnant prairie vegetation. Prior to project initiation, smooth sumac, eastern red cedar, dogwood and other similar species of invading brush/trees

Soils: Thin soils over bedrock, primarily comprised of loam, loamy fine sand, and sand.

Topography: Level to very slightly rolling

Hydrology: Due to the thin soils over sometimes impermeable bedrock, the hydrology is variable and may range from dry to wet, depending on recent precipitation amounts and season. The site is also known to have abrupt swings in hydrology at the microscale level (e.g. a shallow swale may hold water for significant periods of time in an area that apparently had not held water for decades or perhaps over 100 years, or more

Vegetation (structure, dominant species % cover, invasive species (MN DNR) % cover, other):

Surrounding conditions (adjacent land use / veg.): Adjacent land use is primarily other natural areas within Minneopa State Park. Exceptions include the State Park campground to the northeast, as well as a small privately owned parcel on the southwest side that is currently in crop land.

5. Survey methods used (include deliverable format, # of pgs.): The survey method included targeted meander surveys at multiple locations, focusing on areas that had received management specific to this grant.
6. Is the plan based on current science (best management practices, standards, and guidelines)? Yes
7. List indicators of project outcomes at this project stage: reduction in total invasive brush cover; reduction in total nonnative plant (weed) cover; and increase in total desirable native plant cover

8. Does the project plan / implementation of the project plan reasonably allow for achieving proposed project outcome(s)? Yes
9. Are corrections or modifications needed to meet proposed outcomes? Explain. No. It appears that MN DNR PAT resource management staff are using the best current/known restoration techniques for addressing the issues
10. Has anything been done or planned that would detract from existing or potential habitat? Explain. No
11. Are proposed future steps, including long-term management, practical and reasonable? Explain. Yes, MN DNR PAT resource management staff intend to continue persistently managing problem woody/herbaceous species. Minneopa State Park is planned to receive bison within an approximately 300 acre area of this terrace prairie that will be fenced. A well-monitored and managed bison herd is compatible with maintaining and/or improving the overall quality of native vegetation at the site.
12. Are follow-up assessments needed? Explain. Not specifically related to this grant funding. Continued monitoring by MN DNR PAT staff will be essential for successful implementation of adaptive management.
13. Additional comments on the restoration project. Reviewer has known this site for 20 years, including being part of discussions on management strategies while a MN DNR PAT resource management staff employee in 1995-97. In my estimation, the site is has made significant improvements in recent years, in part due to the PAT Funding specifically associated with this project/evaluation. MN DNR PAT staff have made significant efforts in recent years to reduce brush levels and the amount of nonnative pasture grasses present through a combination of brush cutting, fire and other management strategies. My anecdotal observations in recent years lead me to believe the concerted management effort is resulting in a shift in momentum away from invasive/nonnative vegetation and toward the remnant prairie vegetation.

PROJECT EVALUATION

The project will:

- a. Likely not meet proposed outcomes
- b. Minimally meet proposed outcomes
- c. Meet proposed outcomes
- d. Likely exceed proposed outcomes
- e. Greatly exceed proposed outcomes

Confidence of outcome determination

1. Low
2. Medium
3. High

Provide an explanation of the reason(s) for the determination. This particular site includes several species of invasive brush that commonly pose management issues at similar sites across the Midwest. Overall, my opinion is that MN DNR PAT staff have done a good job of using the best known/available tools and techniques to address some persistent invasive brush issues at the site.

Site Assessors (s) Conducting Site Review: Paul Bockenstedt (Stantec)

Appendix II Restoration and Management Plan Template

The purpose of this template is to provide managers with a consistent tool to plan, implement and manage restoration projects. It is provided as best practice guidance, it does not replace existing reporting requirements. This form provides basic, essential project data; the degree of detail needed for each component will be dependent on the type and scope of the project. Project data in this template is fictitious; it is however intended to provide a viable real world example.

This format is intended to provide a readily usable form that will:

- Provide clear outcome based goals
- Improve institutional memory of project details in a concise accessible format
- Partially fulfill requirements from funding sources for a restoration and management plan, including:
 - Outdoor Heritage Fund
http://www.lsohc.leg.mn/manager_info/Restoration%20Management%20Plans%20Guidelines.pdf

MS 97A.056. Subd. 13. (c)(d)

(c) For all restorations, a recipient must prepare and retain an ecological restoration and management plan that, to the degree practicable, is consistent with current conservation science and ecological goals for the restoration site. Consideration should be given to soil, geology, topography, and other relevant factors that would provide the best chance for long-term success and durability of the restoration. The plan must include the proposed timetable for implementing the restoration, including, but not limited to, site preparation, establishment of diverse plant species, maintenance, and additional enhancement to establish the restoration; identify long-term maintenance and management needs of the restoration and how the maintenance, management, and enhancement will be financed; and use current conservation science to achieve the best restoration. (d) For new lands acquired, a recipient must prepare a restoration and management plan in compliance with paragraph (c), including identification of sufficient funding for implementation.

- LCCMR ENRTF Restoration (All Phases) Requirements
http://www.lccmr.leg.mn/pm_info/enrtf_restoration-project-requirements.pdf

The project plan should indicate which planning and/or implementation activities were undertaken with funds from specific public or private sources and appropriation years where appropriate.

Restoration and Management Plan

Project Name:

Project Manager:

Implementing Organization:

Land Owner/Manager:

County:

Location:

Goals and Objectives [The project should have clearly defined outcome based goals and specific measurable objectives, against which project success can be measured]

Goal(s): [Describe the purpose of this project with regards to larger goals]

- **What is the long term desired condition of this site?**
[This is a description of the desired community composition or structure. This may be DNR Native Plant Communities or other]
- **What is the desired outcome of this specific project / phase?**

Quantifiable Objectives: [Measureable indicator or milestone towards such as greater than X % cover in 2nd yrs, # of __. Objectives should be readily observable]

Project Location and Setting: [A description of the project location should include, at a minimum, the county, township, range, and section where the project is located. A detailed site map with defined project boundaries or similar information e.g., legal description, aerial photos should also be included]

Existing Site Conditions: [Documentation of the existing site conditions is critical to both the development of a restoration plan and assessment of the effectiveness of restoration actions. Documentation of existing site conditions may include some or all of the following]

- **Site characteristics:** [Description of topography, soils, hydrology, land cover, wildlife, special elements. Refer to maps as needed.]
- **Baseline data (quantitative if available):** [e.g. plant species present and abundance, stream channel profile, water quality data]
- **Surrounding landscape conditions, land cover / Important adjacencies:**

Fields in bold

[Guidance provided in bracketed red text]

Restoration Work Plan: [Provide a description of actions, a planned implementation schedule]

Attach additional pages and comments as needed: maps, construction plans, planting plans, species lists/seed mixes/seed tags, invoices, special conditions/concerns

Implementation Timetable [Define activities and timetable for implementing the restoration, including site preparation, construction steps, plant establishment, maintenance, and additional activities to establish the restoration. Include previously conducted activities as appropriate]

| Activity | Describe Specific work activities | Planned (month/year) | Implemented (month/year) | Implementer |
|-----------------|--|-----------------------------|---------------------------------|--------------------|
| | | | | |
| | | | | |

Long-term Maintenance and Management [Description of the long-term management plan, including strategies for monitoring and maintenance of the restoration site, funding needs and funding sources]

| Long-term needs | Timeframe (yrs to yrs) | Funding needed | Funding source |
|------------------------|-------------------------------|-----------------------|-----------------------|
| | | | |
| | | | |

Restoration and Management Plan

Project Name: *Blazing Prairie WMA: Grassland Habitat Restoration*

Project Manager: *Jonathan Doe*

Implementing Organization: *Grassland Habitat*

Land Owner/Manager: *MN DNR, Marshall Area Wildlife Office*

County: *Lincoln*

Location: *T 31N R 20W Sec 26, Sec 27
(Access on North side of 135 St. see map for location)*

Goals and Objectives

Goal(s): *Provide improved nesting cover for upland birds and waterfowl as well as improved upland game bird hunting opportunities.*

- **What is the long term desired condition of this site?**
Upland Mesic Prairie; Dominant species corresponding to Ups23 Southern Mesic Prairie
- **What is the desired outcome of this specific project / phase?**
Establish 60 acres of native grasses and forbs

Quantifiable Objectives: *One year post seeding: >25 of 30 species seeded present. <20% invasive/non-native plant species cover; species per O&M plan list*

Year three: 50-70% cover native grasses, 30-40% cover native forbs per seeded plant list; <10% invasive/non-native plant species cover; species per O&M plan list

Project Location and Setting: *(Site map with project boundaries, aerial photos, etc.)*

Example Template Restoration and Management Plan

Fields in bold

Example responses italicized

Existing Site Conditions / Site characteristics

This unit was purchased primarily to offer pheasant hunting and wildlife viewing opportunities, bolster wildlife populations, and grassland conservation. The entire unit was enrolled in CRP at the time of purchase. The fields that have been restored were brome grass that was broken up and farmed for two years as site prep. The balance of the grassland on the unit is native grass (Big Bluestem dominant). The soils present support a mesic prairie reconstruction (see attached soil map).

- **Baseline data (quantitative if available):** *The fields were in 2 years of Roundup Ready soybeans prior to planting. Seeded into soybean stubble.*
- **Surrounding landscape conditions, land cover / Important adjacencies:** *Adjacent landuse is annual row crop, hayed field and riparian corridor. Switchgrass WMA is ¾ miles South of the site, habitat is connected by a partially ditched wetland riparian corridor (see map for locations)*

Restoration Work Plan:

Seeding took place in June 2012. Round-up spraying took place within a week of planting. All the fields restored were clipped twice to reduce broadleaf competition. The last clipping took place in June of this year.

Attach additional pages and comments as needed: maps, construction plans, planting plans, species lists/seed mixes/seed tags, invoices, special conditions/concerns

Implementation Timetable

| Activity | Describe Specific work activities | Planned (month/year) | Implemented (month/year) | Implementer |
|-----------------------|---|-------------------------------------|---------------------------------|---|
| <i>Seeded</i> | <i>Truax seed drill (yellow tags with seed mix and source attached)</i> | <i>Late spring 2012</i> | <i>June 2012</i> | <i>Grassland Habitat (Jon Doe)</i> |
| <i>RoundUp Spray</i> | <i>4 days post seeding</i> | <i>Within one week post seeding</i> | <i>June 2012</i> | <i>Grassland Habitat (Jon Doe)</i> |
| <i>Clipping</i> | <i>All fields to reduce broadleaf competition</i> | <i>Fall 2012</i> | <i>September 2012</i> | <i>Joseph Mow (contract w/ area wildlife office).</i> |
| <i>Clipping</i> | <i>All fields to reduce broadleaf competition</i> | <i>Late spring 2013</i> | <i>June 2013</i> | <i>Joseph Mow (contract w/ area wildlife office).</i> |
| <i>Spot herbicide</i> | <i>As needed for target invasives (see O&M Invasives list)</i> | <i>2013 – 2014</i> | <i>July 2014</i> | <i>Area wildlife staff (Allen Johnson)</i> |
| | | | | |

Long-term Maintenance and Management

| Long-term needs | Timeframe (yrs to yrs) | Funding needed | Funding source |
|---|-----------------------------------|-----------------------|-----------------------|
| <i>Prescribed burn in patches 2-4 year rotation</i> | <i>2015 – ongoing</i> | - | - |
| <i>Cut / remove woody invaders (as needed)</i> | <i>2014 – future as needed</i> | - | - |
| | | | |
| | | | |

Appendix III Example Restoration Work Plan Timeline

This is an excerpt from Cedar Creek Ecosystem Reserve’s plan for Oak Savanna Restoration and Enhancement. This work was completed using leveraged Outdoor Heritage funds. This sample provides a working example of how restoration activities, expected outcomes and assessment measures can be displayed in a simple, informative timetable. This excerpt does not constitute a comprehensive restoration work plan. This type of planning and implementation documentation provides a basis for tracking, evaluating and adapting restoration efforts.

CEDAR CREEK WORK PLAN

Cedar Creek Example

YEAR 1 (FY10-11)

| ACTIVITY | TIMELINE | OUTCOME | ASSESSMENT |
|---|-------------------|---|--|
| Conduct initial savanna/prairie areas species composition survey | July – Aug., 2010 | Provide documentation of initial species composition and distribution for target enhancement areas | Conduct statistical analysis of data (data collection procedures are established Cedar Creek analytical research protocol) |
| Conduct initial woodland area invasive species survey | Sep. – Nov., 2010 | Provide documentation of initial distribution, scope and scale of woodland area invasive species in primary areas of concern | Conduct statistical analysis of data (data collection procedures are established Cedar Creek analytical research protocol) |
| Conduct Fall prescribed burning program | Sep. – Nov., 2010 | Enhance approx. 100 acres (out of 200 acres) of former old field area to drive toward and maintain as grassland/savanna | Formative: conduct visual inspection of prescribed areas |
| Conduct Spring prescribed burning program | Mar. – May, 2011 | Enhance approx. 400 acres (out of 700 acres) of woodland/ savanna area to drive toward and maintain as savanna and control woody invasive species in woodland areas | Formative: conduct visual inspection of prescribed areas |
| Conduct invasive species control program (mixed use of burning, physical removal, and chemical control) | Mar. – Jun., 2011 | Enhance approx. 100 acres of woodland area by specifically removing and controlling invasive species | Formative: conduct visual inspection of treated areas |

Cedar Creek Example

YEAR 2 (FY11-12)

| ACTIVITY | TIMELINE | OUTCOME | ASSESSMENT |
|---|-------------------|--|--|
| Conduct second woodland area invasive species survey | Sep. – Nov., 2010 | Provide documentation of initial distribution, scope and scale of woodland area invasive species in secondary areas of concern | Conduct statistical analysis of data (data collection procedures are established Cedar Creek analytical research protocol) |
| Conduct Fall prescribed burning program | Sep. – Nov., 2011 | Enhance approx. 100 acres (out of 200 acres) of former old field area to drive toward and maintain as grassland/savanna | Formative: conduct visual inspection of prescribed areas |
| Conduct Spring prescribed burning program | Mar. – May, 2012 | Enhance approx. 400 acres (out of 700 acres) of woodland/savanna area to drive toward and maintain as savanna and control woody invasive species in woodland areas | Formative: conduct visual inspection of prescribed areas |
| Conduct invasive species control program (mixed use of burning, physical removal, and chemical control) | Mar. – Jun., 2012 | Enhance approx. 100 acres of woodland area by specifically removing and controlling invasive species | Formative: conduct visual inspection of treated areas |

YEAR 3 (FY12-13)

| ACTIVITY | TIMELINE | OUTCOME | ASSESSMENT |
|---|-------------------|--|--|
| Conduct final woodland area invasive species survey | Sep. – Nov., 2012 | Provide documentation of final distribution, scope and scale of woodland area invasive species in all areas of concern | Conduct statistical analysis of data (data collection procedures are established Cedar Creek analytical research protocol) |
| Conduct Fall prescribed burning program | Sep. – Nov., 2012 | Enhance approx. 100 acres (out of 200 acres) of former old field area to drive toward and maintain as grassland/savanna | Summative: compare initial survey data with final survey data |
| Conduct Spring prescribed burning program | Mar. – May, 2013 | Enhance approx. 400 acres (out of 700 acres) of woodland/savanna area to drive toward and maintain as savanna and control woody invasive species in woodland areas | Summative: compare initial survey data with final survey data |

Cedar Creek Example

| | | | |
|---|-------------------|--|--|
| Conduct invasive species control program (mixed use of burning, physical removal, and chemical control) | Mar. – Jun., 2013 | Enhance approx. 100 acres of woodland area by specifically removing and controlling invasive species | Summative: compare initial survey data with final survey data |
| Conduct final savanna/prairie areas species composition survey | May - Jun., 2013 | Provide documentation of initial species composition and distribution for target enhancement areas | Conduct statistical analysis of data (data collection procedures are established Cedar Creek analytical research protocol) |

NOTE (A): Details of Cedar Creek’s comprehensive prescribed burning program, including procedures, protocols, and maps can be found in the Cedar Creek Prescribed Burn Planning and Implementation Guide (v.2010), available upon request.

NOTE (B): Cedar Creek prescribed burning program includes approximately 900 acres of land burned on a rotational basis; with only approximately 500 to 600 acres burned annually.

NOTE (C): Woodland invasive species, namely buckthorn, have been qualitatively observed in upland wooded areas throughout Cedar Creek. Quantitative surveying and control measures will start with primary areas of concern in large stands near ecologically sensitive areas, followed by secondary areas that are smaller stands in less sensitive locations. We will target treating approximately 100 acres per year (300 acres total over three years) with physical and/or chemical control. At least 100 acres of target woodland will be controlled as part of the prescribed burning program.

NOTE (D): Qualitative assessment of prescribed burn completion and quality typically involves walk-through and visual inspection of post-burn areas for completeness of burn (percentage covered) and relative intensity of the burn (effect on woody shrub and tree sapling species). Quantitative assessment involves sampling and statistical analysis to determine species composition and distribution within and among target sites, and for pre/post treatment comparison. Parameters include: species richness, relative abundance, and areal coverage. Comprehensive, analytical savanna/grassland vegetative surveys are conducted every five years, with one in 2010 and the next scheduled for 2015.