

Redeye River Watershed Landscape Stewardship Plan



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What is Landscape Stewardship?

Effective landscape conservation is a compelling challenge across the United States. Declining water quality, climate change, forestland conversions, wildfires, and invasive species are among many threats to our Nation's forests and the ecosystem services they provide. Forestlands cover roughly 42 percent of the Midwest and Northeast states, with 77 percent of those forests in private ownership. There are nearly 5 million private forest landowners in these 20 states. With over one-quarter of the Nation's forests, and nearly half (43%) of the Nation's population in this region, conserving our forests is not a luxury, it is a necessity. Landscape stewardship is the process established by the US Congress through policy directives in the 2008 Farm Bill to face these challenges.

Leadership from the USDA Forest Service and the Northeastern Area Association of State Foresters (NAASF) developed a vision for landscape scale conservation to address these threats. They recognized the public and private benefits that planning and managing forestlands across boundaries are best addressed through integrated local based partnerships with supporting resources. In 2011, they published the document, "*Landscape Stewardship Guide*" to help state and local partners establish their landscape stewardship programs.

Recognizing the critical linkages between forests and water quality, the Minnesota Department of Natural Resources (DNR) and the Minnesota Board of Water and Soil Resources (BWSR), together with local partners and private landowners, have teamed up to develop watershed-based landscape stewardship plans across the forested regions of the state.

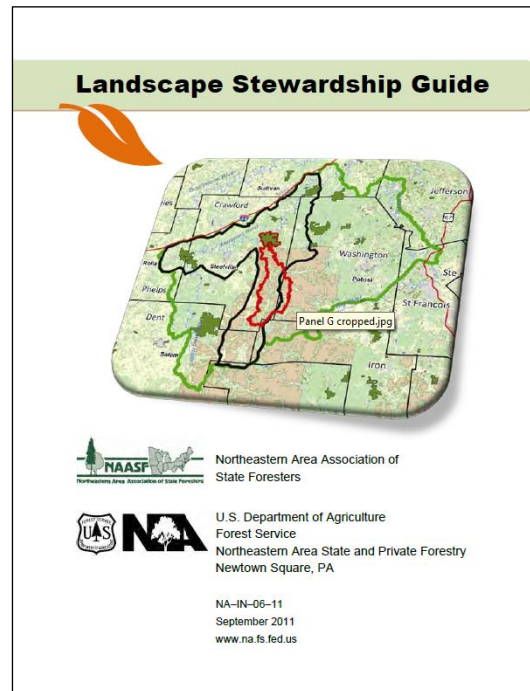
Credits

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Minnesota Department of Natural Resources
Division of Forestry
500 Lafayette Road
St. Paul, Minnesota 55155

June 2020

Dear Citizens of the Redeye River Major Watershed:

We are pleased to present you the approved Redeye River Watershed Landscape Stewardship Plan. This plan was developed by a group of conservation professionals working in your watershed that deliver natural resource services.

The primary purpose of this plan is to empower your team of service providers to work together with private landowners and land managers to protect working forest lands and promote private forest stewardship. This plan identifies and prioritizes opportunities for private landowners to engage in forest land protection and sustainable forest management, including timber harvesting. It is your choice as to which level of forest land protection and management works for you and your family.

This plan also provides an array of forest resource recommendations on a watershed basis to support the implementation of the Mississippi Headwaters Watershed One Watershed One Plan (1W1P). It provides useful information and recommendations on sustainable forest management that will help protect water quality, enhance wildlife habitat, promote healthy forests and address climate change issues while supporting the forest-based economies of tourism and timber.

This plan was developed with federal funding through the Landscape Stewardship Program established by the 2008 Farm Bill. As envisioned by the USDA Forest Service and the National Association of State Foresters (NASF), landscape stewardship plans are “living” documents and should be enhanced as new information becomes available. At a minimum, this plan should be revised every ten years. If you have any suggestions for improving this effort or corrections to information that has been presented, please be sure to contact members of the Local Forestry Technical Team. Please consult your soil and water conservation district website for their contact information.

Thank you for your continued efforts in managing the forests of the Redeye River Major Watershed. We look forward to working together with you.

Sincerely,

A handwritten signature in black ink, appearing to read 'Gary Michael'.

Gary Michael
Cooperative Forest Management Unit Supervisor
Minnesota Department of Natural Resources – Division of Forestry

Introduction

Forests play a critical role in keeping water clean by absorbing and filtering water, preventing erosion through soil stabilization, and allowing for groundwater recharge. The National Association of State Foresters recognized the connection of healthy forests to clean water with its policy statement: *“Water, in all its uses and permutations, is by far the most valuable commodity that comes from the forest land that we manage, assist others to manage, and/or regulate.”*

Purpose and Scope

Recognizing the critical linkages between forests and water quality, the Minnesota Department of Natural Resources (DNR) and the Minnesota Board of Water and Soil Resources (BWSR), together with local partners and private landowners, are teaming up to develop watershed-based landscape stewardship plans across the forested regions of the state.

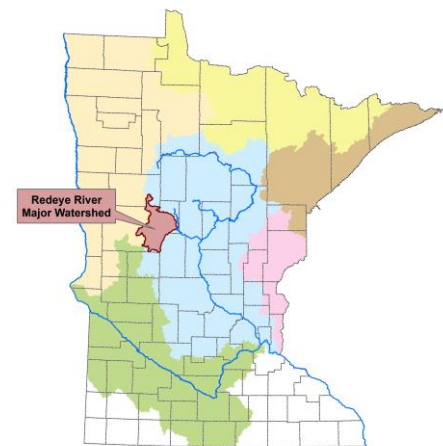
The Redeye River Major Watershed in west central Minnesota is home to hundreds of miles of rivers and numerous lakes. These waterbodies and their riparian areas provide drinking water, wildlife habitat, and recreational opportunities like swimming, fishing, and canoeing. Research of lakes and rivers by DNR Fisheries and the hydrologist Sandy Verry revealed the impacts of land use disturbance in a watershed and importance of protecting private lands. The Redeye River Major Watershed is well-situated to advance the protection and management of working forest lands on a landscape level.

The Redeye River Watershed Landscape Stewardship Plan (LSP) is a 10-year tactical plan focused on guiding the protection and management of working forests on private lands on a watershed basis. The goal of this plan is to empower teams of service providers to work together with private landowners and land managers to strategically protect working forest lands and promote private forest stewardship to enhance both private and public benefits that forests provide. Investing resources for private forest management in the parts of the watershed where the public benefits can be stacked (e.g., tourism, timber, habitat, etc.) provides the greatest return on investment for the citizens of Minnesota.

Forest and Water Resources Context

The Redeye River Major Watershed is in the heart of Minnesota’s lake country. An assessment of the resources in the watershed described in the first part of this plan found that:

- Private land ownership dominates the watershed. Public lands are mostly found in either the Smoky Hills State Forest, Lyons State Forest, or local wildlife management areas.
- Landscape disturbance is high, 62% of the watershed has been converted to agriculture, grassland, or urban land uses.
- Management activities over many years have altered the species composition from forests dominated by aspen and tamarack to aspen and oak.
- Water resources provide recreation opportunities and source water for major populations centers downstream (St. Cloud and the Twin Cities). Water quality is dependent on maintaining significant levels of forest land cover across the watershed.



Linking Landscape Stewardship and Local Water Planning

Landscape stewardship is an “all lands” approach to forest management. Created by the US Forest Service, it addresses multiple conservation challenges through the practical application of science and collaboration. It is based on five working principles: 1) Invest in priority areas, 2) Build a collaborative network of service providers that effectively work together to serve more landowners, 3) Appeal to interests of both landowner and service providers, 4) Manage for results, and 5) Encourage flexibility at all levels to be more adaptive and cooperative in serving customers. Watershed based landscape stewardship plans analyze the critical contexts between land cover and water quality in ways useful to local water planning.

The One Watershed One Plan (1W1P) Program administered by BWSR in partnership with local units of government across the state develop plans at the major watershed (HUC 8) scale. As described in Minnesota Statutes §103B, these plans must address: 1) surface water and ground water; 2) storage and retention systems; 3) groundwater recharge; 4) flooding and water quality problems; 5) wetlands; 6) riparian zone management and buffers; and 7) fish and wildlife habitat and water recreational facilities.

Setting priorities is the first step in BWSR’s strategic “Prioritize-Target-Measure” (PTM) approach to water resource planning and conservation. In managing watersheds, it is essential to recognize that not all valued resources and issues can be addressed at the same time. Prioritizing public and private investments through forest land protection down to the minor watershed level is a critical function in the LSP process. The second step is to target action towards more specific areas and issues within the priority watersheds. Through landscape stewardship plans, targeting is done down at the specific parcel level within priority minor watersheds. To measure is the ability to demonstrate progress towards the achievement of management goals over time. After landowners decide what actions to take and implementation occurs, landscape stewardship plans provide guidance on monitoring.

Partners and Process

This plan was developed by a team of resource professionals working in the watershed. The list of project partners is provided in the [Appendix](#). Data, maps, and reports detailing land cover, hydrology, and an array of natural resource topics developed by the project staff were provided to the LSP planning team. The team reviewed and discussed this material at three meetings as a basis to help shape this plan. This planning process was funded by a grant from the US Forest Service.

Plan Content – Using this Plan

The primary audience of this plan are the service providers who work with the thousands of private forest landowners in the Redeye River Major Watershed. Service providers include soil and water conservation districts, consulting foresters, DNR, NRCS and conservation organizations. This Plan is generally organized into three parts including: 1) analysis of forest and water resources, 2) vision and goals, and 3) guidance for implementing the plan. The [Appendix](#) provides additional background information designed to be actively used by the team of service providers to help them work more effectively together to serve greater numbers of landowners on a consistent basis.

Ultimately it is the landowner’s choice as to which level of forest protection works for them and how active they want to manage their woods. This plan seeks to help service providers increase their intentionality together to increase the strategic delivery of services to landowners and provide a full suite of forest management options to them.

Part 1: Analysis of Forest and Water Resources

Introduction

The first part of this plan provides background information on the setting of the Redeye River Major Watershed and the conditions of its forest and water resources. It also introduces concepts to help increase the ability of service providers to deliver private forest management services.

Resource Context

The Redeye River Major Watershed is in the western portion of the Upper Mississippi Basin and flows into the Mississippi River by the City of Anoka. The Basin starts in Lake Itasca and ends at Lock and Dam Number 2 near Hastings. It covers about 20,100 square miles and is the only major drainage basin located entirely in Minnesota. The Upper Mississippi Basin is the most important source water in Minnesota – supplying both St. Cloud and the Twin Cities – as well as a contributor of source water for every major population center along the Mississippi River.

As its name implies, the Redeye River Major Watershed is home to the Redeye River, which is an important source of drinking water and recreational opportunities for local communities. The Redeye River Major Watershed drains about 894 square miles and is composed of six HUC 10 subwatersheds (Fig 2) which correspond to major streams in the region. The subwatersheds are further subdivided into 58 minor watersheds (HUC 14), each averaging 15.4 square miles.

Smaller than minor watersheds are catchments, which is the area between pour points, and it is also the level at which watersheds can be classified to a protection or restoration strategy as defined by the [MN DNR Fisheries Lake Habitat Framework](#) – see Fig 1 and Fig 3. Most of the catchments in the Redeye River Major Watershed fall into either the “Full Restoration” or “Partial Restoration” categories, with “Protection” catchments around its northern and eastern ends.

Fig 1. Watershed categorization framework.

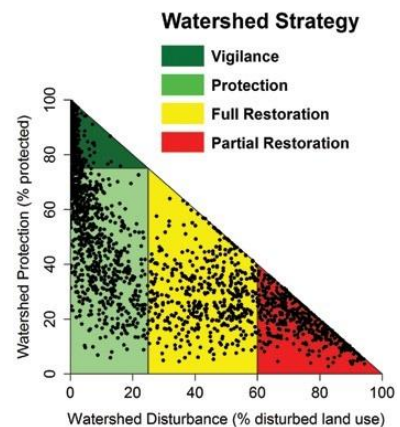


Fig 2. Redeye River major and subwatersheds.

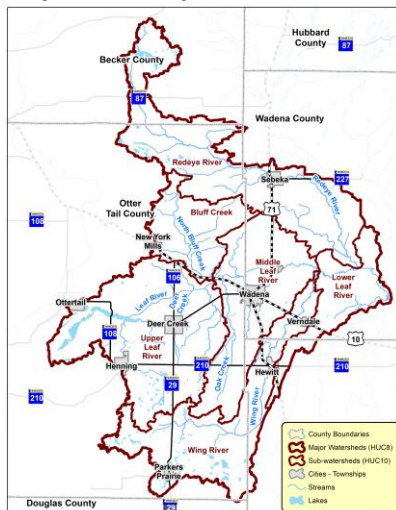
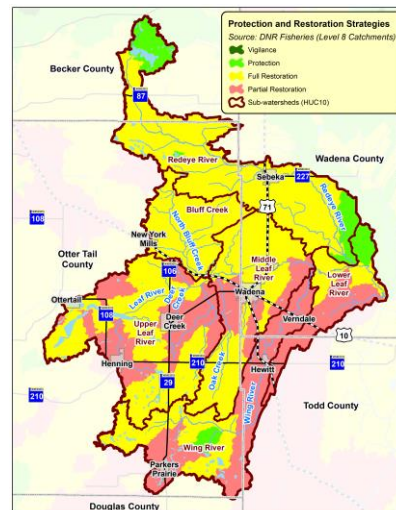


Fig 3. Protection/Restoration classifications.

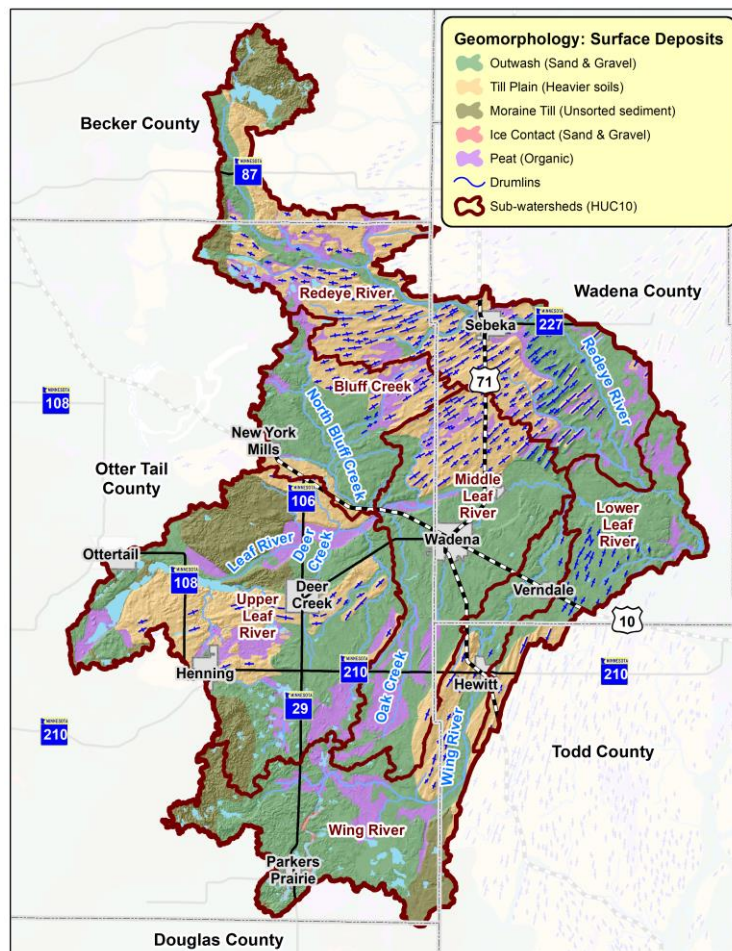


Geomorphology

The Redeye River Major Watershed is largely characterized as a rolling landscape of outwash plains and drumlin fields with the occasional end moraine. Irregular patches of peat formations occur throughout, particularly next to the streams. The soil parent material is largely sand and gravel that has been modified by forest vegetation and prairie vegetation in some areas.

Surface deposits have a strong impact on vegetation development. In general, fire-dependent communities are present on the coarse sand and gravel soils of outwash plains or localized deposits of sand and gravel within moraines and till plains. In contrast, mesic hardwood forests are usually found on heavier soils with impermeable layers that can perch snow melt or rainfall. These soils are often associated with moraines and till plains, or occasionally glacial lake sediments. The peatlands forests developed on level, poorly drained areas - such as glacial lake beds - while wet forests systems are found in areas with periodically saturated soil.

Fig 4. Geomorphology of the Redeye River Major Watershed.



Land Cover

Prior to European settlement, the Redeye River Major Watershed was covered by forests, wetlands, savanna, and prairie (Table 1 and Fig 5). Estimates of the historical land cover indicate that forests were more prevalent north of the Leaf River, while prairies and savannas were more common south of the river. Today, the landscape has been significantly modified and 60% of the forests have been lost, mainly to agriculture (Fig 6). Concentrations of forest cover do remain in parts of the watershed, such as near the headwaters of the Redeye River and Wing River subwatersheds.

Table 1. Historic and current land cover comparison.

| Land cover description | Pre-European settlement | | 2016 | |
|---------------------------------|-------------------------|-----|---------|-----|
| | Acres | % | Acres | % |
| Urban and rural development | 0 | 0% | 22,237 | 4% |
| Cultivated land | 0 | 0% | 190,946 | 33% |
| Prairie – Hay/pasture/grassland | 132,806 | 23% | 82,277 | 14% |
| Forest | 363,532 | 64% | 147,185 | 26% |
| Upland shrub | 0 | 0% | 5,884 | 1% |
| Water | 12,049 | 2% | 9,070 | 2% |
| Bog/marsh/fen | 63,672 | 11% | 114,196 | 20% |
| Mining | 0 | 0% | 256 | 0% |

Source: MnModel Historical Vegetation Model and National Land Cover Database.

Fig 5. Historic vegetation in the Redeye River Major Watershed.

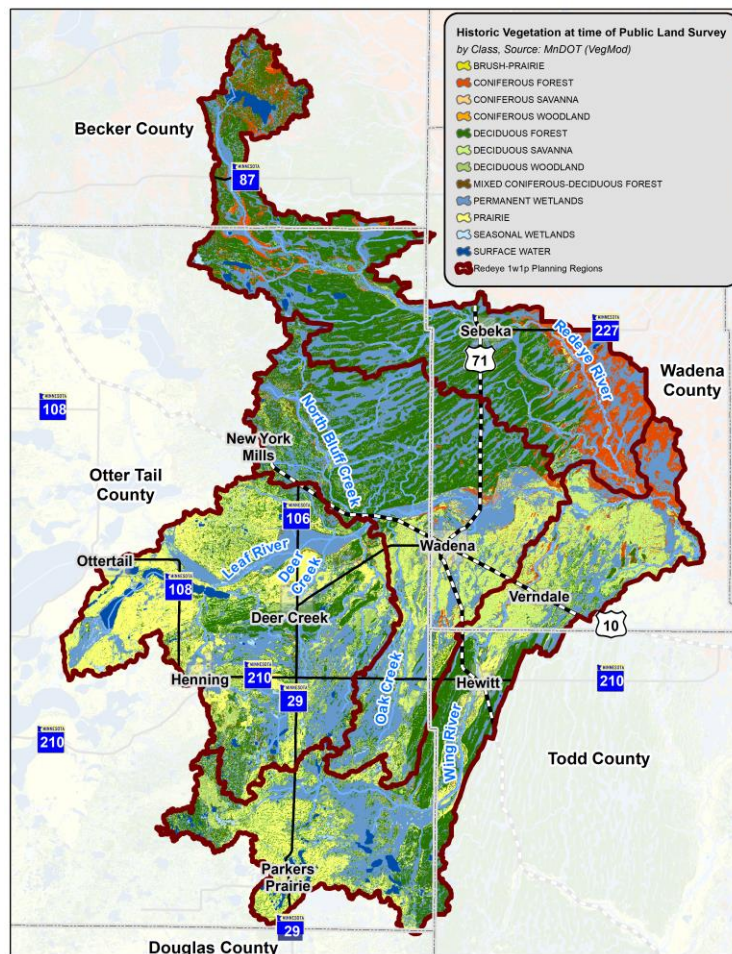
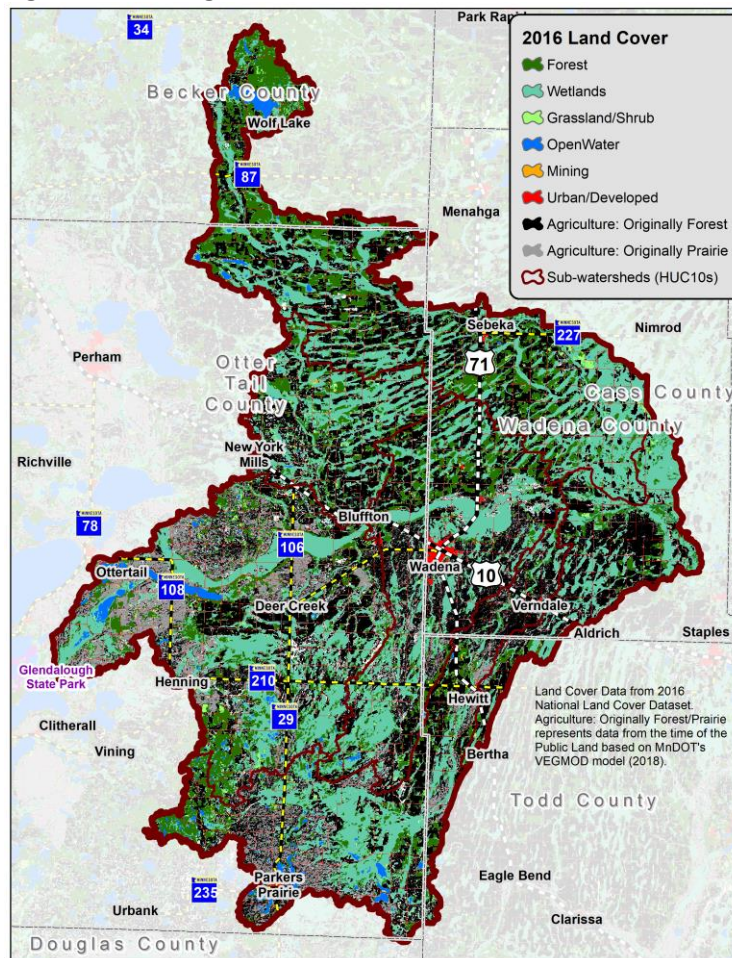
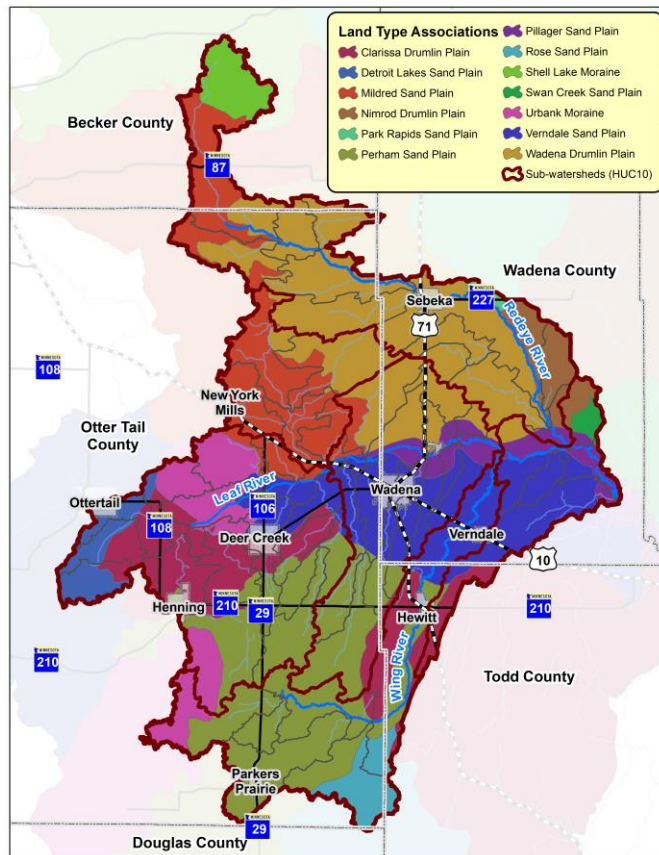


Fig 6. Current vegetation and areas of historic forest loss.

Ecological Setting

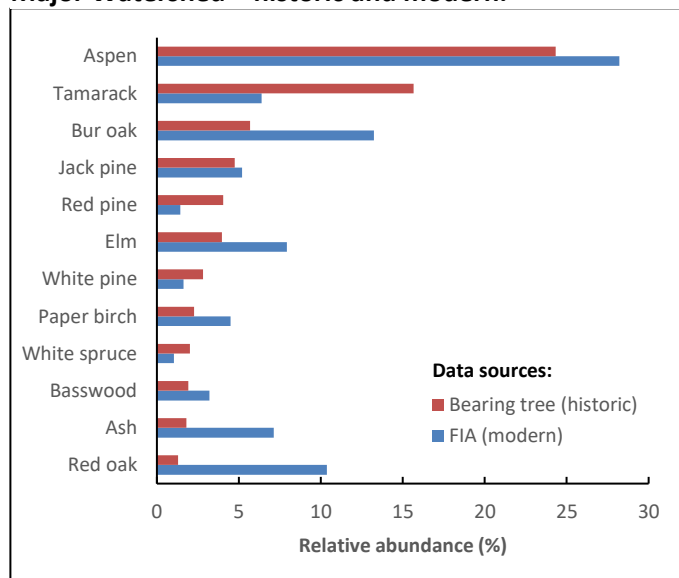
The Redeye River Major Watershed is uniquely situated at the transition between the Laurentian Mixed Forest Province (LMF), which covers its northern half, and the Eastern Broadleaf Forest Province (EBF), which covers the southern half. The portion covered by the LMF Province is also located entirely within the Northern Minnesota Drift & Lake Plains ECS Section and the Pine Moraines & Outwash Plains ECS Subsection. The EBF portion is entirely within the Minnesota & NE Iowa Morainal Section and the Hardwood Hills Subsection.

The next level below the ECS Subsection is the Land Type Association (LTA). LTA's are units within Subsections that are defined using glacial landforms, bedrock types, topographic roughness, lake and stream distributions, wetland patterns, depth to ground water table, soil parent material, and pre-European settlement vegetation. The Redeye River Major Watershed has portions of 13 LTAs (Fig 7), although over half of the area is covered by only three of them: the Wadena Drumlin Plain (22% of watershed), Perham Sand Plain (20%), and Verndale Sand Plain (15%).

Fig 7. Land Type Associations (LTAs) of the Redeye River Major Watershed.

Prior to European settlement the vegetation was a mixture of deciduous forests, conifer swamps, oak savanna, prairie, and some conifer forests. Generally, north of the Wing River there were more forests in the uplands and conifer swamps in the lowlands. The forests were mostly deciduous and composed of oak and aspen. Forests of jack and red pine were also present on the Nimrod Drumlin Plain LTA to the east of the Redeye River. South of the Wing River prairie and oak savanna took over as the dominant upland vegetation, although maple-basswood forests occurred on the Clarissa Drumlin Plain LTA.

As a result of the logging of Minnesota's forests in the late 1800's and early 1900's, along with subsequent forest management practices, the composition of the forest has changed dramatically. In the area around the Redeye River Major Watershed the forest was dominated by aspen and tamarack. Aspen continues to be the most common species, but tamarack has decreased while bur oak and red oak have increased to become co-dominant with aspen. (Fig 8).

Fig 8. Relative abundance of species in the Redeye River Major Watershed – historic and modern.

Land Ownership

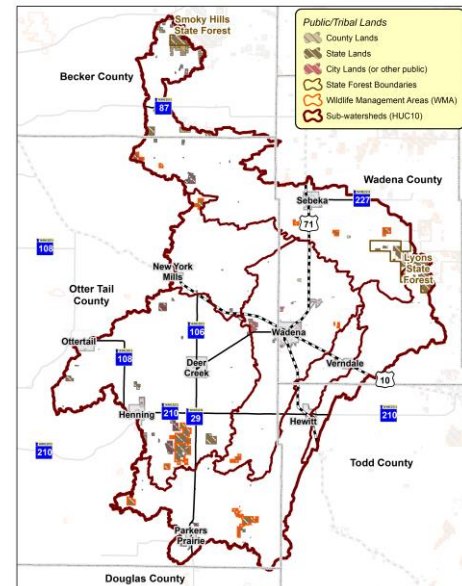
Land ownership in the Redeye River Major Watershed is largely private and only 6% of the area under public ownership. The largest blocks of public land ownership are in the Lyons State Forest at the eastern end of the watershed and the Smokey Hills State Forest at the northern tip.

Social and Economic Context

Census data from 2010 estimates that the population of the Redeye River Major Watershed is 20,990, or 0.4% of Minnesota's population. The largest town is Wadena, which is also the seat of Wadena County.

The Redeye River is unique in that it receives input only from precipitation, which is first filtered by the forests and wetlands, and then goes on to supply drinking water for major population centers in the rest of the state. In fact, in the [Forests, Water, and People](#) study by the Forest Service, the Redeye River Major Watershed was ranked as the 22nd most important major watershed in all of Minnesota, out of 81 major watersheds in the state, for providing drinking water.

Fig 9. Private and public land ownership.



To continue producing high quality drinking water, the forests and wetlands in the Redeye River must be protected. In general, forests and wetlands export much less phosphorous – which is a key determinant of water quality – than development or agriculture (Fig 10). Furthermore, natural cover greatly promotes infiltration and reduces runoff of sediment and potentially pollution-laden runoff (Fig 11).

Fig 10. Annual phosphorous exports by land use.

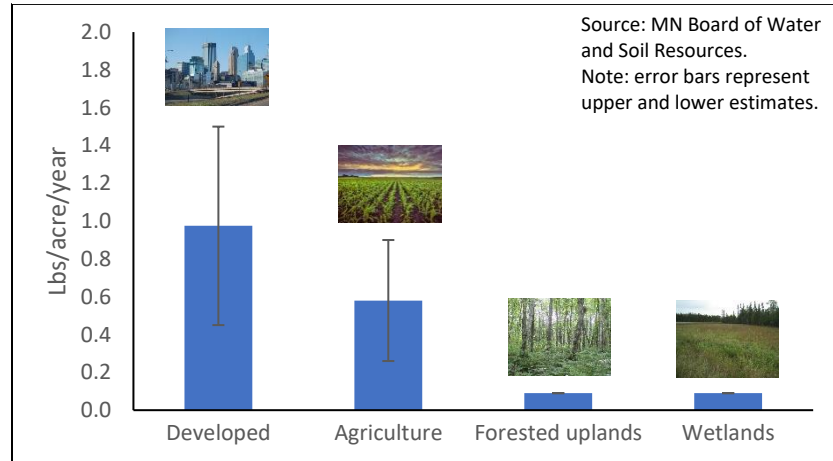
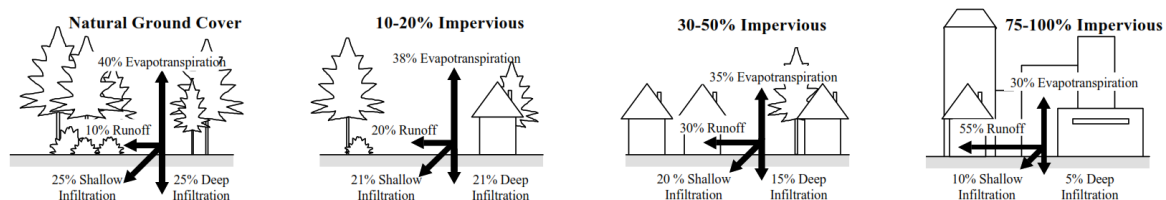


Fig 11. Effects of imperviousness on runoff and infiltration.



Source: Adapted from Arnold and Gibbons, 1996.

Risk/Quality Assessment

“Priority is at the intersection of risk and quality”

- Pete Jacobson, MNDNR Fisheries

What is Protection?

One of the most important concepts in landscape stewardship is that of ‘protection’. In the context of this plan, the parts of a landscape that are protected are those areas that are not likely to be converted from an intact natural ecosystem (e.g., forest, wetland, lakes, etc.) to an open or disturbed state (e.g., agriculture, development, or mining). Protected land is commonly defined as public lands (local, state, federal), public waters (lands & streams), wetlands on private lands, and perpetual conservation easements on private lands. The *Generalized Land Protection Model*, shown below, illustrates the details of what in the landscape is protected and what is at risk.

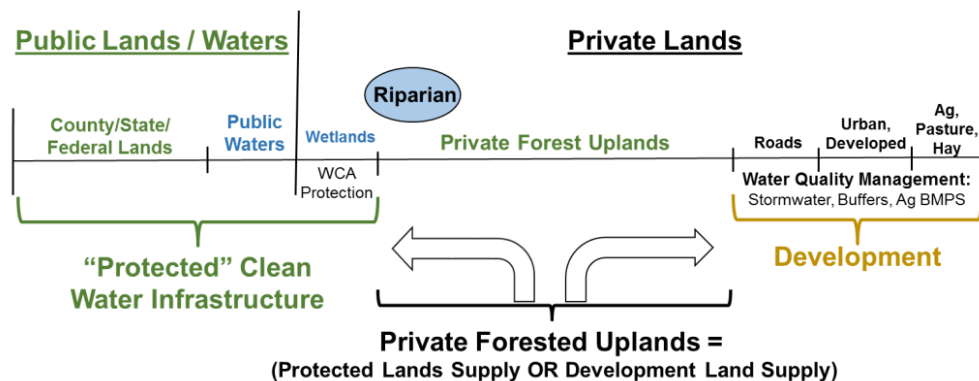


Fig 12. Generalized Land Protection Model.

What is Priority?

The view that protection efforts should focus on areas that have high quality habitat but are at risk of being lost is one of the guiding principles of landscape stewardship in Minnesota. Generally, the greatest risk occurs on private lands because that is where conversion of natural ecosystems to agriculture and development is the most likely to occur. Other potential indicators of risk include lake water quality trends, lake phosphorous sensitivity, point source pollution, land disturbance, slope, and road development. Conversely, measures of quality include prioritized lakes (e.g., wild rice, tullibee, trout), lakes of biodiversity significance, forest cover, Forests for the Future score, terrestrial biodiversity ranking (Minnesota Biological Survey), Wildlife Action Network score, and others. At the first meeting of the Redeye River LSP Planning Team, participants reviewed these indicators for each minor watershed and determined the drivers of quality and risk in each. A summary of these drivers for each subwatershed is provided in the table below.

Table 2. Drivers of quality and risk in the Redeye River Major Watershed.

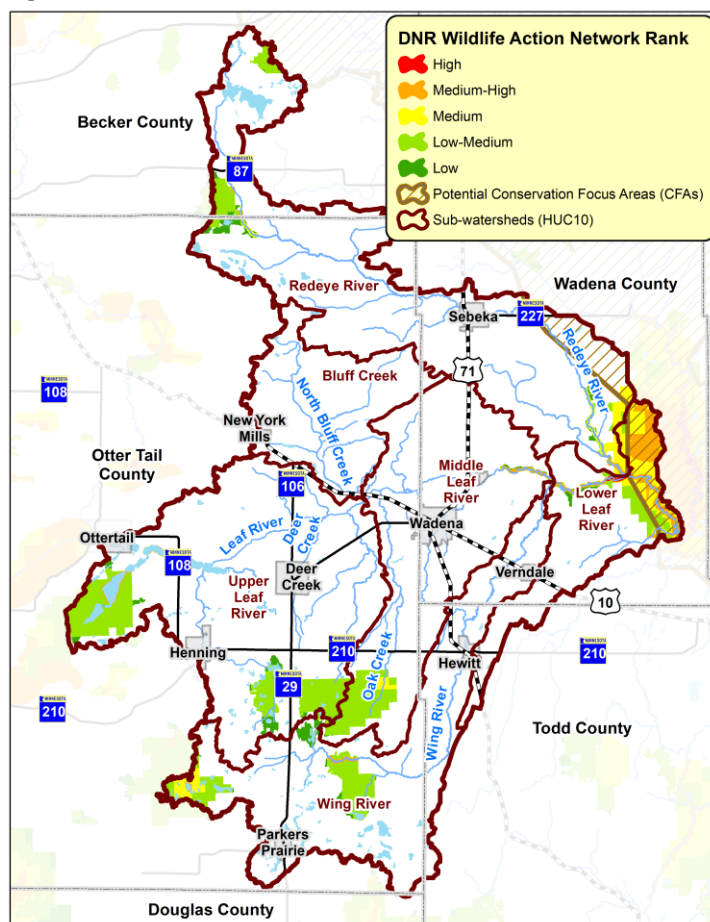
| Subwatershed name | Drivers of quality | Drivers of risk |
|-------------------|---|---------------------------------|
| Upper Leaf River | Surface water, forests/habitat, groundwater | Ag: animal & crops, impairments |
| Bluff Creek | Surface water, forests/habitat, groundwater | Ag: animal & crops, impairments |
| Middle Leaf River | Surface water, forests/habitat, groundwater | Ag: animal & crops, impairments |
| Wing River | Surface water, forests/habitat, groundwater | Ag: animal & crops, impairments |
| Redeye River | Surface water, forests/habitat, groundwater | Ag: animal & crops, impairments |
| Lower Leaf River | Forests/habitat | Ag: animal & crops, impairments |

Forest Conservation Opportunity Areas

The following list of existing conservation priorities in the Redeye River Major Watershed have been identified by various state agencies and environmental organizations. As noted previously, these resources were consulted by the Redeye River LSP Planning Team in helping to determine private forest land protection priorities. As this plan is implemented, project partners are encouraged to consult these priority efforts and seek to support their concurrent implementation. For more information on these priorities, please refer to the [Appendix](#).

- Minnesota DNR Wildlife Action Network – DNR EWR (shown below)
- Important Forest Resource Areas (IFRA) – DNR PFM Program, US Forest Service.
- Forests for the Future Analysis – DNR Forestry Forest Legacy Program, US Forest Service.
- Minnesota Biological Survey – DNR EWR.
- Redeye River Watershed Restoration and Protection Strategies – MPCA.
- 25-Year Lessard-Sams Outdoor Heritage Council (LSOHC) Forest Habitat Vision – MFRC and MFRP.
- Zonation Model – DNR and TNC.

Fig 13. MN DNR Wildlife Action Network.

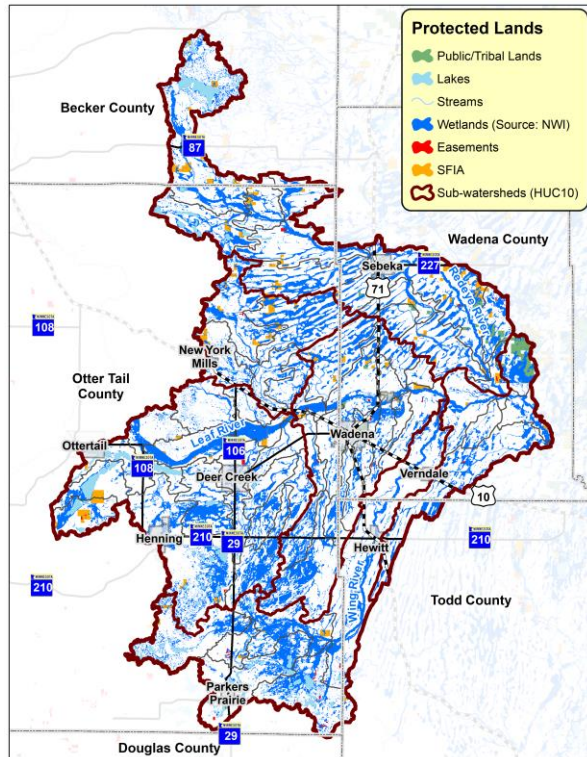


Key Observations and Conclusions

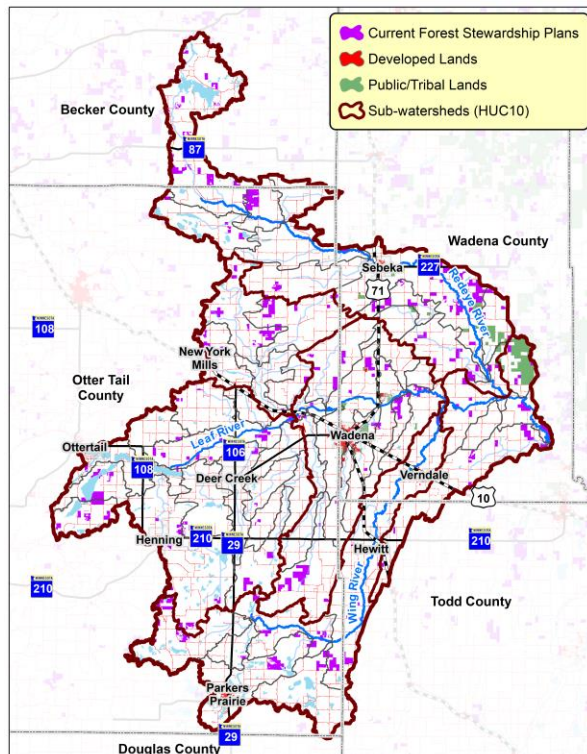
The following key observations and conclusions are based on the information gathered during the planning process for this landscape stewardship plan:

- The Redeye River Major Watershed is characteristic of many major watersheds in Minnesota and across the country. Large expanses of forests and wetlands are being lost to agriculture and development, to the detriment of water quality, wildlife habitat, and recreation opportunities.
- Many excellent conservation tools and programs are already in place, and PFM is the key program through which we can reach out to and serve private landowners. Outreach should be conducted through public/private partnerships with state, local government, and private forest consultants.
- Outreach efforts should be focused on parcels and properties with high RAQ scores, particularly in priority minor watersheds. This gives the best return on investment for available time and money.
- PFM is key in many minor watersheds, although some minors and lakes will be BMP orientated – e.g., reducing nutrient and sediment runoff with practices such as riparian buffers.
- There are no major forest industries located within this watershed, although within and nearby the watershed are several smaller-scale sawmills and specialty mills for products such as poles, mulches, and shavings. Forest industries like these provide key markets to utilize forest resources creating jobs and economic growth while supporting opportunities to increase the sustainable management of the forest lands.
- Well managed forests are important for carbon sequestration. Utilizing ecosystem-based forest management will improve carbon sequestration and storage. Furthermore, as concerns over climate change increase and the need for increasing carbon capture is becoming more apparent, interest in the reforestation of open lands on the rise. The number of farms and acres of farmland in Minnesota are shrinking, and this represents an opportunity to potentially increase the area of forest land in parts of the watershed where agriculture activities are decreasing.

Forest Land Protection – Current Status



Private Forest Stewardship – Current Status



For more information – see the [Appendix](#) and the LFT Workbook.

Part 2: The Vision

Mission

To empower teams of service providers to work together with private landowners and land managers in the Redeye River Major Watershed to protect and manage working forest lands to increase both the private and public benefits that forests provide.

Vision

In ten years, the Redeye River Major Watershed will have:

- Protected Water Resources – landowners and project partners that recognize together healthy working forests are key to protecting good water quality and quantity.
- Healthy and Sustained Forests – forests in the major watershed will be healthy and managed in an ecologically appropriate manner.
- Multiple Uses of Forest Resources – a full range of public and private benefits from timber to tourism will be produced by forests in the watershed.
- Collaborative Management – service providers and partners will work together to achieve the goals set forth in this plan.

Major Watershed Forestry Goals

Goal 1: Increase Forest Land Protection Levels

- Major watershed level (HUC 8): Current level – 30%. Goal – 75%.
- Subwatershed levels (HUC 10): Current levels range from 27% to 33%. Goal – increase protection to an additional 10% of the subwatershed area.
- Minor watershed levels (HUC 14): Protection goals recommended by the LSP Planning Team. See [Appendix](#) and the LFT Workbook.

Goal 2: Promote Private Forest Stewardship

- Coordinate the work of service providers.
- Target outreach to private landowners.
- Increase number/acres of stewardship plans.
- Promote integration of NPC based forest management goals and strategies developed in the MFRC Landscape Plans.
- Increase number/acres of practice plans and implementation projects.
- Increase targeted investment of NRCS, DNR and Legacy funding based on MWA/RAQ.

Coordinated Roles to Increase Forest Land Protection and Stewardship

Goal 1: Increase Forest Land Protection Levels

- DNR + BWSR: administrative lead.
- SWCDs: local lead, outreach, implement.
- DNR CFM: project coordination, reporting.
- DNR FL: target larger tracts.
- NGOs: bring partner resources, advocate.
- Landowners: they choose.

Goal 2: Promote Private Forest Stewardship

- DNR + BWSR: administrative lead.
- DNR CFM: PFM program coordination.
- SWCDs: local lead, outreach, plans, 1W1P.
- Consulting foresters: plans, timber sales.
- Loggers/vendors: forest management.
- Landowners: Its their land.

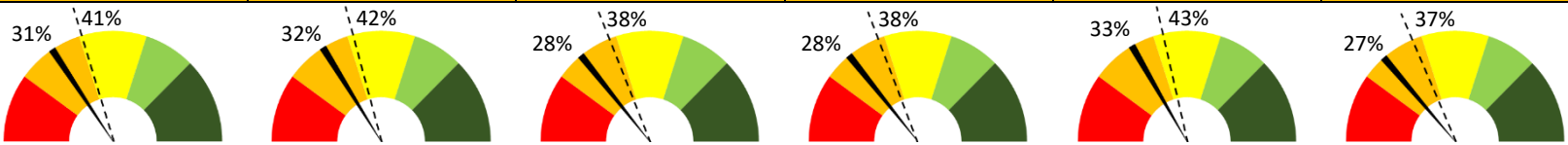
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Goal 1: Forest Land Protection

To draw some conclusions for management priorities and to help compare each subwatershed with the others on each given resource issue, the resulting calculations of the key assessments were placed into a table format. The table below summarizes the results of the calculations made for each subwatershed through the subwatershed assessment process.

| | Subwd. No 1 (HUC 701010701) Upper Leaf River | Subwd. No 2 (HUC 701010702) Bluff Creek | Subwd. No 3 (HUC 701010703) Middle Leaf River | Subwd. No 4 (HUC 701010704) Wing River | Subwd. No 5 (HUC 701010705) Redeye River | Subwd. No 6 (HUC 701010706) Lower Leaf River |
|---|--|---|---|--|--|--|
| Area | 140,218 ac | 49,307 ac | 96,017 ac | 101,220 ac | 139,171 ac | 46,136 ac |
| Natural Factors | | | | | | |
| Presettlement forest cover | 43% | 86% | 63% | 51% | 88% | 57% |
| Current forest cover | 12% | 10% | 14% | 15% | 21% | 17% |
| Lakes | 57 lakes; 4% | 8 lakes; 1% | 7 lakes; 0.2% | 58 lakes; 4% | 33 lakes; 3% | 3 lakes; 0.1% |
| Wetlands | 24% | 27% | 25% | 22% | 24% | 22% |
| Forest Land Protection Assessment | | | | | | |
| Public waters | 6,139 ac; 4% | 361 ac; 1% | 434 ac; 0.5% | 4,008 ac; 4% | 3,947 ac; 3% | 317 ac; 1% |
| Public lands | 5,453 ac; 4% | 501 ac; 1% | 1,860 ac; 2% | 1,718 ac; 2% | 6,660 ac; 5% | 2,956 ac; 6% |
| Private wetlands | 30,290 ac; 22% | 13,235 ac; 27% | 23,271 ac; 24% | 21,462 ac; 21% | 31,115 ac; 22% | 9,004 ac; 20% |
| SFIA | 1,982 ac; 1.4% | 1,571 ac; 3.2% | 1,063 ac; 1.1% | 720 ac; 0.7% | 4,310 ac; 3.1% | 167 ac; 0.4% |
| Easements | 283 ac; 0.2% | 29 ac; 0.1% | 123 ac; 0.1% | 467 ac; 0.5% | 152 ac; 0.1% | 20 ac; 0.0% |
| Total protected area | 44,146 ac; 31% | 15,698 ac; 32% | 26,752 ac; 28% | 28,376 ac; 28% | 46,184 ac; 33% | 12,465 ac; 27% |
| Protection priority | Medium | Low | Low | Medium | High | Medium |
| Forest Land Protection Cost Analysis | | | | | | |
| Protection goal | 41%; 13,343 ac to goal | 42%; 5,011 ac to goal | 38%; 9,735 ac to goal | 38%; 10,088 ac to goal | 43%; 13,660 ac to goal | 37%; 4,605 ac to goal |
| Potential to protect | 30,273 ac; 22% | 8,905 ac; 18% | 25,635 ac; 27% | 29,597 ac; 29% | 52,545 ac; 38% | 16,351 ac; 35% |
| Average land value | \$1,369/ac | \$1,235/ac | \$1,156/ac | \$1,367/ac | \$1,130/ac | \$1,182/ac |
| Protection cost* | \$13,913,025 | \$5,023,214 | \$9,528,402 | \$10,512,710 | \$13,263,600 | \$4,543,393 |
| Forest Land Protection Priorities | | | | | | |
| Quality Protection Factors | | | | | | |
| Cisco lakes | 0 lakes; 0% | 0 lakes; 0% | 0 lakes; 0% | 0 lakes; 0% | 0 lakes; 0% | 0 lakes; 0% |
| Trout lakes | 0 lakes; 0% | 0 lakes; 0% | 0 lakes; 0% | 0 lakes; 0% | 0 lakes; 0% | 0 lakes; 0% |
| Lakes of biodiversity significance (outstanding & high) | 2 lakes; 1% | 0 lakes; 0% | 0 lakes; 0% | 1 lake; 0% | 0 lakes; 0% | 0 lakes; 0% |
| Priority shallow lakes | 3 lakes; 0% | 0 lakes; 0% | 0 lakes; 0% | 7 lakes; 1% | 2 lakes; 0% | 0 lakes; 0% |
| Priority wild rice lakes | 0 lakes; 0% | 0 lakes; 0% | 0 lakes; 0% | 0 lakes; 0% | 0 lakes; 0% | 0 lakes; 0% |
| Trout steams | 10 mi | 0 mi | 11 mi | 0 mi | 0 mi | 9 mi |
| FFF mean composite score | 55.9 | 47.8 | 48.7 | 58.9 | 58.2 | 52.6 |
| Terrestrial biodiversity (MBS) (outstanding and high) | 0 ac; 0% | 1,157 ac; 2% | 2,246 ac; 2% | 0 ac; 0% | 5,047 ac; 4% | 4,817 ac; 10% |
| Wildlife Action Network (high & medium-high) | 1,584 ac; 1% | 0 ac; 0% | 442 ac; 0% | 495 ac; 0% | 473 ac; 0% | 5,234 ac; 11% |
| Risk Management Factors | | | | | | |
| Lake phosphorous sensitivity (highest & higher) | 6 lakes; 2,613 ac | 0 lakes; 0 ac | 0 lakes; 0 ac | 3 lakes; 609 ac | 3 lakes; 1,706 ac | 0 lakes; 0 ac |
| Water quality trend (declining) | 0 lakes; 0 ac | 0 lakes; 0 ac | 0 lakes; 0 ac | 0 lakes; 0 ac | 0 lakes; 0 ac | 0 lakes; 0 ac |
| Land use disturbance | 97,214 ac; 69% | 27,417 ac; 56% | 59,496 ac; 62% | 71,550 ac; 71% | 73,087 ac; 53% | 28,622 ac; 62% |

Protection Levels and Goals[†]



*Protection cost assumes 50% conservation easement and 50% SFIA.
[†]Solid lines represent current level of protection, dashed line is the goal.

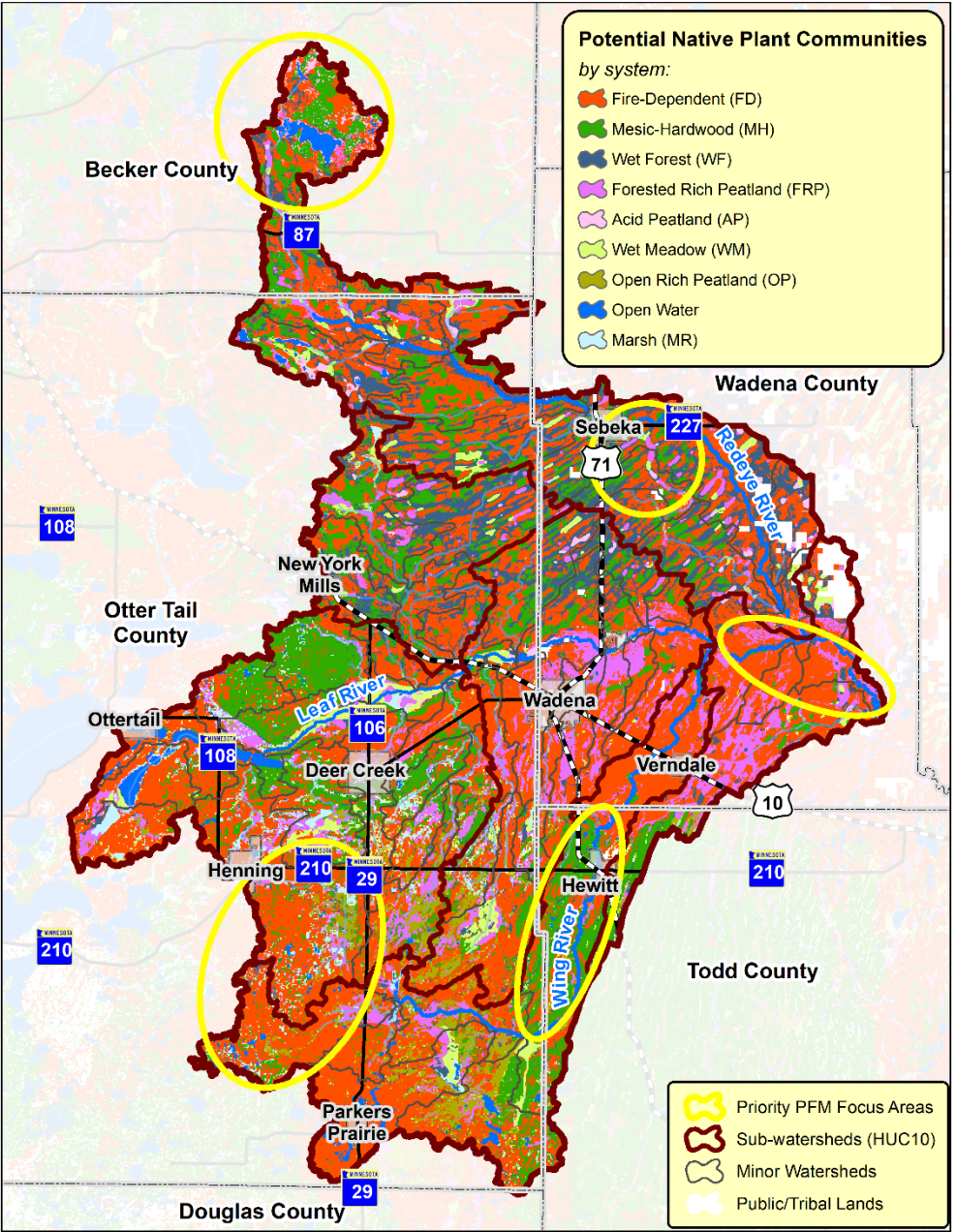
Goal 2: Promote Private Forest Stewardship

The second major goal of this Landscape Stewardship Plan is to promote private forest stewardship and consideration of native plant communities (NPCs) in management activities. The map on the right displays the potential NPC system for private lands in the Redeye River Major Watershed. The yellow circles indicate priorities for forest land management identified by the Redeye River Forestry Technical Committee.

It is important to note that this map displays the potential NPC of private lands only, and it includes lands that are not currently forested. This map is a vision for all private lands, including nonforested lands, because it reflects what the private landscape can potentially be if the land is managed in accordance with its biological potential.

The tables on the right side of this page compares Public Land Survey (PLS; ca. 1846-1908 AD) and Forest Inventory and Analysis (FIA; ca. 1990 AD) growth-stage data for common NPC classes in the Redeye River. These tables are from the Silviculture Interpretations developed by MN DNR Division of Forestry, Ecological Land Classification. Additional information on NPCs and their management can be found in the [Appendix](#).

The goals listed below for each subwatershed are for increased forest management through stewardship plans and acres as well as for cost share practices over the next ten years.



Growth Stage and Composition for Common Private Land NPCs

FDs37: Southern Dry-Mesic Oak (Maple) Woodland

| Dominant Trees | Forest Growth Stages in Years | | | | |
|---|-------------------------------|-----|-----|--------|-----|
| | 0 -75 | | ~75 | >75 | |
| | Young | | | Mature | |
| Bur Oak | 57% | 7% | | 55% | 12% |
| Red Oak | 12% | 6% | | 10% | 14% |
| Quaking Aspen (incl. Bigtooth) | 6% | 57% | | 3% | 27% |
| Northern Pin Oak | 6% | 0% | | — | 1% |
| Black Cherry | 1% | 2% | | — | 2% |
| Basswood | 2% | 8% | / | 2% | 14% |
| American Elm (incl. Slippery) | 3% | 3% | | 5% | 5% |
| White Oak | 8% | 0% | | 25% | 1% |
| Red Maple | 0% | 3% | | — | 3% |
| Paper Birch | 1% | 7% | | — | 12% |
| Ironwood | 0% | 3% | | 0% | 5% |
| Green Ash | 1% | 0% | | 1% | 1% |
| Miscellaneous | 3% | 4% | | 0% | 3% |
| Percent of Community in Growth Stage in Presettlement and Modern Landscapes | 79% | 66% | | 21% | 34% |

Natural growth-stage analysis and landscape summary of historic conditions is based upon the analysis of 2,620 Public Land Survey records for section and quarter-section corners. Comparable modern conditions were summarized from 1,624 FIA subplots that were modeled to be FDs37 sites.

MHc36: Central Hardwood Forest (Eastern)

| Dominant Trees | Forest Growth Stages in Years | | | | |
|---|-------------------------------|-----|---------|--------|-----|
| | 0 - 35 | | 35 - 95 | > 95 | |
| | Young | | T1 | Mature | |
| Red Oak | 50% | 8% | | 9% | 14% |
| Quaking Aspen (incl. Bigtooth) | 10% | 18% | | 1% | 3% |
| Paper Birch | 5% | 4% | | 2% | 4% |
| Basswood | 14% | 10% | | 18% | 20% |
| American Elm | 6% | 5% | | 10% | 3% |
| Ironwood | 4% | 12% | | 8% | 7% |
| Bur Oak (incl. White) | — | 1% | | 5% | 6% |
| White Pine | 1% | 0% | | 3% | 0% |
| Sugar Maple | 4% | 30% | | 36% | 33% |
| Red Maple | — | 3% | | — | 3% |
| Green Ash (incl. Black & White) | 3% | 4% | | 4% | 3% |
| Miscellaneous | 3% | 5% | | 4% | 4% |
| Percent of Community in Growth Stage in Presettlement and Modern Landscapes | 7% | 7% | 75% | 71% | 18% |

Natural growth-stage analysis and landscape summary of historic conditions is based upon the analysis of 5,368 Public Land Survey records for section and quarter-section corners. Comparable modern conditions were summarized from 2,107 FIA subplots that were modeled to be MHc36 sites.

Forest Management Goals

| | | | | | |
|---|---|--|---|---|--|
| Subwd 1 – Upper Leaf River 92% private; 8% public 1,683 parcels > 20 ac 121,503 ac > 20 ac 38 fsp; 4,889 ac <u>10 Yr PFM Goals:</u> 137 fsp; 16,995 ac | Subwd 2 – Bluff Creek 98% private; 2% public 583 parcels > 20 ac 46,022 ac > 20 ac 21 fsp; 3,243 ac <u>10 Yr PFM Goals:</u> 62 fsp; 7,710 ac | Subwd 3 – Middle Leaf River 98% private; 2% public 1,104 parcels > 20 ac 86,553 ac > 20 ac 29 fsp; 3,620 ac <u>10 Yr PFM Goals:</u> 93 fsp; 11,532 ac | Subwd 4 – Wing River 94% private; 6% public 441 parcels > 20 ac 91,868 ac > 20 ac 33 fsp; 3,962 ac <u>10 Yr PFM Goals:</u> 96 fsp; 11,934 ac | Subwd 5 – Redeye River 92% private; 8% public 1,503 parcels > 20 ac 124,894 ac > 20 ac 71 fsp; 7,976 ac <u>10 Yr PFM Goals:</u> 159 fsp; 19,730 ac | Subwd 6 – Lower Leaf River 93% private; 7% public 550 parcels > 20 ac 41,374 ac > 20 ac 21 fsp; 2,770 ac <u>10 Yr PFM Goals:</u> 39 fsp; 4,903 ac |
|---|---|--|---|---|--|

Vision Summary

The following points summarize the vision and the two major goals for the Redeye River Major Watershed.

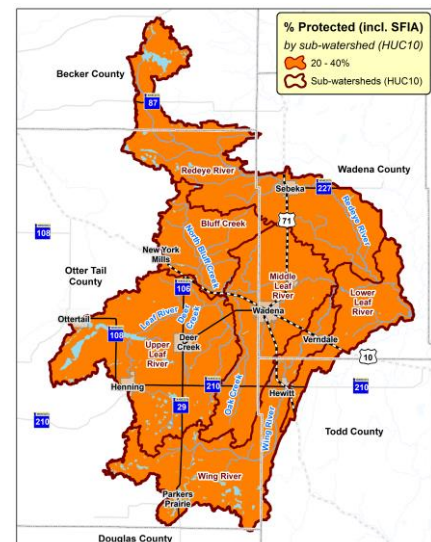
- Private lands dominate the vast majority of the Redeye River Major Watershed, most of which are also agricultural lands. Accordingly, all the subwatersheds have high levels of risk and moderate to low indicators of quality (e.g., lakes of biological significance, high terrestrial biodiversity scores, etc.).
- Several of the subwatersheds have areas that were identified by the Redeye River Forestry Technical Committee as having protection priority areas, which raised their overall priority ranking to ‘medium’ or ‘high’ as was the case in the Redeye River Subwatershed. The Redeye River Subwatershed was given a high priority ranking because of all the subwatersheds it had the highest amount of protection, most forest cover, and lowest amount of land use disturbance.
- In addition to identifying protection priority areas, the Redeye River Forestry Technical Committee also developed several recommendations to enhance forest and wildlife habitat across the major watershed. These recommendations are listed in the ‘Forest Vegetation Management Guidance’ part of the subwatershed action plans.
- One of the aims of Goal 2 (Promote Private Forest Stewardship) is to at a minimum have an updated forest stewardship plan (FSP) on every acre that is or will be protected by a conservation easement or SFIA. Consequently, larger areas of existing conservation easements or SFIA and higher forest land protection goals equate to higher FSP goals in this plan.

Subwatershed Guidance

The purpose of the following nine narratives provide service providers and resource managers with a detailed description of subwatershed-level conditions and recommendations.

These ‘subwatershed action plans’ are intended to help service providers and managers identify and prioritize specific areas in the Redeye River Major Watershed so they can more effectively work together to implement activities that are likely to improve water quality, increase forest management, and achieve other public and private benefits.

Fig 14. Subwatershed (HUC10) protection levels.



Subwatershed No. 1 Upper Leaf River (HUC 701010701)

Goal 1: Forest Land Protection Guidance

- Low amount of forest cover, 12%.
- Has high land use disturbance, 69% of the watershed has been converted to agriculture or urban development.
- Home to the Elmo and Inman (Wunderlich) Wildlife Management Areas.
- At risk from low levels of protection, high amounts of agriculture, and surface water impairments.
- Medium priority for forest land protection, focus protection efforts on parcels with high RAQ scores in the priority minor watersheds (Table 3).
- Forest land protection goal is 41%, current protection is 31%.

Goal 2: Forest Stewardship Guidance

- The geomorphology of this subwatershed is a mix of moraines, outwash, till plains, and peat formations. The till plains run in an east-west direction and features drumlins formed by the Wadena Lobe glacier.
- The potential NPCs are mainly fire-dependent and mesic hardwood forests. The fire-dependent forests are usually on the outwash deposits while the mesic hardwood forests are more closely associated with the moraines and till plains.
- The current forest cover is heavily deciduous with a minor conifer component. The southern tip of the subwatershed is more heavily forested than the rest of the area.
- Recommend enhancing habitat along the Leaf River corridor.
- Forest stewardship goal – 137 plans, 16,995 acres.

Priority Minor Watersheds

- Priority minor watershed for protection is 13007.

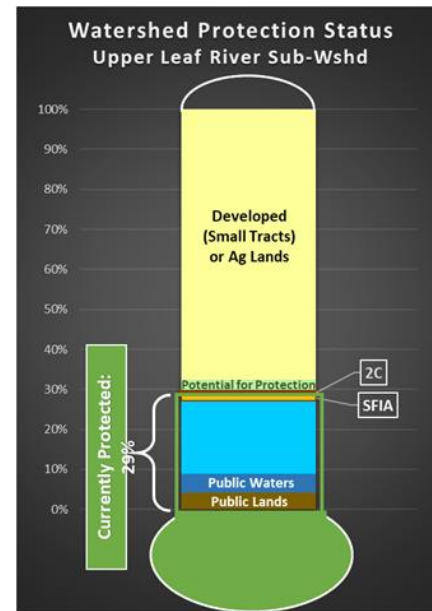


Table 3. Minor watershed info.

| Minor wshd # | Acres | Current % protected | Protection goal % |
|--------------|--------|---------------------|-------------------|
| 13007 | 30,175 | 33.2% | 45% |
| 13008 | 10,378 | 39.7% | 45% |
| 13012 | 4,220 | 31.7% | 40% |
| 13013 | 9,789 | 15.6% | 20% |
| 13014 | 11,468 | 30.1% | 35% |
| 13015 | 10,381 | 28.7% | 35% |
| 13016 | 7,367 | 34.4% | 45% |
| 13017 | 7,070 | 47.5% | 50% |
| 13018 | 6,839 | 15.3% | 20% |
| 13019 | 8,837 | 33.5% | 35% |
| 13020 | 4,825 | 13.5% | 20% |
| 13021 | 5,403 | 14.7% | 20% |
| 13022 | 5,016 | 18.7% | 25% |
| 13026 | 4,658 | 54.4% | 60% |
| 13027 | 10,085 | 16.1% | 25% |
| 13028 | 3,706 | 8.0% | 10% |

Subwatershed No. 2 Bluff Creek (HUC 701010702)

Goal 1: Forest Land Protection Guidance

- Low amount of forest cover, 10%.
- Largely stream based watershed with relatively few lakes.
- Home to the Bluff Creek Wildlife Management Area.
- Has high land use disturbance, 56% of the watershed has been converted to agriculture or urban development.
- At risk from low levels of protection, high amounts of agriculture, and surface water impairments.
- Low priority for forest land protection.
- Forest land protection goal is 42%, current protection is 32%.

Goal 2: Forest Stewardship Guidance

- This subwatershed is largely covered by an outwash plain, although the eastern one-third is till plain with drumlin fields.
- The potential NPCs are a mixture of fire-dependent forests, mesic hardwood forests, wet forests, and forested rich peatlands. Of these potential NPCs fire-dependent forests are the most common and are associated with both outwash and till plain deposits.
- The current forest cover is almost entirely deciduous.
- Recommend enhancing wildlife habitat in the central and northern portions of the subwatershed.
- Forest stewardship goal – 62 plans, 7,710 acres.

Priority Minor Watersheds

- Not all minor watershed forest land protection goals are met, but no priority minor watersheds were identified by the Redeye River LSP Planning Team.

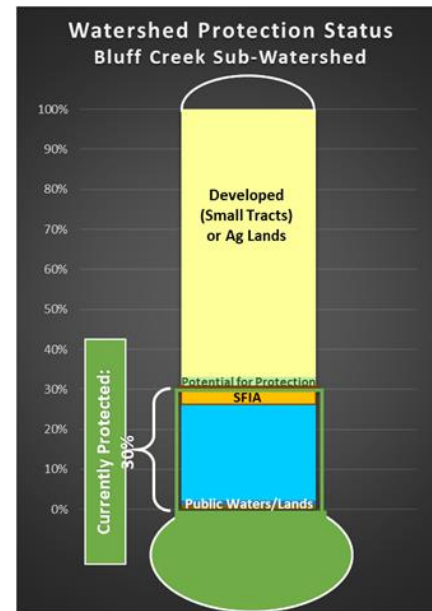
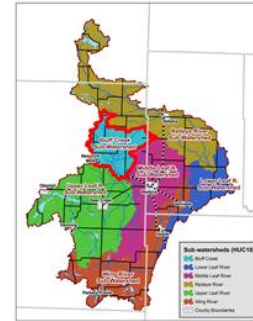


Table 4. Minor watershed info.

| Minor wshd # | Acres | Current % protected | Protection goal % |
|--------------|--------|---------------------|-------------------|
| 13029 | 6,894 | 20.8% | 25% |
| 13030 | 4,873 | 19.1% | 25% |
| 13032 | 15,446 | 36.1% | 42% |
| 13034 | 13,734 | 36.1% | 45% |
| 13035 | 8,360 | 21.1% | 30% |

Subwatershed No. 3 Middle Leaf River (HUC 701010703)

Goal 1: Forest Land Protection Guidance

- Low amount of forest cover, 14%.
- Largely stream based watershed with relatively few lakes.
- Home to the Wrightstown Wildlife Management Area.
- Has high land use disturbance, 62% of the watershed has been converted to agriculture or urban development.
- At risk from low levels of protection, high amounts of agriculture, some development from Wadena, and surface water impairments.
- Low priority for forest land protection.
- Forest land protection goal is 38%, current protection is 28%.

Goal 2: Forest Stewardship Guidance

- Most of this subwatershed is covered by outwash deposits, but a section of the subwatershed near its northern tip is in a till plain with drumlin fields.
- Fire-dependent forests are the largest potential NPC, but mesic hardwood forests are also associated with the till plain in the northern part of the subwatershed. The potential lowland NPCs are forested rich peatlands on the south side of the Leaf River and wet forests on the north side.
- The current forest cover is almost entirely deciduous and the area to the north of the Leaf River is more heavily forested than the rest of the watershed.
- Recommend enhancing the forest habitat to the north of the Leaf River.
- Forest stewardship goal – 93 plans, 11,532 acres.

Priority Minor Watersheds

- Not all minor watershed forest land protection goals are met, but no priority minor watersheds were identified by the Redeye River LSP Planning Team.

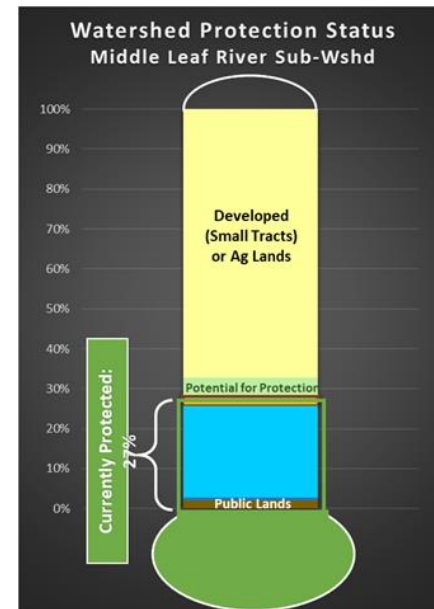


Table 5. Minor watershed info.

| Minor wshd # | Acres | Current % protected | Protection goal % |
|--------------|--------|---------------------|-------------------|
| 13009 | 16,064 | 30.8% | 40% |
| 13010 | 5,862 | 21.5% | 25% |
| 13011 | 7,773 | 32.3% | 35% |
| 13023 | 4,202 | 30.8% | 35% |
| 13024 | 6,795 | 14.5% | 15% |
| 13025 | 9,497 | 28.5% | 35% |
| 13031 | 12,100 | 26.2% | 30% |
| 13043 | 5,468 | 39.2% | 45% |
| 13044 | 2,524 | 28.2% | 50% |
| 13045 | 7,749 | 18.7% | 25% |
| 13046 | 7,994 | 26.1% | 40% |
| 13047 | 5,341 | 30.1% | 38% |
| 13052 | 2,258 | 9.3% | 40% |
| 13060 | 2,391 | 38.2% | 45% |

Subwatershed No. 4 Wing River (HUC 701010704)

Goal 1: Forest Land Protection Guidance

- Low amount of forest cover, 15%.
- Home to several priority shallow lakes.
- Home to the Eastern and Folders Woods Marsh wildlife management areas.
- Has high land use disturbance, 71% of the watershed has been converted to agriculture or urban development.
- At risk from low levels of protection, high amounts of agriculture, and surface water impairments.
- Medium priority for forest land protection, focus protection efforts on parcels with high RAQ scores in the priority minor watersheds (Table 6)
- Forest land protection goal is 38%, current protection is 28%.

Goal 2: Forest Stewardship Guidance

- This subwatershed is mostly covered by outwash deposits along with moderate amounts of moraines, till plains, and peat formations.
- Fire-dependent forests are the largest potential NPC, but mesic hardwood forests are also associated with the till plain towards the center of the subwatershed.
- The current forest cover is almost entirely deciduous.
- The Redeye River Forestry Technical Committee did not have any vegetation management recommendations for this subwatershed. Refer to the West Central Landscape Forest Resource Management Plan for guidance.
- Forest stewardship goal – 96 plans, 11,934 acres.

Priority Minor Watersheds

- Priority minor watersheds for protection are 13003 and 13006.

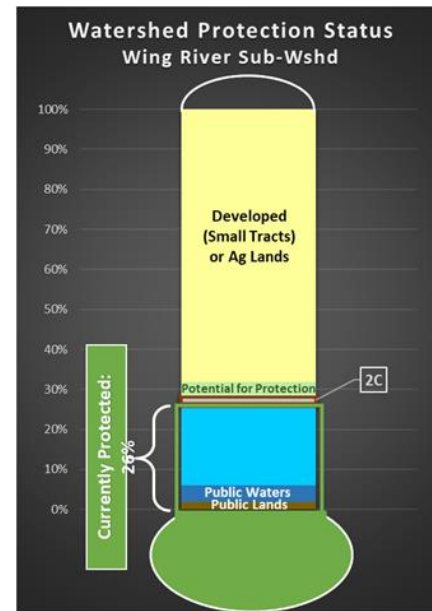
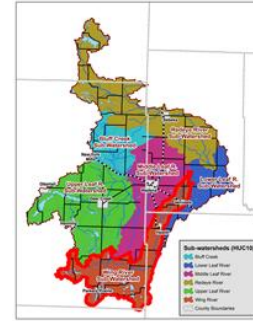


Table 6. Minor watershed info

| Minor wshd # | Acres | Current % protected | Protection goal % |
|--------------|---------------|---------------------|-------------------|
| 13001 | 15,327 | 33.7% | 40% |
| 13002 | 16,900 | 29.0% | 35% |
| 13003 | 37,010 | 18.0% | 30% |
| 13004 | 12,232 | 40.5% | 50% |
| 13005 | 4,352 | 21.8% | 25% |
| 13006 | 15,398 | 26.4% | 50% |

Subwatershed No. 5 Redeye River (HUC 701010705)

Goal 1: Forest Land Protection Guidance

- Low amount of forest cover, 21%.
- Home to a portion of the Smoky Hills State Forest and the Lyons State Forest, as well as several wildlife management areas.
- Has high land use disturbance, 53% of the watershed has been converted to agriculture or urban development.
- At risk from low levels of protection, high amounts of agriculture, and surface water impairments.
- High priority for forest land protection, focus protection efforts on the river corridor and parcels with high RAQ scores in the priority minor watersheds (Table 7).
- Forest land protection goal is 43%, current protection is 33%.

Goal 2: Forest Stewardship Guidance

- The Redeye River begins at Wolf Lake, which is in the Itasca Moraine at the northern tip of the subwatershed. From there it flows through the drumlin plains that characterize the landscape around the town of Sebeka. Towards the tail end of the subwatershed the river enters an outwash plain and merges with the Leaf River.
- The potential NPCs are a diverse mosaic of fire-dependent and mesic hardwood forests in the uplands, and wet forests and peatlands in the lowlands. The drumlins in this subwatershed cause the potential NPCs to have a unique variegated pattern. Generally, but not always, the potential fire-dependent NPCs are on the outwash deposits, while the mesic hardwoods are on the moraines and till plains.
- The current forest cover is heavily deciduous with a minor conifer component. Overall forest cover is greater near the head of the subwatershed.
- Recommended management activities:
 - Restore a 1-2 mile wide buffer around the Redeye River.
 - Restore and enhance a ½ mile wide buffer around Hay Creek.
 - Enhance the forest habitat near the Perham WMA.
 - Carry out a crop tree release of oaks and clearcut stands of 50-60 year old aspen in the forests to the south of Sebeka.
- Forest stewardship goal – 159 plans, 19,730 acres.

Priority Minor Watersheds

- Priority minor watersheds for protection are 13042, 13048, 13049, and 13050.

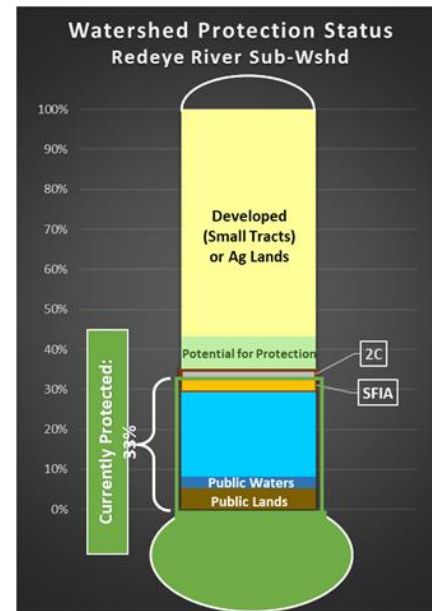
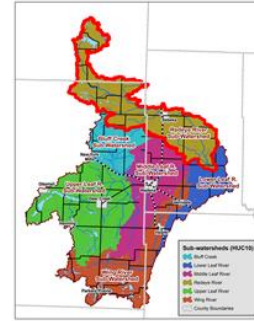


Table 7. Minor watershed info.

| Minor wshd # | Acres | Current % protected | Protection goal % |
|--------------|--------|---------------------|-------------------|
| 13036 | 12,956 | 31.6% | 35% |
| 13037 | 11,250 | 40.0% | 50% |
| 13038 | 12,831 | 19.1% | 30% |
| 13039 | 6,294 | 24.1% | 30% |
| 13040 | 6,050 | 25.0% | 30% |
| 13042 | 33,000 | 40.6% | 60% |
| 13048 | 3,727 | 24.8% | 30% |
| 13049 | 5,399 | 25.6% | 45% |
| 13050 | 27,813 | 31.4% | 40% |
| 13051 | 10,692 | 28.6% | 40% |
| 13053 | 5,973 | 43.5% | 55% |
| 13055 | 3,187 | 39.4% | 50% |

Subwatershed No. 6 Lower Leaf River (HUC 701010706)

Goal 1: Forest Land Protection Guidance

- Low amount of forest cover, 17%.
- Largely stream based watershed with relatively few lakes.
- Home to a portion of the Lyons State Forest.
- Highest terrestrial biodiversity and Wildlife Action Network scores of all the subwatersheds in the major watershed.
- Has high land use disturbance, 62% of the watershed has been converted to agriculture or urban development.
- At risk from low levels of protection, high amounts of agriculture, and surface water impairments.
- Medium priority for forest land protection, focus protection efforts on the river corridor and parcels with high RAQ scores in the priority minor watersheds (Table 8).
- Forest land protection goal is 37%, current protection is 27%.

Goal 2: Forest Stewardship Guidance

- Most of this subwatershed is covered by outwash, although minor amounts of till plain and peat formations are present. Drumlins also occur throughout the subwatershed.
- Fire-dependent forests are the most common potential NPC, especially on the outwash deposits. Mesic hardwoods are another potential NPC that can be found in this subwatershed, although they are limited to the till plain towards the south. In the lowland the most common potential NPC are forested rich peatlands, but wet forest potential NPCs are present as well.
- The current forest cover is heavily deciduous with a minor conifer component.
- Recommend restoring a 1-2 mile wide buffer around the Redeye River.
- Forest stewardship goal – 39 plans, 4,903 acres.

Priority Minor Watersheds

- Priority minor watersheds for protection are 13056, 13057, and 13058.

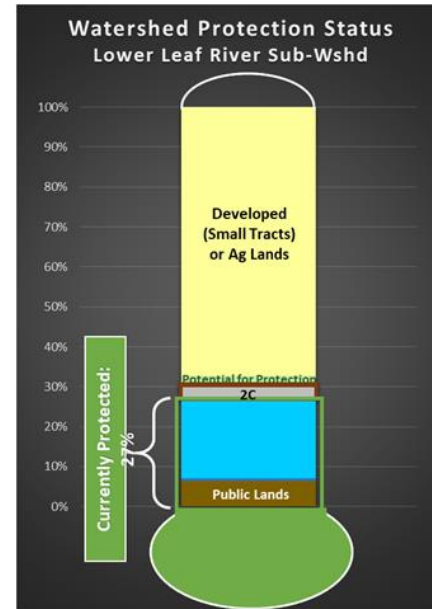
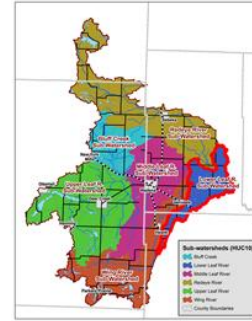


Table 8. Minor watershed info.

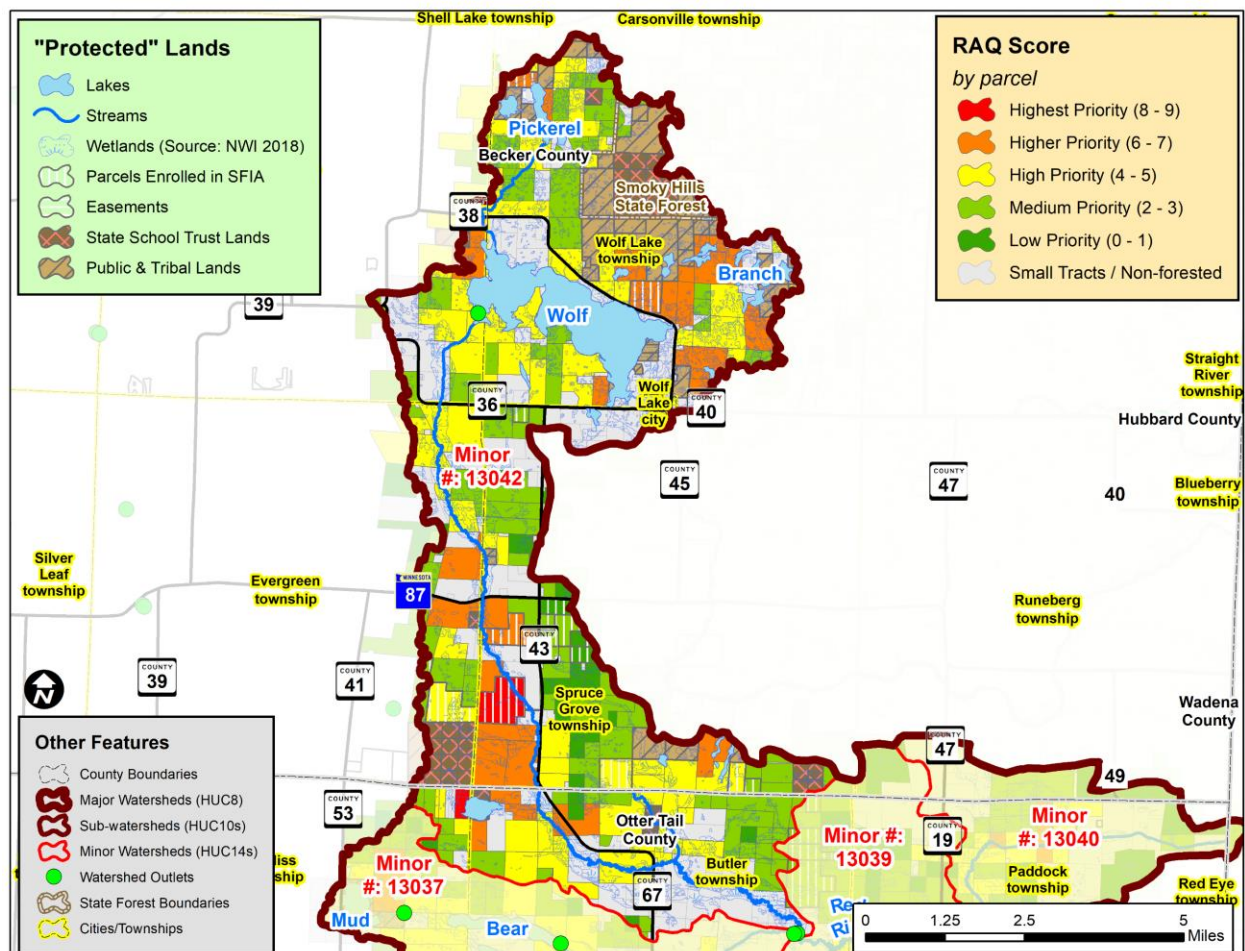
| Minor wshd # | Acres | Current % protected | Protection goal % |
|--------------|--------|---------------------|-------------------|
| 13054 | 6,095 | 66.1% | 70% |
| 13056 | 9,767 | 15.7% | 30% |
| 13057 | 3,544 | 16.8% | 25% |
| 13058 | 4,784 | 26.1% | 50% |
| 13059 | 21,946 | 23.1% | 30% |

Minor Watershed Methodology and RAQ Scoring

The overall Redeye River Major Watershed has a protection goal of 75%. Each of its six subwatersheds have their own protection goals, which range from 37 to 43%. The subwatersheds have 5 to 16 minor watersheds, and each minor also has a protection goal that was determined by the Redeye River LSP Planning Team based on their best professional judgement on what is achievable for that minor.

To meet these goals local service providers will need to identify and target individual parcels and landowners. To assist in this effort, a Minor Watershed Assessment (MWA) was developed for every minor watershed in the Redeye River Major Watershed. As a part of this assessment every minor watershed has a map showing its potential for protection, parcel and landowner RAQ scores (Riparian – Adjacency – Quality), and tables of information about individual parcels and landowners. An example of one of these resources is Fig 15, which shows the RAQ scores for parcels across a group of minor watersheds in the Redeye River Subwatershed. We can see on this map that the parcels with the highest RAQ scores are clustered around the Redeye River and Wolf Lake. Protecting these parcels would provide the greatest return on investment. MWA maps and tables are provided in the LFT Workbook. The MWA priorities and RAQ scoring can also useful information to support local land use officials when developing their comprehensive plans and guidance on land use and public infrastructure decisions.

Fig 15. RAQ scores for parcels in minor watershed #13042.



Part 3: Making it Happen

The key to successfully implementing any plan is coordination. Coordination is the critical, yet far too often, invisible process of organizing the ongoing work to be done in landscape management. Successful implementation requires proactive and purposeful coordination. This part of the plan focuses outlines how funding and staff resources will be coordinated to implement the vision and goals in this Plan.

Coordination Strategies

This plan calls for protecting 56,442 acres of private forest land and the preparation of 72,805 acres of forest stewardship plans across the 572,000-acre Redeye River Major Watershed over the next ten years. Implementing these goals will require significant collaborative efforts over this timeframe.

To be certain, these are “push” goals. But they are doable, especially given growing funding levels for protection from state Legacy funds through Clean Water and Outdoor Heritage Funds. In addition, there are growing capacity funds for private forest management that service providers are securing including funding from the US Forest Service S&PF through the LSR grants, DNR cost share and SFIA programs, and local capacity funds to soil and water conservation districts through the BWSR. These funds are foundational to supporting this dynamic private forest management paradigm.

The team of service providers working in this watershed need to pre-think through and commit to a series of coordination strategies. The following outline provides partners in the Redeye River Major Watershed an initial pathway to greater success implementation through better coordination:

- Coordination Strategy # 1 – Reconvene, Support and Sustain the Local Forestry Technical Team.
- Coordination Strategy # 2 – Confirm the Project Coordinator.
- Coordination Strategy # 3 – Clarify Partner Roles in Serving Private Landowners.
- Coordination Strategy # 4 – Coordinate Resources for Implementation.
- Coordination Strategy # 5 – Support Accomplishment Reporting.
- Coordination Strategy # 6 – Recommendations to Local and State Agencies and Programs.



Coordination Strategy # 1 – Reconvene the Local Forestry Technical Team

The primary coordination strategy for this plan is to periodically convene a core group of partners – resource professionals, service providers, local and state officials, environmental groups, tribal representatives, and landowners – into a local team to oversee the coordination and implementation efforts over the next ten years. The team should meet on a regular basis to 1) review and determine service delivery priorities and workloads, 2) collaborate on developing proposals for funding opportunities, 3) coordinate training and landowner outreach efforts, 4) support accomplishment reporting, and 5) ensure clear communications on the status of the project. The LFT Workbook (to be distributed to the LFT when it reconvenes) provides additional guidance to support the team’s coordination efforts.

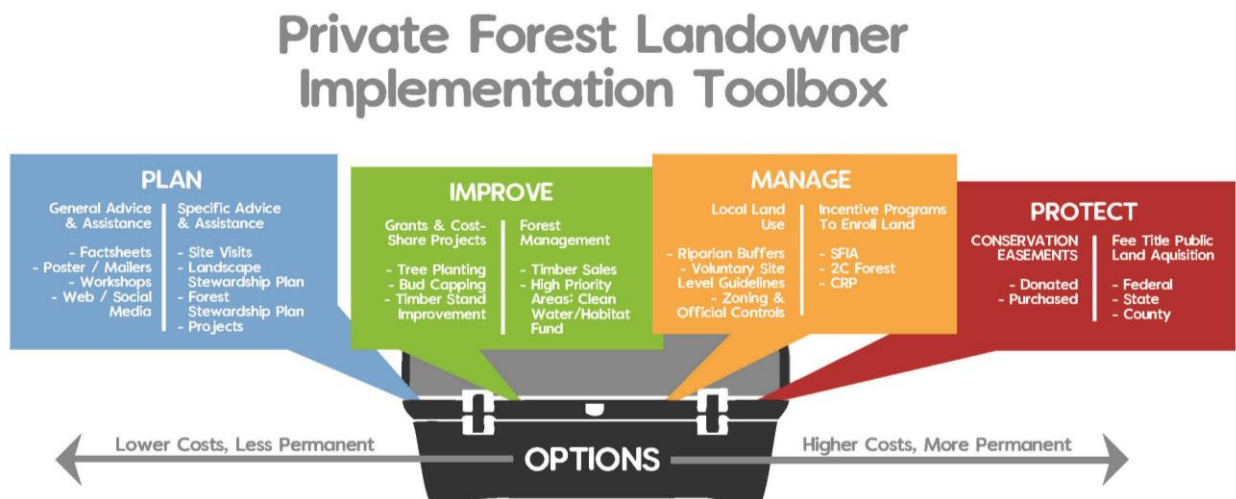
Coordination Strategy # 2 – Confirm the Project Coordinator

To support the ongoing coordination work by the Local Forestry Technical Team, it is essential that one person serve as the point of contact to manage the overall coordination process. This should be a paid position and could be administered by one of the three SWCDs. Seed moneys and capacity funding are available to support this position.

Coordination Strategy # 3 – Clarify Partner Roles in Serving Private Landowners

PFM Implementation Toolbox

There are four primary approaches to delivering services to private landowners. The “PFM implementation toolbox” shown below illustrates these approaches and the full suite of options available to serving private landowners. Promoting the full range of options to private landowners helps to improve the economic, ecological, and social benefits they can receive from their woodlands. As the diagram below suggests, services provided to landowners on the left tend to be less costly but are also less permanent and generally have less societal benefits. In contrast, tools further to the right involve options that are more costly (to the public) but have a greater degree of permanence and produce more recognizable benefits to society. Local forestry technical teams are encouraged to define roles and organize their implementation efforts through these four approaches and corresponding array of tools.



Forestry professionals including approved Minnesota Forest Stewardship Plan writers are available to help private forest landowners obtain forest stewardship plans for their property and implement parts of the toolbox. These professionals are typically from the DNR, local SWCD and NRCS offices, forest industries, or are private consultants. An estimated 26 approved forestry professionals/plan writers have service areas in and near the Redeye River Major Watershed. Their contact information can be found at <http://www.myminnisotawoods.umn.edu/minnesota-stewardship-plan-preparers/>.

Clarifying Roles, Growing Commitment

Partners and stakeholders working in the watershed are all encouraged to serve on the Forestry Technical Team. The team should include DNR Forestry, SWCDs, consulting foresters, tribal representatives, environmental organizations, industry foresters, loggers and vendors, landowners, local officials, and other local groups.

The PFM implementation toolbox displays many of the choices that can be used to promote private forest stewardship. However, not all service providers in this watershed have the resources to implement all the options. To efficiently implement the full toolbox, partners on the forestry technical teams are encouraged to define the roles and responsibilities of each partner using the diagram below.

| | #1 General advice & <u>assistance</u> | #2 Specific advice & <u>assistance</u> | #3 Grants / cost-share <u>project</u> | #4 Forest <u>management</u> | #5 Land use <u>controls</u> | #6 Incentive <u>programs</u> | #7 Conservation <u>easements</u> | #8 Fee title public land <u>acquisition</u> |
|--|--|---|--|-----------------------------------|--------------------------------------|------------------------------------|--|--|
| <u>Mission and roles</u> | | | | | | | | |
| <ul style="list-style-type: none"> • Primary • Supporting | | | | | | | | |
| <u>Programs/projects</u> | | | | | | | | |
| <ul style="list-style-type: none"> • Geographic areas of interest • Topical interests | | | | | | | | |
| <u>Staffing/equipment</u> | | | | | | | | |
| <ul style="list-style-type: none"> • FTE's, expertise • Equipment • Other resources | | | | | | | | |

By working together to define each partners roles and responsibilities will help to ensure seamless, effective, and efficient PFM service delivery. The more commitment that partners and stakeholders bring to the table in sharing resources and information increases the successful implementation of this plan. Actively participating on an ongoing basis is the core to developing and expanding partnership and stakeholder capacity to reach the shared goals and objectives of this Plan.

Moving from a paradigm of serving one landowner at a time to a landscape team approach that concurrently serves landowners and their communities will require the project coordinator and forestry technical team to encourage all partners to significantly expand the sharing of their limited resources for landscape stewardship. The sharing of resources—staff, funding, equipment, information, and know-how—in far more robust and active ways—is fundamental to partnership capacity development.

Collaborate Outreach Efforts to Engage Landowners, Community Leaders and Local Decision Makers

To gain the support of decision makers in the community, resource managers need to provide a convincing answer to the fundamental marketing question: “What is in it for them?” Broader community support is likely to depend on being able to demonstrate that conservation programs are effectively and efficiently

addressing issues of importance in terms that residents and their decision makers easily understand. Increasing support for forest conservation that protects and enhances water quality will be based primarily on the off-site benefits that accrue to community residents, rather than on the on-site benefits that accrue to forest landowners.

Tools for Engaging Landowners Effectively (TELE) was developed by the Sustaining Family Forests Initiative (SFFI) to engage landowners effectively. The SFFI is a collaboration of government agencies, NGOs, certification systems, landowner groups, businesses, and universities organized to gain comprehensive knowledge about family forest owners (10-999 acres) in the United States. The SFFI has taken advantage of the wealth of information from the National Woodland Owner Survey database and linked this resource with demographic and behavior information to develop the TELE marketing approach to help natural resource professionals and others engage more effectively with family forest owners about their woods and woodland management. More information about the SFFI and TELE can be found at www.engaginglandowners.org and in the [Appendix](#).

Coordination Strategy # 4 – Coordinating Resources for Implementation

Prioritizing PFM Service Delivery Through MWA and RAQ

DNR Forestry and BWSR have developed the minor watershed assessment/RAQ methodology that connects forest land cover and water quality based on research developed by MN DNR Fisheries. The process works as follows: 1) Prioritize lakes that can meet at least 3 of 5 risk and quality factors, and have less than 75% protected watersheds, 2) Target specific parcels with high scores for proximity to riparian “R”, adjacency to public land “A”, and habitat quality “Q” (RAQ) scores (5 or greater) and focused proactive outreach efforts to these landowners that promote increased forest management and forest land protection (SFIA, conservation easements, public land acquisitions), and 3) over time, measure progress toward 75% protection goal on watershed basis.

We periodically measure the percent of the watersheds with permanent forest protection to illustrate this transformation on graphic dial like a speedometer. We call this measurement and assessment, moving the needle towards watershed protection. Through the implementation and monitoring of this plan over time, we can document and assess forest land protection levels at the major watershed, subwatershed and minor watershed levels.

This plan is intended to help support the PTM thinking by all service providers in a collaborative manner. This intentional and measurable planning process enhances opportunities for the collaborative implementation of the plans over time. To support this effective cross boundary approach, increased coordination capacity provided by this federal grant is essential.

Linking Landscape Stewardship Plans and 1W1Ps through PTM

By coordinating forest and water resource planning and implementation through the development of this plan, we are setting the watershed/land cover context for developing the Redeye River 1W 1P. These interconnected public planning processes promote more active and cross boundary management of not only forest resources, but water resources along with fish and wildlife. This collaborative work is helping to strengthen working relationships with agency fish and wildlife managers as well as outdoor and sportsmen groups. Through the LSP and 1W1P, MN DNR Forestry and partners are shaping approaches to working more proactively with landowners and providing them with more options to:

- Provide conservation-minded landowners with 3 protection options.
- Promote SFIA, the state’s incentives program for maintaining forest lands.

- Conservation easements acquired by either Forests for the Future (FFF) or Reinvest in Minnesota (RIM) programs. FFF focusing more on larger tracts and shoreland, RIM focusing on smaller tracts and backlots.
- For landowners choosing fee title, proposals go to the county via the land commissioner for review and comment—first. Work with conservation organizations on fee title projects. Transfer land to either county or state.

The Subwatershed Action Plans, Minor Watershed Assessments and RAQ scoring (provided in the LFT Workbook) provide a useful evaluation of the land cover/watershed relationships and initial risk assessment. These tools provide the Local Forestry Technical Team with resource management strategies at the subwatershed and minor watershed scales to more effectively implement the two goals in this plan.

10-Year Investment Plan

The table below summarizes acreage goals and estimated costs for implementing Goal 1 – Increase Forest Land Protection and Goal 2 – Promote Forest Stewardship. This information should be reviewed and integrated into the Redeye River 1W1P and used to help secure funding needed to implement the goals in this plan.

Table 9. 10-year forestry investment plan summary.

| No. | Subwatershed name | Goal 1 – Increase Forest Land Protection | | Goal 2 – Promote Forest Stewardship | |
|-----|-------------------|--|--------------------------------|-------------------------------------|--------------------------------|
| | | Acres | Public investment ^A | Plans / acres | Public investment ^B |
| 1 | Upper Leaf River | 13,343 | \$13,913,025 | 137 / 16,995 | \$109,600 |
| 2 | Bluff Creek | 5,011 | \$5,023,214 | 62 / 7,710 | \$49,600 |
| 3 | Middle Leaf River | 9,735 | \$9,528,402 | 93 / 11,532 | \$74,400 |
| 4 | Wing River | 10,088 | \$10,512,710 | 96 / 11,934 | \$76,800 |
| 5 | Redeye River | 13,660 | \$13,263,600 | 159 / 19,730 | \$127,200 |
| 6 | Lower Leaf River | 4,605 | \$4,543,393 | 39 / 4,903 | \$31,200 |
| | Totals | 56,442 | \$56,784,345 | 586 / 72,805 | \$468,800 |

^ACost assumes 50% of area in conservation easement and 50% in SFIA for 100 years.

^BCost assumes \$800 / stewardship plan plus - \$600 for the plan plus \$200 for outreach and administration costs. Public funds to be used to help underwrite costs of preparing forest stewardship plans. Assumes average parcel size of 124 acres. 50% of the plan writing cost to be cost shared.

Funding Sources

How will the implementation of this plan be funded? Experience has shown that landscape approaches to natural resource conservation tend to have a synergistic effect on funding. Partners that get involved in a landscape-scale project area do so because it meets some of their own resource or public relations goals. Because of this they can support efforts in the project area.

Landscape-scale, multi-partner, coordinated efforts often carry increased weight with foundations, trusts, and government agencies when it comes to applying for grants. Federal and state funding agencies as well as private foundations tend to look favorably on multi-partner project applications. There is a considerable amount of money available through grants and other programs that landscape stewardship approaches can facilitate.

The following is a list of potential resources available to the Forestry Technical Team to pursue in the project and funding development. The Team should maintain and grow this inventory to foster increased success in implementation of this Plan.

- BWSR capacity funds.
- DNR PFM Program – cost share and SFIA.
- Watershed based implementation funding (WBIF).
- Clean Water Legacy funding through BWSR, MPCA and DNR.
- LSOHC – big and small grants.
- LCCMR.
- US Endowment.

Private Sector Partnerships

As envisioned by the US Forest Service and state foresters, landscape stewardship projects seek to encourage and promote greater levels of private investments in ways to leverage public investments. Private woodland owners make significant investments in their own lands. These investments may not end up on the balance sheets of service provider agencies (although they sometimes do), but the investments private landowners make on their lands are no less important. The bottom line is that there will likely be more money and resources for coordination and implementation available in a more coordinated way for on-the-ground resource management work.

An untapped reservoir of funding may come from local businesses that will benefit from the results of the resource management activities taking place. For example, a local canoe outfitter may see benefit in financially aiding efforts that will result in maintenance or improvement in water quality in a local river. Family resorts, campgrounds and other businesses that benefit from clean water and healthy forests can promote and support the watershed-based landscape stewardship plans. By doing so, they can help promote opportunities for financial support at the community level through lake associations and chambers of commerce to encourage more businesses decide to project a “high quality forest and water – sustainable green” image where we can all benefit through win-win-win approaches.

Coordination Strategy # 5 – Support Accomplishment Reporting

Accomplishment reporting will be critical to evaluating the success of implementation efforts of this Plan over the next ten years. The table below provides a starting point for monitoring progress made by all partners. It should be maintained on an annual basis. The Forestry Technical Team will be responsible for organizing this information and sharing it with their local boards, DNR, and BWSR.

Table 10. Annual PFM accomplishment report summary table - template.

| | Upper Leaf River | Bluff Creek | Middle Leaf River | Wing River | Redeye River | Lower Leaf River |
|---|------------------|-------------|-------------------|-------------|--------------|------------------|
| Baseline | | | | | | |
| Total land area (acres) | 140,218 | 49,307 | 96,017 | 101,220 | 139,171 | 46,136 |
| Area of private ownership (acres; % of subwshd) | 128,626; 92% | 48,444; 98% | 93,722; 98% | 95,494; 94% | 128,564; 92% | 42,863; 93% |
| Private parcels <5 acres | 1,577 | 564 | 2,771 | 1,290 | 681 | 183 |
| Private parcels 5-20 acres | 608 | 167 | 366 | 317 | 305 | 113 |
| Private parcels >20 acres | 1,683 | 583 | 1,104 | 441 | 1,503 | 550 |
| Forest stewardship plans (#; acres) | 38; 4,889 | 21; 3,243 | 29; 3,620 | 33; 3,962 | 71; 7,976 | 21; 2,770 |
| General advice & assistance | | | | | | |
| Mailings | | | | | | |
| Workshops | | | | | | |
| Specific advice & assistance | | | | | | |
| Site visits | | | | | | |
| Forest stewardship plans | | | | | | |
| Grants/ cost-share projects | | | | | | |
| Forest restoration | | | | | | |
| Forest stand improvement | | | | | | |
| Forest management | | | | | | |
| Timber harvests | | | | | | |
| Biomass harvests | | | | | | |
| Land use controls | | | | | | |
| Riparian buffer plantings | | | | | | |
| Site-level guideline compliance | | | | | | |
| Incentive programs | | | | | | |
| SFIA | | | | | | |
| 2C | | | | | | |
| Conservation easements | | | | | | |
| Public | | | | | | |
| Private/nonprofit NGO | | | | | | |
| Fee title public land acquisition | | | | | | |
| Public land acquisitions | | | | | | |
| Land trades/ exchanges | | | | | | |

Template table to be completed annually by the Local Forestry Technical Team and distributed to DNR Forestry, local SWCD board and county boards, US FS, and the MFRC West Central Landscape Committee.

Coordination Strategy # 6 – Recommendations to Local and State Agencies

Recommendations to BWSR and SWCDs for the Redeye River 1W1P

1. MOUs. Complete the memorandum of understanding between DNR Forestry and BWSR on the new paradigm for PFM including landscape stewardship and comprehensive local water planning.
2. Reference Document. Adopt the Redeye River Watershed Landscape Stewardship Plan by reference for addressing forest land protection and forest stewardship topics in the Redeye River 1W1P. Attached the LSP as an appendix to the 1W1P.
3. Policy Integration. Incorporate the two forestry goals into the policy framework in the 1W1P.
4. Funding Coordination. Integrate the overall funding needs listed in the 10-Year Forestry Investment Plan – Summary Table into the 1W1P Implementation Schedule.

Recommendations to Redeye River Counties

1. Reference Document. Local land use officials are strongly encouraged to use this Plan as a reference document when developing their comprehensive plans to guide land use and public infrastructure decisions. They are further encouraged to adopt this landscape stewardship plan as an appendix to their plans to provide more detailed guidance on sustainable forest resource management and support more proactive and collaborative funding development.
2. Consider Forests in Local Land Use Decisions. Local officials are encouraged to consider the values and benefits that forests can bring to their communities. Healthy and sustainable forests promote a high quality of life for citizens and can support increased economic opportunities as well. Forests should be included in the land use decision making process.
3. Alternative Land Development Options. Local officials are encouraged to use forestry as a design tool to help them work more effectively with landowners and developers. There are alternative ways that land can be developed to provide for both economic growth and the protection of forest and water resources. Large lot developments are not always desirable or cost effective from the public sector or taxpayers perspectives.
4. Guide Growth to Existing Infrastructure. Use the maps from the minor watershed assessment / RAQ scoring and related tools to help inform local land use decisions. Guide growth and development towards existing roads and infrastructure and protection of larger blocks of working forest lands into interiors areas away from roads.

Recommendations to Lake Association Based Sustainability Committees

1. Convene meeting with lake associations to explore creating sustainable committees for larger recreational lakes in the watershed. The lake associations can serve as local leaders to grow landowner buy-in for forest land protection.
2. Explore setting up a trust fund to use as match for forest land protection on key properties.

Recommendations to Redeye River County Land Departments

1. Land Asset Management Programs. Continue to develop county land asset management programs that support guiding of growth and forest land protection areas. Use the maps from the minor watershed assessment / RAQ scoring and relevant PFM implementation tools for land protection to help protect working private forest lands adjacent to county forest lands.
2. Timber Sale Coordination. Continue to support active communications with adjacent private landowners on coordinating timbers sales and other forest management activities.
3. Forest Roads. Continue to support active communications with adjacent private landowners on the maintenance and improvement of forest roads and access issues.

Recommendations to state and federal programs for PFM policy changes and funding needed

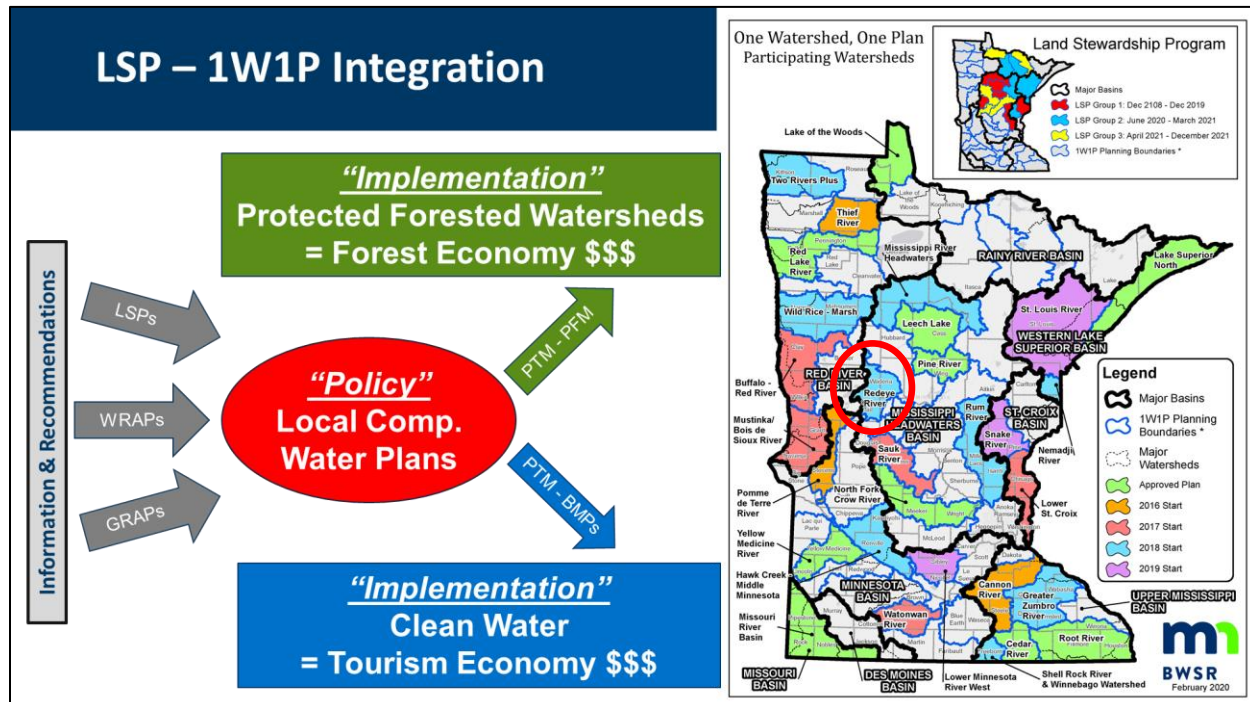
1. Integrate Landscape Stewardship Approaches into the PFM Program. Overall, encourage integrated service delivery between the broad range of agencies and organizations that serve private woodland owners to make delivery of their programs better coordinated, simpler and less costly in processing, and less time consuming.
2. Base PFM Program Funding. Increase and sustain funding for the private forest management program including support for SWCDs, consulting foresters, industry foresters and loggers.
3. Coordinated Landowner Outreach. Support efforts by local partners to focus, coordinate and increase landowner outreach efforts to promote forest land protection, forest stewardship plans, and increased forest management in priority areas identified in this LSP through the PTM/MWA/RAQ methodologies to meet the directive set forth by Governor Dayton in his November 2, 2016 letter to Minnesota Forest Industries – “accelerate outreach efforts with family forest landowners to increase harvest from private lands”.
4. Forest Habitat Priority Areas Planning. Support the updating of the 25-Year LSOHC Forest Habitat Vision developed by the MFRP and MFRC and the regional landscape committees. Support the collaborative development and integration of other conservation priority efforts that complement priorities identified in the watershed-based landscape stewardship plans.
5. ECS / NPC. Continue to promote the Ecological Classification System (ECS) and Native Plant Community modeling (NPC) from the MFRC landscape plans as guides to developing forest vegetation and land management strategies when working with landowners and local officials.
6. Ash Management. Prioritize funding towards proactively managing ash resources on private lands and increasing resilience of wet forest ecosystems to address emerald ash borer.
7. Source Water. Continued support from the Minnesota Department of Health to work with the LFT on projects through this the implementation of this plan that support and protect source water resources.
8. Climate Change and Carbon Sequestration. Support efforts by the LFT to address climate change and carbon sequestration through the implementation of this LSP including: 1) protect existing forestlands in the watershed from being converted to non-forested land uses, 2) improve forest management activities to increase carbon storage in the forest and associated wood products that come from the forests, and 3) support efforts by the LFT to assist interested landowners in the reforestation of their open lands.
9. Fire Management. Actively promote the implementation of the National Cohesive Wildland Fire Management Strategy including the three national goals: 1) Restore and Maintain Resilient Landscapes, 2) Fire Adapted Communities, and 3) Wildfire Response through the implementation of this plan. Provide resources to the LFT that support the integrated delivery of fire prevention and management efforts including the Firewise Program through delivery of PFM services to private landowners in this watershed.

Demonstration Projects

Demonstration projects can provide valuable insights to resource professionals and landowners. They can serve as starting points for the implementation of this Plan. The table below is a template for developing a 10-year demonstration project list on a subwatershed basis. This list summarizes potential projects with partners, initial priorities, and suggested timelines. One of the benefits and uses of project lists is they can help partners work together to develop shared priorities when pursuing additional funding. The Local Forestry Technical Team will be responsible for developing this list. The Team should periodically review and refine the 10-year project list.

| Map no. | Project name and brief description | Subwd / project priority | Lead entity / support entities | Proposed timeline |
|---------|---------------------------------------|--------------------------|--------------------------------|-------------------|
| | Upper Leaf River Subwatershed | | | |
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| | Bluff Creek Subwatershed | | | |
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| | Middle Leaf River Subwatershed | | | |
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| | Wing River Subwatershed | | | |
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| | Redeye River Subwatershed | | | |
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| | Lower Leaf River Subwatershed | | | |
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Linking Forest & Water Planning and Implementation through LSPs and 1W1Ps

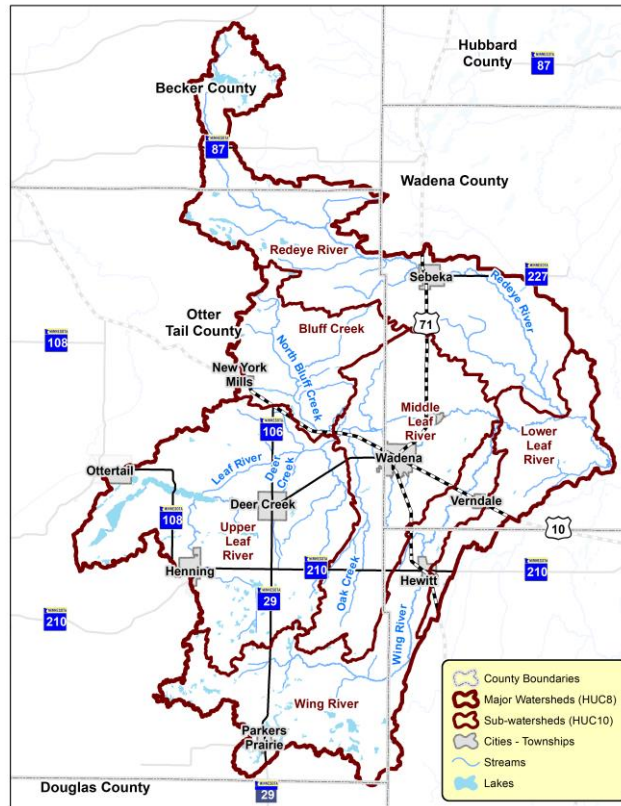


Note: Landscape stewardship plans (LSPs) like the MPCA Watershed Restoration and Protection Strategies (WRAPs) and the MDH Groundwater Restoration and Protection Strategies (GRAPs) provide important information and relevant context from state water and forest resource programs to inform comprehensive local water management (1W1Ps) processes. Members of the 1W1P committees are encouraged to consider the recommendations in this document for incorporation into their plans. Through the integration of landscape stewardship plans and 1W1Ps, conservation professionals and landowners are working together to address the following national priorities from the USDA Forest Service:

- Conserve Working Forest Lands.
- Protect Forests from Harm.
- Enhance Public Benefits from Trees and Forests.

*“A lake is the landscape’s most beautiful and expressive feature.
It is Earth’s eye;
looking into which the beholder measures the depth of his own nature.”*
- Henry David Thoreau

Index Information – Redeye River Major Watershed



| Subwd no. | Subwatershed name | HUC no. | Acres | No. of minors |
|-----------|-------------------|-----------|----------------|---------------|
| 1 | Upper Leaf River | 701010701 | 140,218 | 16 |
| 2 | Bluff Creek | 701010702 | 49,307 | 5 |
| 3 | Middle Leaf River | 701010703 | 96,017 | 14 |
| 4 | Wing River | 701010704 | 101,220 | 6 |
| 5 | Redeye River | 701010705 | 139,171 | 12 |
| 6 | Lower Leaf River | 701010706 | 46,136 | 5 |
| | Totals | | 572,069 | 58 |

