St. Louis River Watershed Landscape Stewardship Plan

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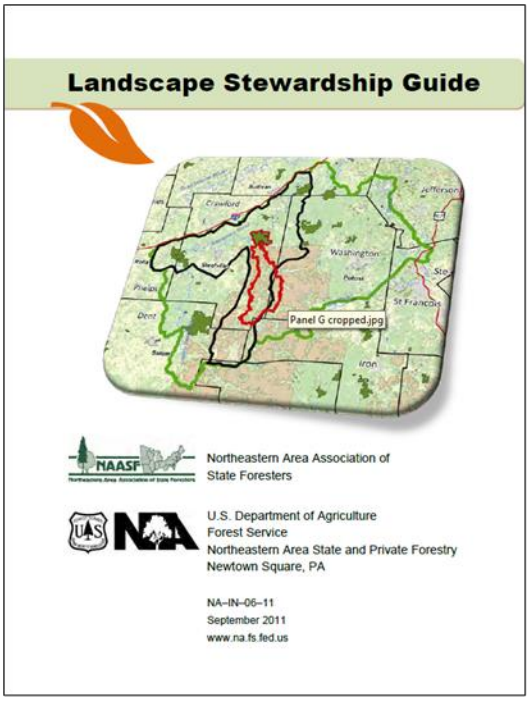
DEPARTMENT OF NATURAL RESOURCES

BOARD OF WATER AND SOIL RESOURCES

What is Landscape Stewardship?



Effective landscape conservation is a compelling challenge across the United States. Declining water quality, climate change, forest land conversions, wildfires, and invasive species are among many threats to our Nation's forests and the ecosystem services they provide. Forest lands 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 forest lands 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.

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Cover photo: "St Louis River Valley Minnesota" by Jim Brekke is licensed under CC BY-NC-ND 2.0.
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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.

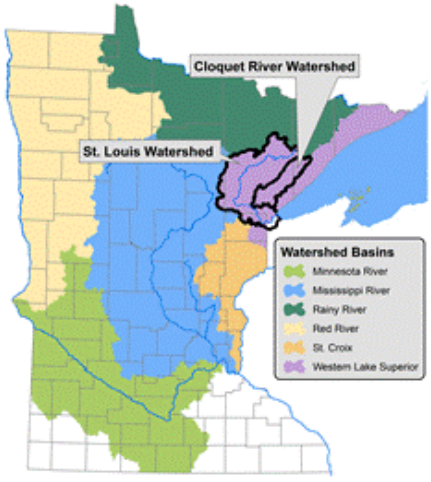
The St. Louis River and Cloquet River major watersheds in northeast Minnesota have numerous of lakes and streams, many of which are popular recreation destinations. The St. Louis and Cloquet rivers are also major suppliers of surface water to Lake Superior. Research of lakes and rivers by DNR Fisheries and the hydrologist Sandy Verry revealed the impacts of land use disturbance in a watershed and importance of protecting private lands. The St. Louis River and Cloquet River major watersheds are well-situated to advance the protection and management of working forest lands on a landscape level.

The St. Louis 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 St. Louis River and Cloquet River major watersheds are in Minnesota's Arrowhead Region. An assessment of the resources in these watersheds described in the first part of this plan found that:

- Forests and wetlands are largely intact, especially in the center of the region where much of the area is protected by public land and private wetlands.
- The forests and wetlands are more fragmented near the northern end of the region by mining, and the southern end by agriculture and development.
- Management activities over many years have significantly reduced coniferous species like tamarack, white pine, and white spruce while increasing deciduous species such as aspen, maple, and ash.
- High-quality water resources provide abundant recreation opportunities and source water for regional populations centers. 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.

In Minnesota water management planning is done on either the county or the major watershed (HUC 8) scale, and the goals or recommendations from the Landscape Stewardship Plans may be integrated into these water management plans. Major watershed-based water management plans are created through the One Watershed One Plan (1W1P) program administered by BWSR in partnership with local units of government. 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 St. Louis 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.

Analysis of Forest and Water Resources

Introduction

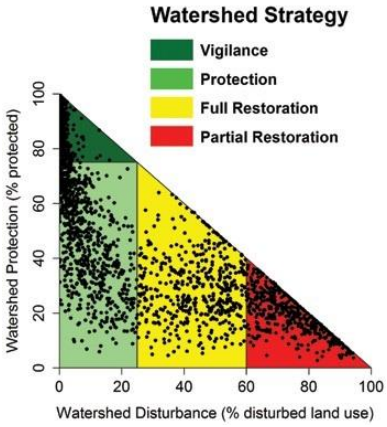
The first part of this plan provides background information on the setting of the St. Louis River Major Watershed and the conditions of its forest and water resources. It also introduces concepts to help increase the ability of service providers to deliver private forest management services.

Resource Context

The St. Louis River and Cloquet River major watersheds are the westernmost watersheds of the Lake Superior Basin. The Basin drains 49,000 square miles and encompasses parts of Michigan, Minnesota, Wisconsin, and Ontario. The outlet is the Soo Locks on the St. Marys River by Sault Ste. Marie. As its name implies, the Lake Superior Basin is home to Lake Superior, which is world's largest freshwater lake (by surface area) and contains 10% of all the earth's fresh surface water.

The St. Louis River and Cloquet River both originate in Lake County and run in a southwestern direction parallel to the north shore of Lake Superior. The St. Louis River turns southeast and merges with the Cloquet River by Brookston, then continues to flow into Lake Superior by Duluth. Together these watersheds drain about 3,655 square miles and are composed of 22 HUC 10 subwatersheds (Fig 2) which correspond to major streams and lakes in the region. The subwatersheds are further subdivided into 244 minor watersheds (HUC 14), each averaging 15 square miles.

Fig 1. Watershed categorization framework.



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 are in the "Protection" or "Vigilance" categories, although a few "Full Protection" catchments are located by the Iron Range in the north, and Duluth in the south.

Fig 2. St. Louis River major and subwatersheds.

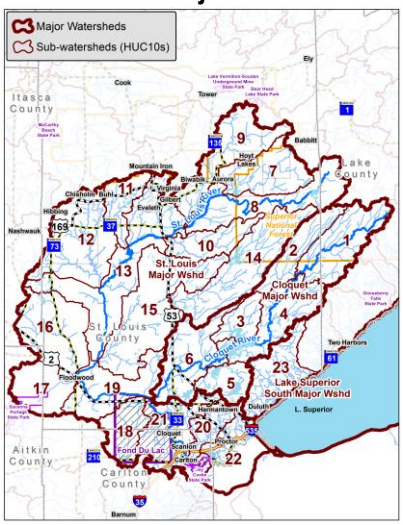
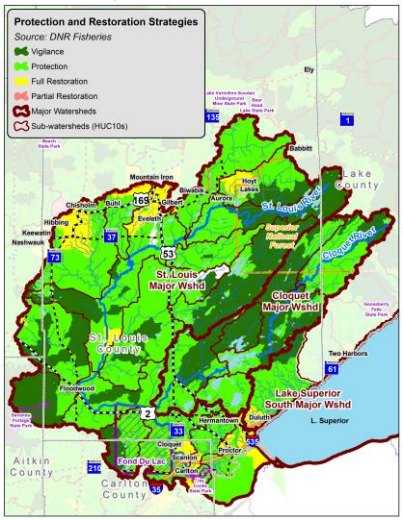


Fig 3. Protection/Restoration classifications.

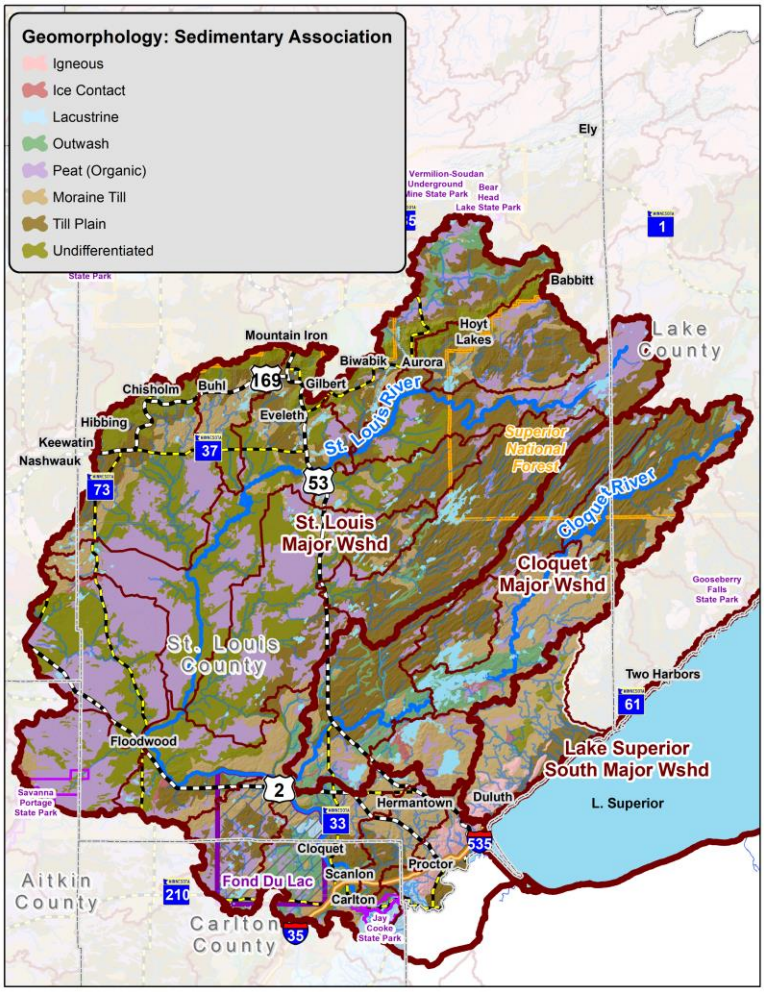


Geomorphology

The St. Louis River and Cloquet River major watersheds have a diverse geomorphology. As shown in the map below the area near the border between the two major watersheds is a rolling drumlin plain with the drumlins orientated in a northeast-southwest direction. Near the northern border and the Iron Range communities is a complex of outwash deposits, rolling till plains, and end moraines. The western part of the St. Louis River Major Watershed is a flat landscape that is dominated by shallow water lake sediments and large contiguous peatlands with small islands of upland mineral soil. Closer to Duluth are rolling to hummocky end moraines and level to rolling outwash plains.

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 plans. 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 Cloquet and St. Louis River major watersheds.



Land Cover

Prior to European settlement, the Cloquet and St. Louis River major watersheds were covered by forests, wetlands, and lakes (Fig 5 and Table 1). Today, the landscape remains 85% forested with significant amounts of wetlands - including forested wetlands - in the west central part of the watershed, which was once covered by Glacial Lake Upham. Pockets of development, agriculture, and barren land from mining are also present throughout the landscape (Fig 6). Development is concentrated around Duluth and its suburbs, as well as the communities along the Iron Range near the watershed's northern border. The Iron Range also has significant amounts of barren land because of iron ore mining. Agriculture is more common in the western half of the watershed, particularly around communities such as Cherry, Meadowlands, and Esko.

Fig 5. Historic vegetation Cloquet and St. Louis River major watersheds.

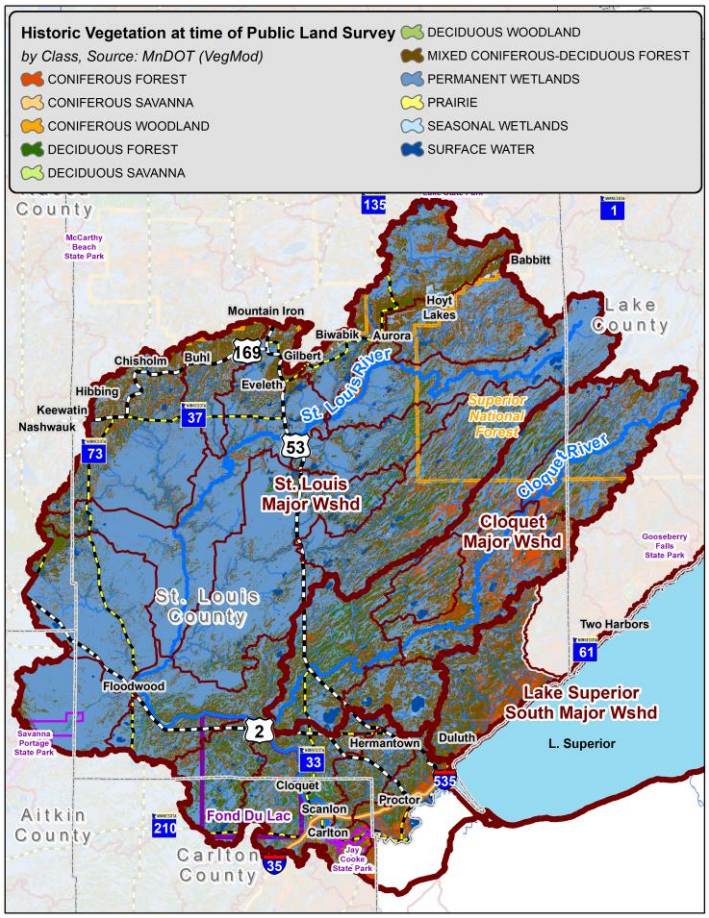
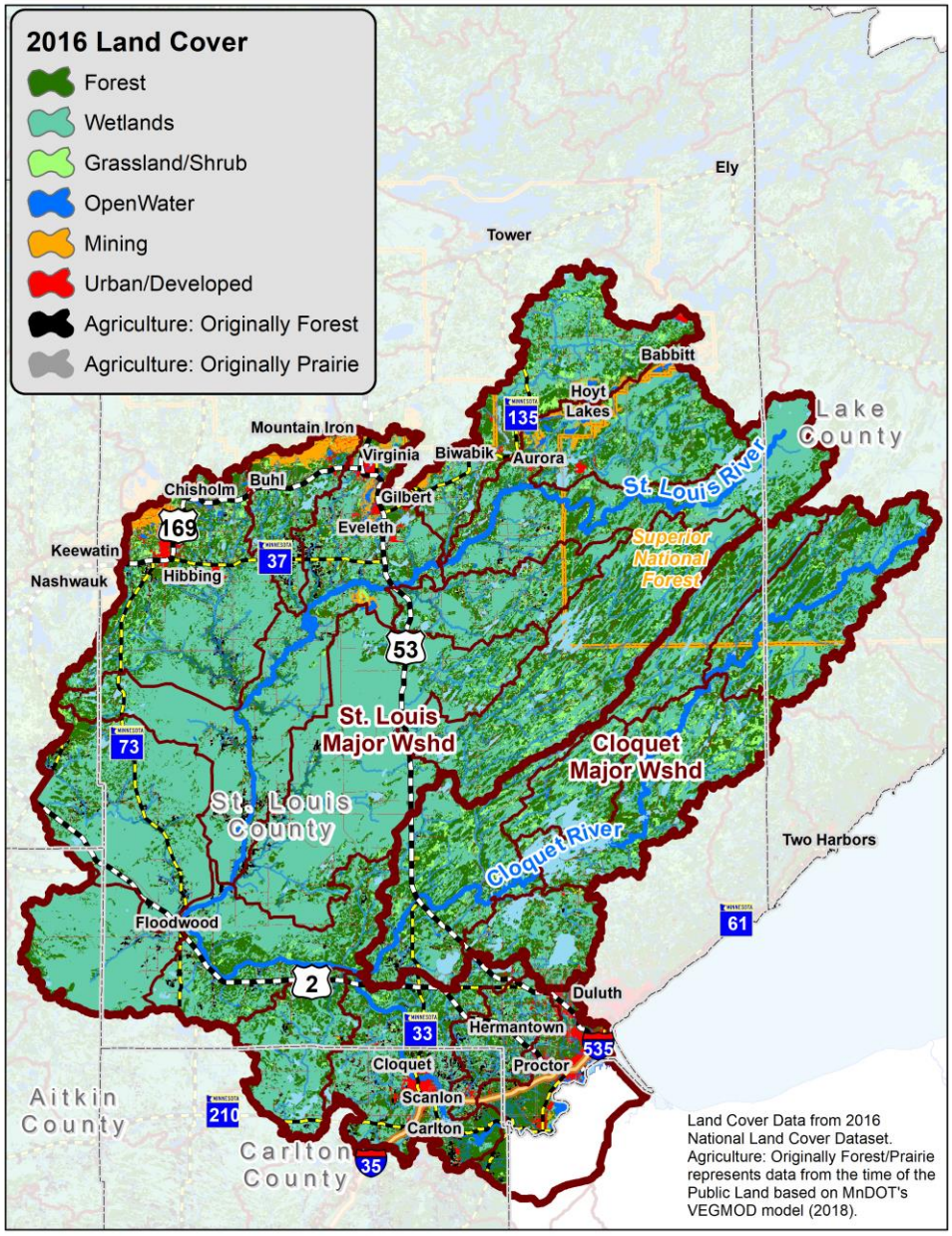


Table 1. Historic and current land cover comparison.

Land cover description	Pre-European settlement		2016	
	Acres	%	Acres	%
Urban and rural development	0	0%	100,068	4%
Cultivated land	0	0%	3,141	0%
Prairie – Hay/pasture/grassland	1,693	0%	75,067	3%
Forest	2,258,749	93%	1,987,518	81%
Upland shrub	0	0%	89,310	4%
Water	64,949	3%	88,427	4%
Bog/marsh/fen	106,379	4%	72,200	3%
Mining	0	0%	26,986	1%

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

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

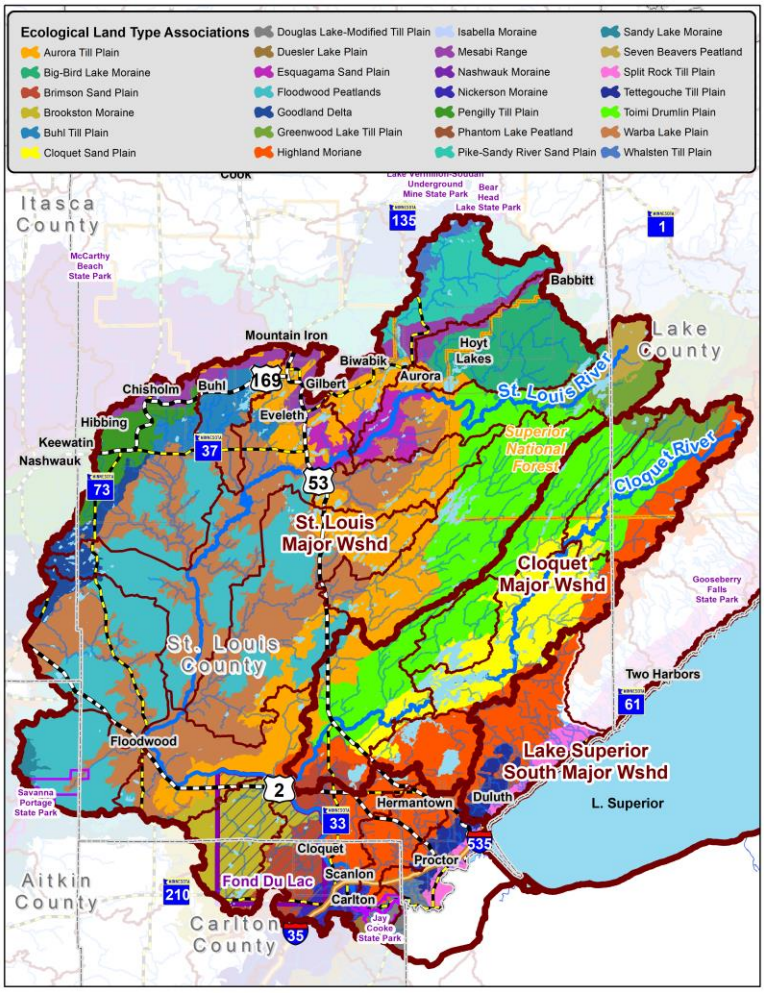


Ecological Setting

The St. Louis River and Cloquet River major watersheds are located entirely in the Laurentian Mixed Forest Province and is split between the Northern Superior Uplands and the Northern Minnesota Drift & Lake Plains ECS Sections. A small portion of the region near its southern end also intersects with the Southern and Western Superior Uplands ECS Sections. At the ECS Subsection level the region intersects with eight different Subsections, although 80% is covered by just three: Tamarack Lowlands (43%), North Shore Highlands (22%), and Toimi Uplands (15%).

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 St. Louis River and Cloquet River major watersheds have portions of 27 LTAs (Fig 7), although half of the area is covered by only four of them: the Warba Lake Plain (17% of region), Toimi Drumlin Plain (15%), Floodwood Peatlands (13%), and Aurora Till Plain (12%).

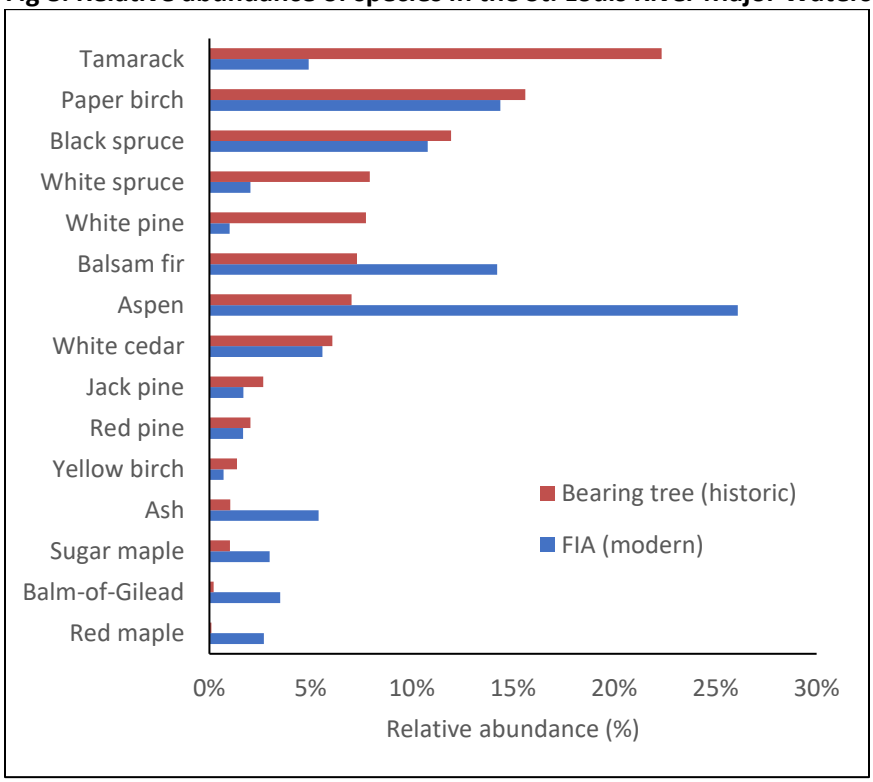
Fig 7. Land Type Associations (LTAs) of the St. Louis River Major Watershed.



Prior to European settlement the vegetation was highly variable. In the western half of the region – which corresponds to the Northern Minnesota Drift & Lakes Plain ECS Subsection – the vegetation was dominated by lowland conifers (black spruce, tamarack, and white cedar) and lowland hardwoods (black ash). Sedge meadows were also extensive. Uplands supported aspen-birch and upland conifer forest. The remainder of the region the vegetation was a mixture of coniferous and deciduous trees. The uplands supported aspen-birch, white pine-red pine, and mixed hardwood-pine forests. Wetland vegetation included conifer bogs and swamps.

As a result of land conversion and logging of northern 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 significantly. In the area around the St. Louis River Major Watershed the forest shifted away from conifers and towards deciduous species (Fig 8). Aspen is now the most common trees species and is found in both pure and mixed stands throughout the watershed.

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

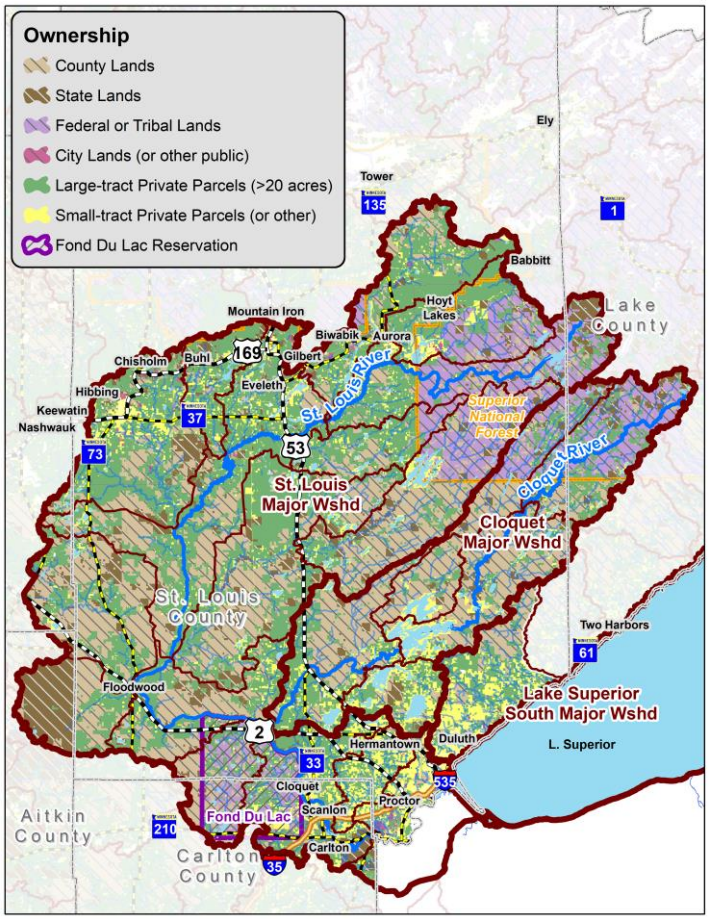


Land Ownership

Land ownership in the St. Louis River and Cloquet River major watersheds is split between many different public and private entities, but public ownership is slightly higher with 54% of the area under federal, state, or county management. In general, public ownership is highest in the center of the watershed where St. Louis County manages large holdings of tax-forfeited lands. State lands are scattered throughout the region in the form of school trust lands, state forests, wildlife management areas, and state parks. Lastly, the Superior National Forest Manages a sizeable area in the northeastern portion of this region.

Private land is distributed across the landscape but is more concentrated in the area around Duluth and the Iron Range. Most of the private land is managed by family forests or farm owners, but Industry owners such as mining corporations, Minnesota Power, and Potlatch also manage large blocks.

Fig 9. Private and public land ownership.



Social and Economic Context

Census data from 2010 estimates that the population of all minor civil divisions in the St. Louis River and Cloquet River major watersheds is 215,647, or 4.1% of Minnesota's population. Despite its relatively low population, this region provides outsized social and economic services.

The St. Louis River and Cloquet River major watersheds are a popular recreation destination that draws tourists from across the state to visit its 500+ lakes and 4,300+ miles of streams. The most famous of these is Lake Superior along with the St. Louis and Cloquet rivers. This region is also 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 communities within the watershed, as well as population centers along the shores of the Great Lakes and St. Lawrence River. In fact, in the Forests, Water, and People study by the Forest Service, the St. Louis River and Cloquet River major watersheds were ranked as the 10th and 31st most important major watersheds, respectively, in all of Minnesota for providing drinking water.

To continue producing high quality drinking water, the forests and wetlands in the St. Louis 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.

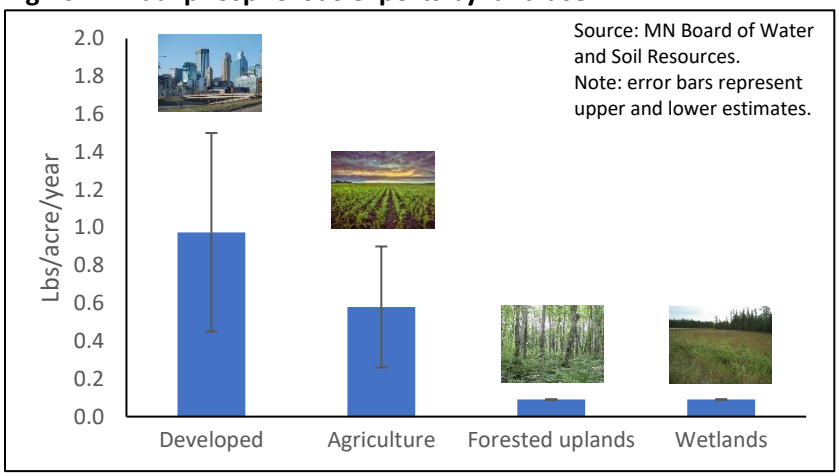
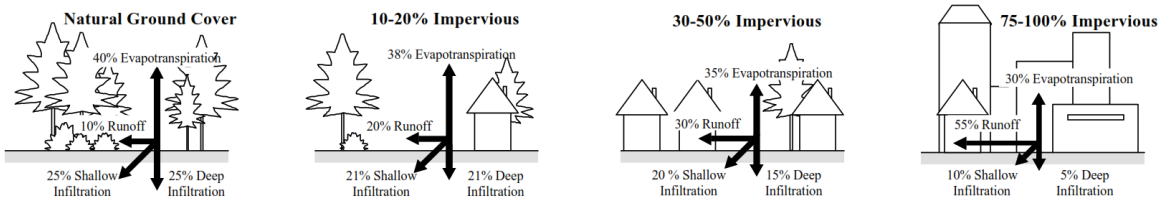


Fig 11. Effects of imperviousness on runoff and infiltration.



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.

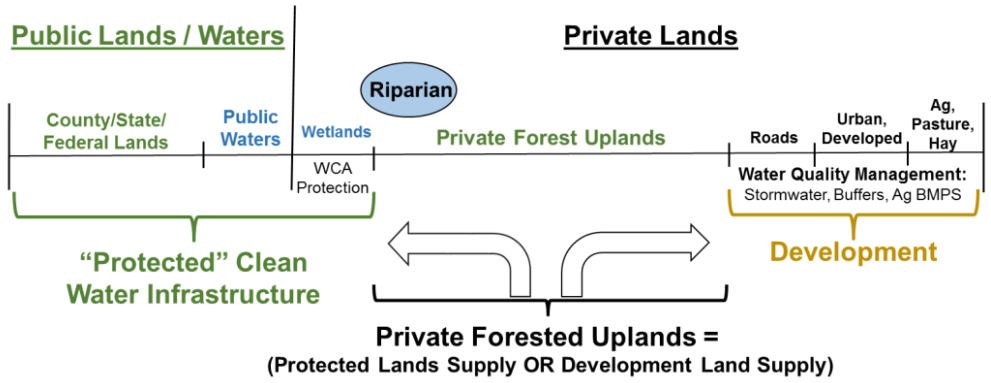


Fig 12. Generalized Land Protection Model.

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. A summary of these drivers for each subwatershed is provided in the table below.

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

Subwatershed name	Drivers of quality	Drivers of risk
Headwaters Cloquet River	• Trout streams • Wild rice lakes • High and outstanding lakes of biodiversity significance	
West Branch Cloquet River	• Trout streams • High terrestrial biodiversity scores • High Forests for the Future scores	
Boulder Lake Reservoir-Boulder Creek	• High and outstanding lakes of biodiversity significance • High terrestrial biodiversity scores	

Subwatershed name	Drivers of quality	Drivers of risk
Island Lake Reservoir-Cloquet River	• High and outstanding lakes of biodiversity significance • Trout lakes • Wild rice lakes • High terrestrial biodiversity scores • High Forests for the Future scores • High quality upland forests	• Declining water quality trends • Phosphorous sensitive lakes
Fish Lake Reservoir-Beaver River	• High and outstanding lakes of biodiversity significance • Wild rice lakes • High quality upland forests	• Phosphorous sensitive lakes • Development
Cloquet River	• Trout streams	
Partridge River	• High terrestrial biodiversity scores	• Mining
Headwaters St. Louis River	• High and outstanding lakes of biodiversity significance • Wild rice lakes • High terrestrial biodiversity scores • High Wildlife Action Network rankings	
Embarrass River	• Trout lakes • Wild rice lakes	• Declining water quality trends
Mud Hen Creek		
West Two River		• Mining, development, and agriculture
West Swan River-East Swan River		• Development • Wetland ditching and draining
Sand Creek-St. Louis River		• Phosphorous sensitive lakes • Development and agriculture
Upper Whiteface River	• Trout streams • High and outstanding lakes of biodiversity significance • Wild rice lakes	
Lower Whiteface River	• High and outstanding lakes of biodiversity significance • Wild rice lakes	
Floodwood River	• High terrestrial biodiversity scores	• Wetland ditching and draining
East Savanna River	• High terrestrial biodiversity scores • High Wildlife Action Network rankings	
Stoney Brook	• High and outstanding lakes of biodiversity significance • Wild rice and priority shallow lakes	
Artichoke River-St. Louis River		• Agriculture
Midway River	• Trout streams, including cold spring-fed streams • High stream density	• Development • Agriculture
Thompson Reservoir-St. Louis River	• Trout streams, including cold spring-fed streams	• Development • Agriculture
St. Louis River	• Trout streams • Wild rice lakes	• Development

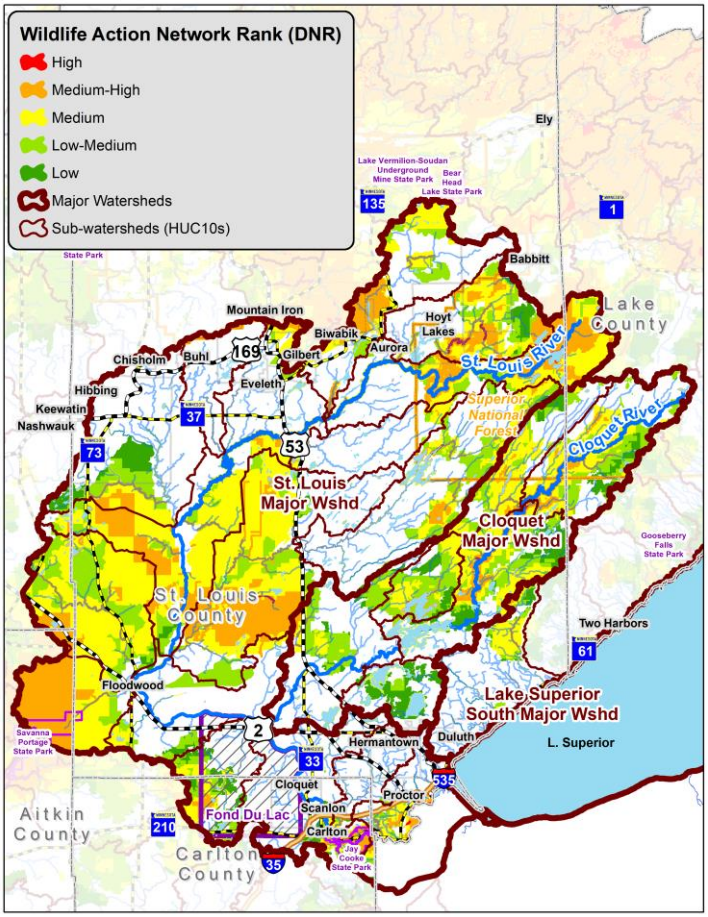
Subwatershed name	Drivers of quality	Drivers of risk
City of Duluth / Lake Superior Frontal	• Trout streams	• Parcelization and fragmentation • Development

Forest Conservation Opportunity Areas

The following list of existing conservation priorities in the St. Louis River Major Watershed have been identified by various state agencies and environmental organizations. As noted previously, these resources were consulted by the St. Louis 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.
- St. Louis River Headwaters 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.

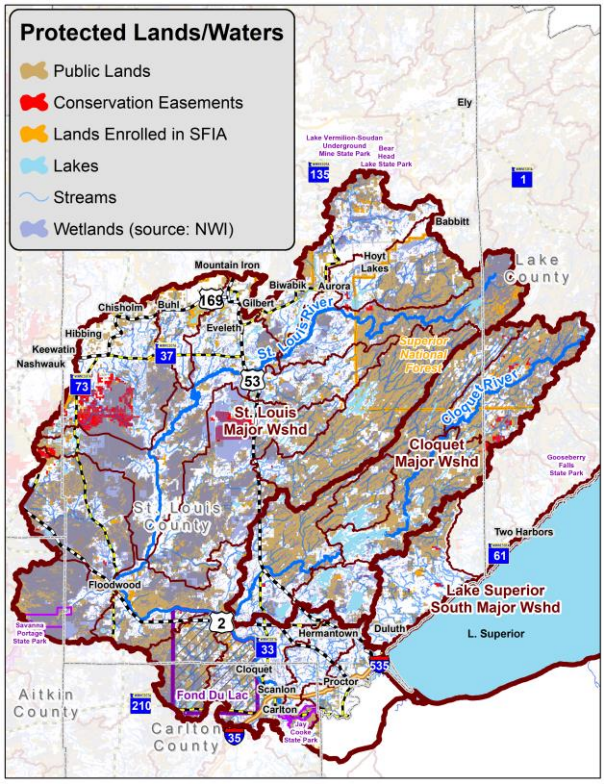


Key Observations and Conclusions

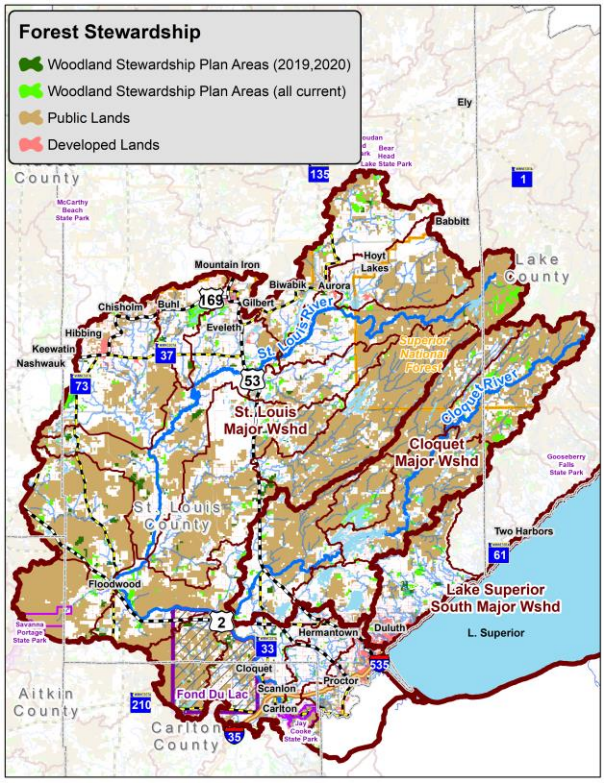
The following key observations and conclusions are based on the information gathered during the planning process for this landscape stewardship plan:

- The St. Louis River and Cloquet River major watersheds have some of the finest freshwater lakes and rivers in the state with good water quality thanks to relatively high forest cover, intact wetlands, and mostly natural (not channelized) streams.
- There is significant potential for loss of private forest lands and an increase in landscape disturbance in the areas around Duluth and Cloquet in the southern part of the region.
- 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.
- Sappi Fine Paper is the only remaining major forest industry within this region. Nearby mills include Savanna Pallets and Blandin Paper Company. These industries use a mix of conifer and deciduous species. 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.
- This watershed supports the move towards managing for ECS / NPC based forest management including long lived conifers while at the same time supports an array of upland and lowland deciduous species. Managing for native plant communities and healthier forests benefits the hydrologic functions of the watersheds. In addition, the mix of forest industries creates opportunities to support the sustainable management of all forest cover types in the watershed.
- The Northeast Landscape Plan approved by the Minnesota Forest Resources Council (MFRC) provides useful guidance for forest vegetation management based on native plant communities across the 4-county region including this watershed. The Council's site level guidelines provide detailed guidance for forest management activities on a site level. Combined, the landscape and site level guidance provide excellent foundations for service providers in advising private landowners on ways to sustainably manage their woodlands.

Forest Land Protection – Current Status



Private Forest Stewardship – Current Status



For more information – see the Appendix and the LFT Workbook.

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The Vision

Mission

To empower teams of service providers to work together with private landowners and land managers in the St. Louis 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 St. Louis 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 – 69%. Goal – 75%.
- Subwatershed levels (HUC 10): Current levels range from 27% to 95%. Goal – 75% across most subwatersheds, although in some subwatersheds this is not possible and the goals are set at the upper end of the potential to protect.
- Minor watershed levels (HUC 14): Current levels average 67% but range from 0-100%. Protection goals set by the LSP Planning Team will protect an additional 132,433 acres across 130 minors.

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

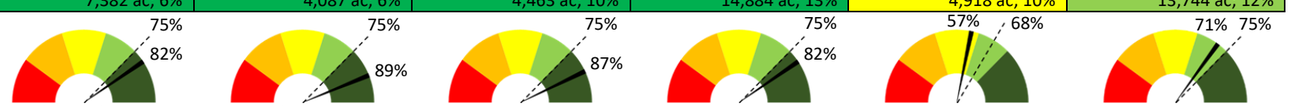
- DNR + BWSR: administrative lead.
- DNR CFM: PFM program coordination.
- SWCDs: local lead, outreach, plans, 1W1P.
- Consulting foresters: plans, timber sales.
- Loggers/vendors: forest management.
- Landowners: Its their land.

Goal 1: Forest Land Protection – Cloquet River Major Watershed

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 tables below summarizes the results of the calculations made for each subwatershed through the subwatershed assessment process.

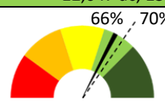
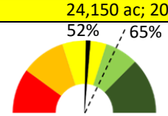
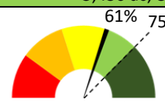
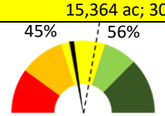
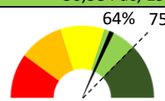
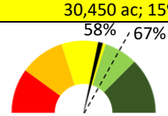
	Subwd. No 1 (HUC 401020201) Headwaters Cloquet River	Subwd. No 2 (HUC 401020202) West Branch Cloquet River	Subwd. No 3 (HUC 401020203) Boulder Lake Reservoir-Boulder Creek	Subwd. No 4 (HUC 401020204) Island Lake Reservoir-Cloquet River	Subwd. No 5 (HUC 401020205) Fish Lake Reservoir-Beaver River	Subwd. No 6 (HUC 401020206) Cloquet River
Area	116,853 ac	67,656 ac	43,127 ac	113,277 ac	48,471 ac	118,186 ac
Natural Factors						
Presettlement forest cover	88%	87%	94%	90%	91%	92%
Current forest cover	92%	92%	81%	75%	75%	83%
Lakes	27 lakes; 2%	7 lakes; 2%	6 lakes; 9%	56 lakes; 11%	8 lakes; 15%	23 lakes; 3%
Wetlands	31%	37%	31%	26%	28%	29%
Forest Land Protection Assessment						
Public waters	2,616 ac; 2%	1,727 ac; 3%	4,050 ac; 9%	13,218 ac; 12%	7,453 ac; 15%	4,158 ac; 4%
Public lands	77,827 ac; 67%	54,413 ac; 80%	30,746 ac; 71%	72,829 ac; 64%	8,966 ac; 18%	61,409 ac; 52%
Private wetlands	11,979 ac; 10%	3,279 ac; 5%	2,330 ac; 5%	5,685 ac; 5%	10,705 ac; 22%	17,192 ac; 15%
SFIA	1,714 ac; 1.5%	402 ac; 0.6%	283 ac; 0.7%	908 ac; 0.8%	465 ac; 1.0%	413 ac; 0.3%
Easements	2,063 ac; 1.8%	118 ac; 0.2%	0 ac; 0.0%	510 ac; 0.5%	21 ac; 0.0%	107 ac; 0.1%
Total protected area	96,205 ac; 82%	59,983 ac; 89%	37,408 ac; 87%	93,150 ac; 82%	27,610 ac; 57%	83,363 ac; 71%
Protection priority	Low	Low	Low	Low	High	High
Forest Land Protection Cost Analysis						
Minor watershed protection goal total*	1,826 ac to goal	71 ac to goal	21 ac to goal	2,264 ac to goal	4,824 ac to goal	8,569 ac to goal
Subwatershed protection goal*	0 ac to goal	0 ac to goal	0 ac to goal	0 ac to goal	5,350 ac to goal	5,277 ac to goal
Potential to protect	11,931 ac; 10%	4,770 ac; 7%	2,862 ac; 7%	9,315 ac; 8%	5,691 ac; 12%	15,736 ac; 13%
Average land value	$873/ac	$895/ac	$939/ac	$1,477/ac	$1,803/ac	$1,190/ac
Minor watershed protection cost total†	$1,746,523	$65,121	$19,556	$3,177,552	$5,814,774	$8,976,368
Subwatershed protection cost†	$0	$0	$0	$0	$6,376,185	$5,317,914
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%	3 lakes; 0%	0 lakes; 0%	0 lakes; 0%
Lakes of biodiversity significance (outstanding & high)	4 lakes; 0%	4 lakes; 2%	1 lake; 9%	6 lakes; 8%	2 lakes; 13%	2 lakes; 2%
Priority shallow lakes	0 lakes; 0%	0 lakes; 0%	0 lakes; 0%	0 lakes; 0%	0 lakes; 0%	0 lakes; 0%
Wild rice lakes	16 lakes; 1%	4 lakes; 2%	0 lakes; 0%	14 lakes; 3%	3 lakes; 8%	3 lakes; 2%
Trout steams	64 mi	27 mi	8 mi	14 mi	5 mi	90 mi
FFF mean composite score	93.8	95.2	85.0	95.2	81.7	81.5
Terrestrial biodiversity (MBS) (outstanding and high)	21,024 ac; 18%	15,830 ac; 23%	17,653 ac; 41%	39,856 ac; 35%	0 ac; 0%	7,703 ac; 7%
Wildlife Action Network (high & medium-high)	11,989 ac; 10%	3,322 ac; 5%	4,308 ac; 10%	12,310 ac; 11%	0 ac; 0%	3,200 ac; 3%
Risk Management Factors						
Lake phosphorous sensitivity (highest & higher)	3 lakes; 442 ac	1 lake; 424 ac	0 lakes; 0 ac	6 lakes; 1,059 ac	2 lakes; 3,643 ac	4 lakes; 1,870 ac
Water quality trend (declining)	0 lakes; 0 ac	0 lakes; 0 ac	0 lakes; 0 ac	4 lakes; 2,592 ac	0 lakes; 0 ac	2 lakes; 243 ac
Land use disturbance	7,382 ac; 6%	4,087 ac; 6%	4,463 ac; 10%	14,884 ac; 13%	4,918 ac; 10%	13,744 ac; 12%

HUC 10 Protection Levels and Goals‡



*The LSP Planting Team set separate subwatershed (HUC10) and minor watershed (HUC14) protection goals. The acres to goal and protection cost between the minor and subwatershed goals in this table are overlapping, not additive – see the subwatershed action plans for more details.
*Occasionally the overall subwatershed protection goal has been met, but individual minors in the subwatershed are still in need of greater protection.
†Protection cost assumes 50% conservation easement and 50% SFIA.
‡Solid lines represent current level of protection, dashed line is the goal.

Goal 1: Forest Land Protection – Upper Reaches of the St. Louis River Major Watershed

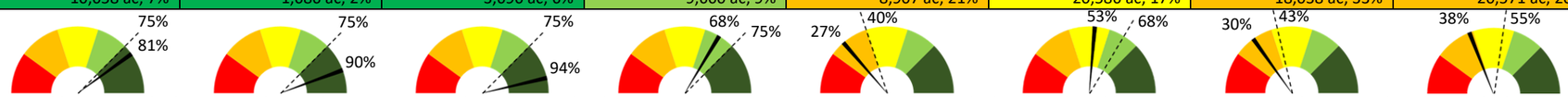
	Subwd. No 7 (HUC 401020101) Partridge River	Subwd. No 8 (HUC 401020102) Headwaters St. Louis River	Subwd. No 9 (HUC 401020103) Embarrass River	Subwd. No 10 (HUC 401020104) Mud Hen Creek	Subwd. No 11 (HUC 401020105) West Two River	Subwd. No 12 (HUC 401020106) West Swan River-East Swan River	Subwd. No 13 (HUC 401020107) Sand Creek-St. Louis River	Subwd. No 14 (HUC 401020108) Upper Whiteface River	Subwd. No 15 (HUC 401020109) Lower Whiteface River
Area	99,890 ac	133,795 ac	120,480 ac	64,795 ac	50,708 ac	159,875 ac	209,317 ac	167,740 ac	207,751 ac
Natural Factors									
Presettlement forest cover	90%	86%	92%	87%	96%	97%	95%	92%	92%
Current forest cover	79%	88%	74%	86%	63%	74%	82%	86%	87%
Lakes	7 lakes; 3%	28 lakes; 3%	28 lakes; 2%	13 lakes; 3%	9 lakes; 3%	14 lakes; 1%	24 lakes; 1%	29 lakes; 4%	41 lakes; 2%
Wetlands	31%	44%	31%	42%	18%	36%	46%	34%	57%
Forest Land Protection Assessment									
Public waters	3,508 ac; 4%	5,545 ac; 4%	3,390 ac; 3%	2,369 ac; 4%	1,943 ac; 4%	1,745 ac; 1%	4,019 ac; 2%	8,190 ac; 5%	4,832 ac; 2%
Public lands	47,325 ac; 47%	80,343 ac; 60%	35,462 ac; 29%	23,753 ac; 37%	11,573 ac; 23%	55,926 ac; 35%	74,827 ac; 36%	132,020 ac; 79%	100,007 ac; 48%
Private wetlands	14,247 ac; 14%	14,878 ac; 11%	20,716 ac; 17%	12,030 ac; 19%	6,173 ac; 12%	25,958 ac; 16%	37,810 ac; 18%	8,325 ac; 5%	52,304 ac; 25%
SFIA	40 ac; 0.0%	2,853 ac; 2.1%	2,457 ac; 2.0%	1,232 ac; 1.9%	3,156 ac; 6.2%	4,708 ac; 2.9%	3,780 ac; 1.8%	281 ac; 0.2%	2,167 ac; 1.0%
Easements	437 ac; 0.4%	587 ac; 0.4%	41 ac; 0.0%	28 ac; 0.0%	30 ac; 0.1%	13,308 ac; 8.3%	165 ac; 0.1%	78 ac; 0.0%	1,558 ac; 0.8%
Total protected area	65,633 ac; 66%	104,485 ac; 78%	62,324 ac; 52%	39,815 ac; 61%	22,911 ac; 45%	102,314 ac; 64%	121,406 ac; 58%	149,021 ac; 89%	161,715 ac; 78%
Protection priority	Medium	Low	Medium	Medium	Medium	High	Medium	Low	Low
Forest Land Protection Cost Analysis									
Minor watershed protection goal total*	3,127 ac to goal	8,446 ac to goal	8,659 ac to goal	4,489 ac to goal	5,006 ac to goal	14,849 ac to goal	15,189 ac to goal	994 ac to goal	1,073 ac to goal
Subwatershed protection goal*	4,290 ac to goal	0 ac to goal	15,988 ac to goal	8,782 ac to goal	5,486 ac to goal	17,593 ac to goal	18,836 ac to goal	0 ac to goal	0 ac to goal
Potential to protect	18,289 ac; 18%	11,599 ac; 9%	29,322 ac; 24%	8,813 ac; 14%	10,425 ac; 21%	26,805 ac; 17%	27,914 ac; 13%	7,765 ac; 5%	9,386 ac; 5%
Average land value	$629/ac	$834/ac	$682/ac	$786/ac	$763/ac	$662/ac	$796/ac	$854/ac	$641/ac
Minor watershed protection cost total†	$2,662,956	$7,792,132	$7,531,632	$3,985,735	$4,587,971	$12,907,607	$13,998,139	$873,493	$930,767
Subwatershed protection cost†	$3,600,932	$0	$13,672,782	$7,783,426	$4,824,852	$14,941,748	$16,753,715	$0	$0
Forest Land Protection Priorities									
Quality Protection Factors									
Cisco lakes	0 lakes; 0%	0 lakes; 0%	1 lake; 0%	0 lakes; 0%	0 lakes; 0%	0 lakes; 0%	0 lakes; 0%	0 lakes; 0%	0 lakes; 0%
Trout lakes	0 lakes; 0%	1 lake; 0%	1 lake; 0%	0 lakes; 0%	0 lakes; 0%	0 lakes; 0%	0 lakes; 0%	0 lakes; 0%	0 lakes; 0%
Lakes of biodiversity significance (outstanding & high)	0 lakes; 0%	6 lakes; 2%	3 lakes; 0%	2 lakes; 1%	0 lakes; 0%	0 lakes; 0%	0 lakes; 0%	5 lakes; 3%	6 lakes; 0%
Priority shallow lakes	0 lakes; 0%	0 lakes; 0%	0 lakes; 0%	0 lakes; 0%	0 lakes; 0%	1 lake; 0%	0 lakes; 0%	0 lakes; 0%	0 lakes; 0%
Wild rice lakes	2 lakes; 1%	10 lakes; 2%	17 lakes; 2%	5 lakes; 2%	0 lakes; 0%	1 lake; 0%	5 lakes; 1%	4 lakes; 3%	13 lakes; 1%
Trout steams	11 mi	0 mi	0 mi	0 mi	0 mi	0 mi	0 mi	24 mi	0 mi
FFF mean composite score	94.6	84.5	91.1	87.3	74.1	75.9	78.4	83.8	83.1
Terrestrial biodiversity (MBS) (outstanding and high)	26,034 ac; 26%	61,829 ac; 46%	162 ac; 0%	1,686 ac; 3%	0 ac; 0%	11,392 ac; 7%	33,432 ac; 16%	11,138 ac; 7%	0 ac; 0%
Wildlife Action Network (high & medium-high)	17,525 ac; 18%	40,138 ac; 30%	16,717 ac; 14%	1,409 ac; 2%	84 ac; 0%	5,964 ac; 4%	34,026 ac; 16%	7,697 ac; 5%	47,801 ac; 23%
Risk Management Factors									
Lake phosphorous sensitivity (highest & higher)	2 lakes; 1,830 ac	3 lakes; 408 ac	3 lakes; 912 ac	2 lakes; 420 ac	0 lakes; 0 ac	0 lakes; 0 ac	5 lakes; 1,290 ac	1 lake; 303 ac	1 lake; 153 ac
Water quality trend (declining)	1 lake; 539 ac	0 lakes; 0 ac	2 lakes; 755 ac	1 lake; 280 ac	0 lakes; 0 ac	0 lakes; 0 ac	0 lakes; 0 ac	1 lake; 303 ac	1 lake; 205 ac
Land use disturbance	12,647 ac; 13%	9,010 ac; 7%	24,150 ac; 20%	5,436 ac; 8%	15,364 ac; 30%	30,384 ac; 19%	30,450 ac; 15%	14,239 ac; 8%	10,005 ac; 5%
HUC 10 Protection Levels and Goals‡									

*The LSP Planting Team set separate subwatershed (HUC10) and minor watershed (HUC14) protection goals. The acres to goal and protection cost between the minor and subwatershed goals in this table are overlapping, not additive – see the subwatershed action plans for more details.
*Occasionally the overall subwatershed protection goal has been met, but individual minors in the subwatershed are still in need of greater protection.
†Protection cost assumes 50% conservation easement and 50% SFIA.
‡Solid lines represent current level of protection, dashed line is the goal.

Goal 1: Forest Land Protection – Lower Reaches of the St. Louis River Major Watershed

	Subwd. No 16 (HUC 401020110) Floodwood River	Subwd. No 17 (HUC 401020111) East Savanna River	Subwd. No 18 (HUC 401020112) Stoney Brook	Subwd. No 19 (HUC 401020113) Artichoke River-St. Louis River	Subwd. No 20 (HUC 401020114) Midway River	Subwd. No 21 (HUC 401020115) Thompson Reservoir-St. Louis River	Subwd. No 22 (HUC 401020116) St. Louis River	Subwd. No 23 (HUC 401010204) City of Duluth-Frontal Lake Superior
Area	146,859 ac	78,032 ac	64,710 ac	109,012 ac	42,494 ac	122,162 ac	53,848 ac	102,141 ac
Natural Factors								
Presettlement forest cover	96%	99%	90%	96%	98%	95%	85%	96%
Current forest cover	81%	91%	85%	85%	76%	77%	55%	79%
Lakes	32 lakes; 2%	3 lakes; 0%	22 lakes; 5%	13 lakes; 1%	1 lake; 0%	17 lakes; 1%	5 lakes; 1%	9 lakes; 0%
Wetlands	59%	74%	49%	35%	21%	27%	8%	16%
Forest Land Protection Assessment								
Public waters	2,839 ac; 2%	645 ac; 1%	3,405 ac; 5%	2,060 ac; 2%	199 ac; 0%	3,330 ac; 3%	3,587 ac; 7%	971 ac; 1%
Public lands	88,924 ac; 61%	61,016 ac; 78%	51,422 ac; 79%	53,144 ac; 49%	1,159 ac; 3%	38,153 ac; 31%	9,278 ac; 17%	26,463 ac; 26%
Private wetlands	22,463 ac; 15%	8,438 ac; 11%	5,212 ac; 8%	15,886 ac; 15%	10,168 ac; 24%	21,890 ac; 18%	3,185 ac; 6%	9,292 ac; 9%
SFIA	3,050 ac; 2.1%	49 ac; 0.1%	439 ac; 0.7%	2,190 ac; 2.0%	111 ac; 0.3%	1,092 ac; 0.9%	298 ac; 0.6%	1,629 ac; 1.6%
Easements	1,931 ac; 1.3%	74 ac; 0.1%	85 ac; 0.1%	195 ac; 0.2%	0 ac; 0.0%	54 ac; 0.0%	5 ac; 0.0%	907 ac; 0.9%
Total protected area	119,207 ac; 81%	70,222 ac; 90%	60,567 ac; 94%	73,639 ac; 68%	11,637 ac; 27%	64,586 ac; 53%	16,351 ac; 30%	39,279 ac; 38%
Protection priority	Low	Low	Low	Medium	High	High	Medium	High
Forest Land Protection Cost Analysis								
Minor watershed protection goal total*	2,232 ac to goal	212 ac to goal	293 ac to goal	9,946 ac to goal	4,822 ac to goal	12,897 ac to goal	6,112 ac to goal	16,510 ac to goal
Subwatershed protection goal*	0 ac to goal	0 ac to goal	0 ac to goal	8,120 ac to goal	5,361 ac to goal	18,484 ac to goal	6,803 ac to goal	16,898 ac to goal
Potential to protect	8,459 ac; 6%	835 ac; 1%	4,184 ac; 6%	15,650 ac; 14%	5,949 ac; 14%	18,733 ac; 15%	7,143 ac; 13%	20,754 ac; 20%
Average land value	$906/ac	$840/ac	$856/ac	$996/ac	$2,401/ac	$1,482/ac	$5,616/ac	$2,179/ac
Minor watershed protection cost total†	$2,201,546	$200,947	$278,044	$9,627,646	$6,674,713	$14,424,741	$10,811,805	$22,896,712
Subwatershed protection cost†	$0	$0	$0	$7,710,481	$7,349,370	$20,244,915	$15,888,514	$22,041,797
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%	0 lakes; 0%	0 lakes; 0%
Trout lakes	0 lakes; 0%	0 lakes; 0%	1 lake; 0%	0 lakes; 0%	0 lakes; 0%	0 lakes; 0%	2 lakes; 0%	0 lakes; 0%
Lakes of biodiversity significance (outstanding & high)	1 lake; 0%	0 lakes; 0%	5 lakes; 3%	1 lake; 0%	0 lakes; 0%	0 lakes; 0%	1 lake; 1%	0 lakes; 0%
Priority shallow lakes	2 lakes; 0%	0 lakes; 0%	3 lakes; 1%	0 lakes; 0%	0 lakes; 0%	1 lake; 0%	0 lakes; 0%	1 lake; 0%
Wild rice lakes	0 lakes; 0%	2 lakes; 0%	10 lakes; 4%	5 lakes; 1%	0 lakes; 0%	5 lakes; 0%	3 lakes; 10%	1 lake; 0%
Trout steams	4 mi	0 mi	7 mi	3 mi	81 mi	100 mi	92 mi	191 mi
FFF mean composite score	85.0	88.8	92.9	83.4	74.6	85.0	86.0	93.3
Terrestrial biodiversity (MBS) (outstanding and high)	79,005 ac; 54%	51,238 ac; 66%	11,413 ac; 18%	156 ac; 0%	687 ac; 2%	11,076 ac; 9%	10,991 ac; 20%	11,298 ac; 11%
Wildlife Action Network (high & medium-high)	16,047 ac; 11%	44,301 ac; 57%	3,112 ac; 5%	1,714 ac; 2%	354 ac; 1%	9,730 ac; 8%	8,263 ac; 15%	1,394 ac; 1%
Risk Management Factors								
Lake phosphorous sensitivity (highest & higher)	1 lake; 223 ac	0 lakes; 0 ac	2 lakes; 678 ac	0 lakes; 0 ac	0 lakes; 0 ac	2 lakes; 624 ac	0 lakes; 0 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	0 lakes; 0 ac	0 lakes; 0 ac
Land use disturbance	10,058 ac; 7%	1,686 ac; 2%	3,696 ac; 6%	9,600 ac; 9%	8,907 ac; 21%	20,586 ac; 17%	18,038 ac; 33%	20,571 ac; 20%

HUC 10 Protection Levels and Goals‡



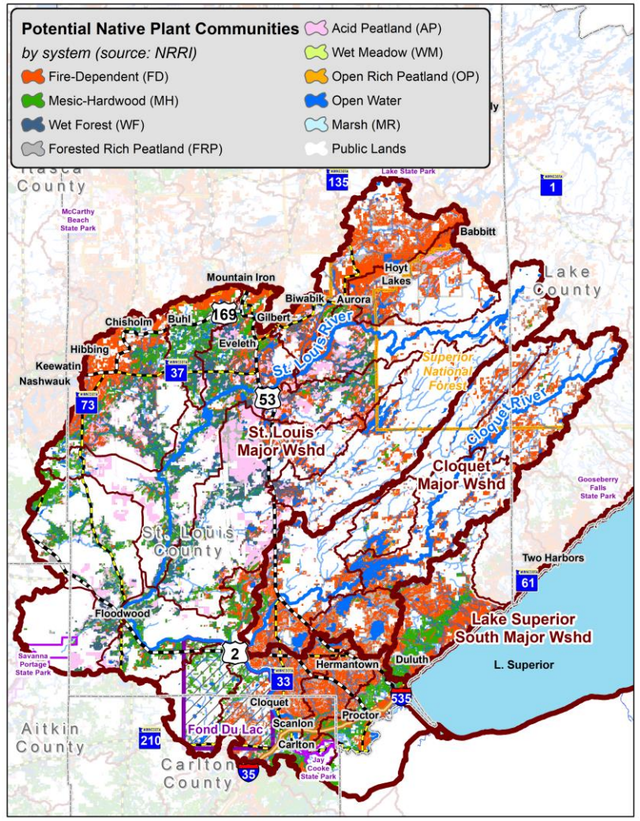
*The LSP Planting Team set separate minor watershed (HUC 14) and subwatershed (HUC 10) protection goals. The acres to goal and protection cost between the minor and subwatershed goals in this table are overlapping, not additive – see the subwatershed action plans for more details.
*Occasionally the overall subwatershed protection goal has been met, but individual minors in the subwatershed are still in need of greater protection.
†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 region.

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 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.



Subwd 1 – Headwaters Cloquet River
31% private; 69% public
922 parcels > 20 ac
35,907 ac > 20 ac
19 fsps; 6,431 ac

10 Yr PFM Goals*:
HUC 14 goal total: 46 fsps; 9,843 ac
HUC 10 goal: 37 fsps; 8,016 ac

Subwd 2 – West Branch Cloquet River
17% private; 83% public
260 parcels > 20 ac
10,614 ac > 20 ac
5 fsps; 629 ac

10 Yr PFM Goals*:
HUC 14 goal total: 4 fsps; 857 ac
HUC 10 goal: 4 fsps; 786 ac

Subwd 3 – Boulder Lake Reservoir-Boulder Creek
19% private; 81% public
97 parcels > 20 ac
4,943 ac > 20 ac
2 fsps; 2,257 ac

10 Yr PFM Goals*:
HUC 14 goal total: 2 fsps; 390 ac
HUC 10 goal: 2 fsps; 369 ac

Subwd 4 – Island Lake Reservoir-Cloquet River
24% private; 76% public
514 parcels > 20 ac
17,092 ac > 20 ac
19 fsps; 3,030 ac

10 Yr PFM Goals*:
HUC 14 goal total: 21 fsps; 4,577 ac
HUC 10 goal: 11 fsps; 2,313 ac

Subwd 5 – Fish Lake Reservoir-Beaver River
66% private; 34% public
513 parcels > 20 ac
17,972 ac > 20 ac
10 fsps; 1,771 ac

10 Yr PFM Goals*:
HUC 14 goal total: 26 fsps; 5,614 ac
HUC 10 goal: 28 fsps; 6,141 ac

Subwd 6 – Cloquet River
45% private; 55% public
952 parcels > 20 ac
39,452 ac > 20 ac
21 fsps; 2,461 ac

10 Yr PFM Goals*:
HUC 14 goal total: 44 fsps; 9,473 ac
HUC 10 goal: 29 fsps; 6,181 ac

Subwd 7 – Partridge River
49% private; 51% public
1,046 parcels > 20 ac
45,112 ac > 20 ac
2 fsps; 736 ac

10 Yr PFM Goals*:
HUC 14 goal total: 20 fsps; 4,339 ac
HUC 10 goal: 25 fsps; 5,502 ac

Subwd 8 – Headwaters St. Louis River
36% private; 64% public
961 parcels > 20 ac
41,498 ac > 20 ac
12 fsps; 7,260 ac

10 Yr PFM Goals*:
HUC 14 goal total: 72 fsps; 15,505 ac
HUC 10 goal: 33 fsps; 7,059 ac

Subwd 9 – Embarrass River
68% private; 32% public
1,870 parcels > 20 ac
85,291 ac > 20 ac
30 fsps; 5,682 ac

10 Yr PFM Goals*:
HUC 14 goal total: 64 fsps; 13,919 ac
HUC 10 goal: 98 fsps; 21,248 ac

Subwd 10 – Mud Hen Creek
60% private; 40% public
759 parcels > 20 ac
33,838 ac > 20 ac
7 fsps; 2,358 ac

10 Yr PFM Goals*:
HUC 14 goal total: 32 fsps; 6,851 ac
HUC 10 goal: 52 fsps; 11,143 ac

Subwd 11 – West Two River
73% private; 27% public
924 parcels > 20 ac
35,493 ac > 20 ac
7 fsps; 4,821 ac

10 Yr PFM Goals*:
HUC 14 goal total: 49 fsps; 10,625 ac
HUC 10 goal: 51 fsps; 11,105 ac

Subwd 12 – West Swan River-East Swan River
64% private; 36% public
1,964 parcels > 20 ac
104,011 ac > 20 ac
22 fsps; 5,969 ac

10 Yr PFM Goals*:
HUC 14 goal total: 278 fsps; 60,136 ac
HUC 10 goal: 291 fsps; 62,880 ac

Subwd 13 – Sand Creek-St. Louis River
62% private; 38% public
2,637 parcels > 20 ac
120,438 ac > 20 ac
34 fsps; 8,901 ac

10 Yr PFM Goals*:
HUC 14 goal total: 114 fsps; 24,560 ac
HUC 10 goal: 130 fsps; 28,207 ac

Subwd 14 – Upper Whiteface River
16% private; 84% public
525 parcels > 20 ac
21,216 ac > 20 ac
9 fsps; 1,194 ac

10 Yr PFM Goals*:
HUC 14 goal total: 10 fsps; 2,163 ac
HUC 10 goal: 5 fsps; 1,169 ac

Subwd 15 – Lower Whiteface River
50% private; 50% public
1,582 parcels > 20 ac
94,533 ac > 20 ac
33 fsps; 6,178 ac

10 Yr PFM Goals*:
HUC 14 goal total: 78 fsps; 16,955 ac
HUC 10 goal: 73 fsps; 15,882 ac

Subwd 16 – Floodwood River
38% private; 62% public
1,079 parcels > 20 ac
50,531 ac > 20 ac
35 fsps; 7,840 ac

10 Yr PFM Goals*:
HUC 14 goal total: 55 fsps; 11,942 ac
HUC 10 goal: 45 fsps; 9,710 ac

Subwd 17 – East Savanna River
21% private; 79% public
303 parcels > 20 ac
15,966 ac > 20 ac
4 fsps; 1,221 ac

10 Yr PFM Goals*:
HUC 14 goal total: 4 fsps; 862 ac
HUC 10 goal: 3 fsps; 650 ac

Subwd 18 – Stoney Brook
15% private; 85% public
311 parcels > 20 ac
12,774 ac > 20 ac
8 fsps; 1,063 ac

10 Yr PFM Goals*:
HUC 14 goal total: 6 fsps; 1,332 ac
HUC 10 goal: 5 fsps; 1,039 ac

Subwd 19 – Artichoke River-St. Louis River
49% private; 51% public
1,064 parcels > 20 ac
48,663 ac > 20 ac
21 fsps; 5,454 ac

10 Yr PFM Goals*:
HUC 14 goal total: 66 fsps; 14,213 ac
HUC 10 goal: 57 fsps; 12,387 ac

Subwd 20 – Midway River
97% private; 3% public
563 parcels > 20 ac
18,382 ac > 20 ac
17 fsps; 1,307 ac

10 Yr PFM Goals*:
HUC 14 goal total: 23 fsps; 4,948 ac
HUC 10 goal: 25 fsps; 5,487 ac

Subwd 21 – Thompson Reservoir-St. Louis River
66% private; 34% public
1,380 parcels > 20 ac
52,772 ac > 20 ac
41 fsps; 4,500 ac

10 Yr PFM Goals*:
HUC 14 goal total: 69 fsps; 14,909 ac
HUC 10 goal: 95 fsps; 20,496 ac

Subwd 22 – St. Louis River
76% private; 24% public
359 parcels > 20 ac
12,088 ac > 20 ac
11 fsps; 1,059 ac

10 Yr PFM Goals*:
HUC 14 goal total: 30 fsps; 6,419 ac
HUC 10 goal: 33 fsps; 7,110 ac

Subwd 23 – City of Duluth-Frontal Lake Superior
73% private; 27% public
855 parcels > 20 ac
38,418 ac > 20 ac
38 fsps; 5,919 ac

10 Yr PFM Goals*:
HUC 14 goal total: 90 fsps; 19,549 ac
HUC 10 goal: 92 fsps; 19,938 ac

*These goals are linked to the minor watershed (HUC 14) and subwatershed (HUC 10) forest land protection goals (see Vision Summary on next page for explanation).

*The HUC 14 and HUC 10 goals are overlapping, not additive – see the subwatershed action plans for more details.

Vision Summary

The following points summarize the vision and the two major goals for the St. Louis River LSP planning area.

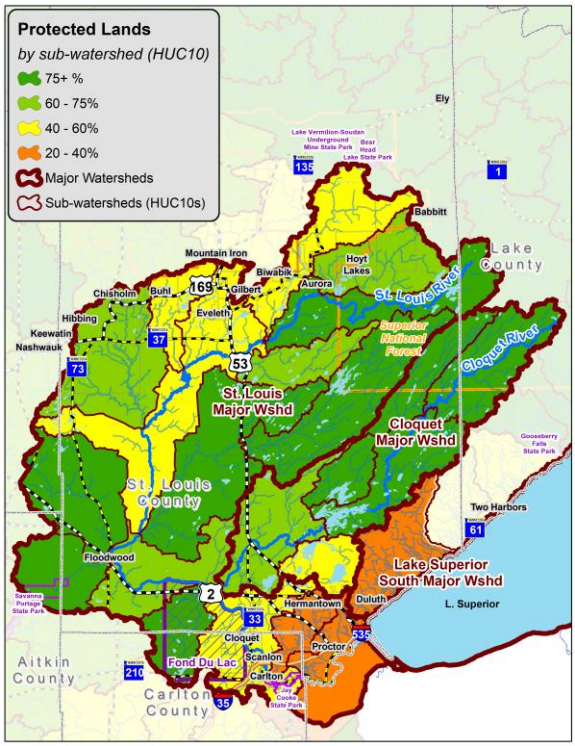
- Private lands cover approximately half of the region and is intermixed with public lands in some areas but dominates the landscape in others. Generally, private lands are more common in the subwatersheds surround Duluth and Cloquet in the southern part of the region, as well as around the Iron Range communities near the northern border of the St. Louis River Major Watershed.
- Public lands and protected wetlands are concentrated towards the center of the region, which consequently has higher levels of protection.
- To further focus protection efforts the planning team selected priority minor watersheds to concentrate landowner outreach efforts – see tables in the following 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.
- The LSP Planting Team set separate subwatershed (HUC 10) and minor watershed (HUC 14) goals. Generally, the minor watershed goals are likely to be achieved before the subwatershed goals and can be thought of as short-term and long-term goals, respectively.
- The region has significantly fewer conifers than it had under natural conditions. Long-lived conifers, including white pine and white spruce, made up a much larger components of both fire-dependent and mesic-hardwood forests across the region historically.
- Contemporary forest management strategies tend to favor shade intolerant hardwoods such as aspen. This combined with high populations of deer, fire suppression, and reliance on winter harvests have increased the amount of aspen over time. NPC based silvicultural actions could help to restore conifer components in many of these stands.

Subwatershed Guidance

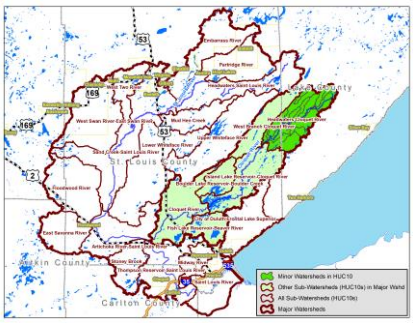
The purpose of the following 23 narratives is to provide service providers and resource managers with a detailed description of subwatershed-level conditions and recommendations.

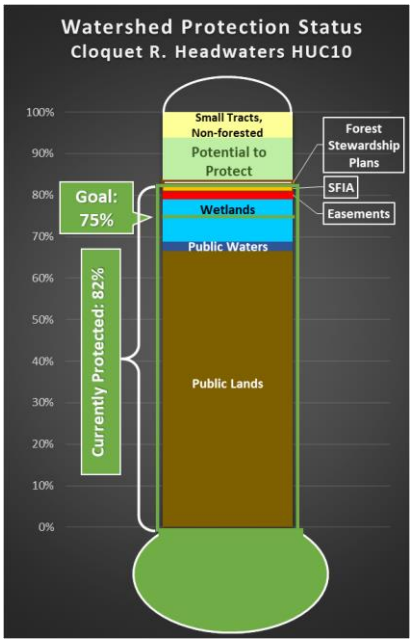
These 'subwatershed action plans' are intended to help service providers and managers identify and prioritize specific areas in the St. Louis River LSP planning area so they can more effectively work together to implement activities that are likely to improve water quality, increase forest management, and achieve other public and private benefits.

Fig 14. Subwatershed (HUC10) protection levels.



Subwatershed No. 1
Headwaters Cloquet River (HUC 401020201)





Goal 1: Forest Land Protection Guidance

- Very high forest and woody wetland cover, 92%.
- Home to 27 lakes, many of which are lakes of high or outstanding biodiversity significance and wild rice lakes.
- Contains 156 miles of streams, including 64 miles of trout streams.
- Low priority for forest land protection.
- Two minor watersheds have not met their protection goals – 1,826 acres of protection are required to meet all minor watershed protection goals.
- Subwatershed forest land protection goal is 75%, current protection is 82% – subwatershed protection goal met!

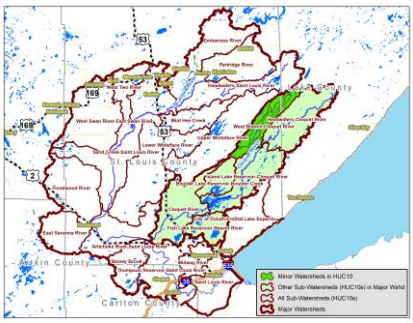
Goal 2: Forest Stewardship Guidance

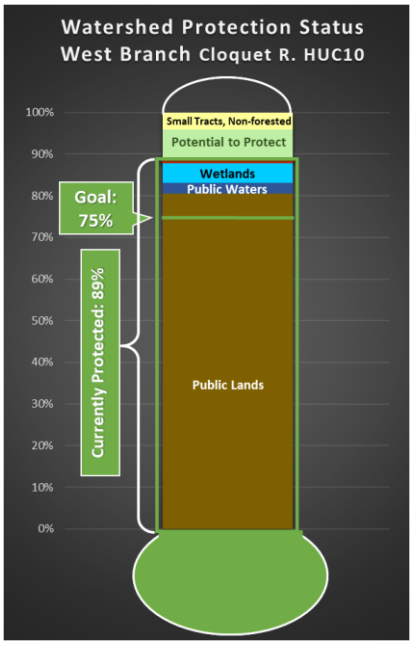
- Primary landforms are till and drumlin plains, although end moraines are also present near the subwatershed's eastern and southern borders.
- Upland areas have the potential to support fire-dependent native plant communities (NPCs). The lowland areas primarily support forested rich peatland NPCs.
- The forest composition is a primarily a mixture of aspen-birch and spruce-fir cover types in the uplands, and lowland conifers (spruce, fir, cedar) in the lowlands.
- Spruce budworm, eastern larch beetle, and emerald ash borer are significant forest health risks.
- Refer to the vegetation management framework in the 2nd Generation Northeast Landscape Plan for more specific NPC-based guidance.
- Provide forest stewardship services to interested landowners.
- Minor watershed FSP goal total – 9,843 acres, estimated 46 plans.
- Subwatershed FSP goal – 8,016 acres. Subwatershed FSP goal is smaller than the minor watershed FSP goal and may be met while achieving the minor watershed FSP goal.

Table 3. Minor watershed info.

Minor wshd #	Acres	Current % protected	Protection goal %
4003	3,900	91.4%	75%
4004	11,372	85.3%	75%
4005	4,509	83.3%	75%
4006	10,830	89.4%	75%
4007	4,769	99.3%	75%
4008	3,377	88.1%	75%
4009	10,775	94.3%	75%
4010	9,407	63.0%	75%
4011	3,564	92.8%	75%
4012	9,517	67.7%	75%
4013	15,909	79.4%	75%
4014	13,252	79.9%	75%
4015	4,757	80.6%	75%
4056	7,977	77.7%	75%
4058	2,937	91.4%	75%

Subwatershed No. 2
West Branch Cloquet River (HUC 401020202)





Goal 1: Forest Land Protection Guidance

- Very high forest and woody wetland cover, 92%.
- Largely stream-based watershed with relatively few lakes but 102 miles of streams, including 27 miles of trout streams.
- High terrestrial biodiversity and Forests for the Future scores.
- Low priority for forest land protection.
- One minor watershed has not met its protection goal – 71 acres of protection are required to meet its goal.
- Subwatershed forest land protection goal is 75%, current protection is 89% – subwatershed protection goal met!

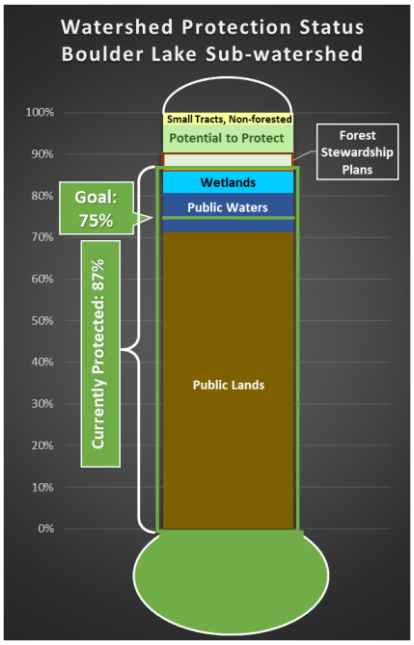
Goal 2: Forest Stewardship Guidance

- Primary landforms are a rolling drumlin plain interspersed with peatlands.
- Upland areas have the potential to support fire-dependent native plant communities (NPCs). The lowland areas primarily support forested rich peatland NPCs.
- The forest composition is a primarily a mixture of aspen-birch and spruce-fir cover types in the uplands, and lowland conifers (spruce, fir, cedar) in the lowlands.
- Spruce budworm, eastern larch beetle, and emerald ash borer are significant forest health risks.
- Refer to the vegetation management framework in the 2nd Generation Northeast Landscape Plan for more specific NPC-based guidance.
- Provide forest stewardship services to interested landowners.
- Minor watershed FSP goal total – 857 acres, estimated 4 plans.
- Subwatershed FSP goal – 786 acres. Subwatershed FSP goal is smaller than the minor watershed FSP goal and may be met while achieving the minor watershed FSP goal.

Table 4. Minor watershed info.

Minor wshd #	Acres	Current % protected	Protection goal %
4001	5,815	92.3%	75%
4002	9,165	81.8%	75%
4018	16,028	91.6%	75%
4019	9,118	76.3%	75%
4020	6,647	94.7%	75%
4021	4,298	88.2%	75%
4022	5,490	99.4%	75%
4023	6,954	99.4%	75%
4059	4,142	73.3%	75%

Subwatershed No. 3
Boulder Lake Reservoir-Boulder Creek (HUC 401020203)



Goal 1: Forest Land Protection Guidance

- Very high forest and woody wetland cover, 81%.
- Home to only six lakes, but the largest – Boulder Lake - is a lake of outstanding biodiversity significance.
- High terrestrial biodiversity scores.
- Low priority for forest land protection.
- One minor watershed has not met its protection goal – 21 acres of protection are required to meet its goal.
- Subwatershed forest land protection goal is 75%, current protection is 87% – subwatershed protection goal met!

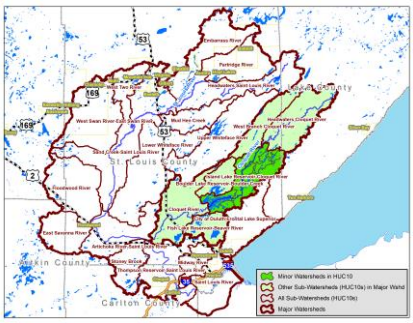
Goal 2: Forest Stewardship Guidance

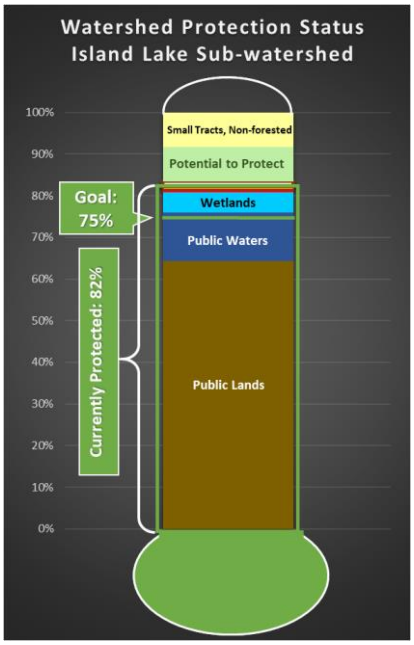
- Primary landforms are a drumlin plain interspersed with peatlands in the northern two-thirds of the subwatershed, and moraines and outwash plains near Boulder Lake.
- Upland areas have the potential to support fire-dependent native plant communities (NPCs), although mesic hardwood forests also have potential in an area to the northwest of the Boulder Lake. The lowland areas may support a mix of forested rich peatland, acid peatland, and wet forest NPCs.
- The forest composition is a primarily a mixture of aspen-birch and spruce-fir cover types in the uplands, and lowland conifers (spruce, fir, cedar) in the lowlands. Northern hardwoods, pines, and lowland hardwoods are also locally important in areas.
- Spruce budworm, eastern larch beetle, and emerald ash borer are significant forest health risks.
- Refer to the vegetation management framework in the 2nd Generation Northeast Landscape Plan for more specific NPC-based guidance.
- Provide forest stewardship services to interested landowners.
- Minor watershed FSP goal total – 390 acres, estimated 2 plans.
- Subwatershed FSP goal – 369 acres. Subwatershed FSP goal is smaller than the minor watershed FSP goal and may be met while achieving the minor watershed FSP goal.

Table 5. Minor watershed info.

Minor wshd #	Acres	Current % protected	Protection goal %
4026	10,057	90.9%	75%
4031	6,543	81.8%	75%
4032	3,359	87.8%	75%
4034	3,342	99.6%	75%
4035	16,723	85.7%	75%
4036	3,104	74.3%	75%

Subwatershed No. 4
Island Lake Reservoir-Cloquet River (HUC 401020204)





Goal 1: Forest Land Protection Guidance

- High forest and woody wetland cover, 75%.
- Home to 56 lakes, many of which are lakes of high or outstanding biodiversity significance, wild rice lakes, and/or trout lakes.
- Contains 124 miles of streams, including 14 miles of trout streams.
- High terrestrial biodiversity and Forests for the Future scores.
- At risk from lakes with high phosphorous sensitivity and lakes with declining water quality trends.
- Low priority for forest land protection.
- Three minor watersheds have not met their protection goals – 2,264 acres of protection are required to meet all minor watershed protection goals.
- Subwatershed forest land protection goal is 75%, current protection is 82% – subwatershed protection goal met!

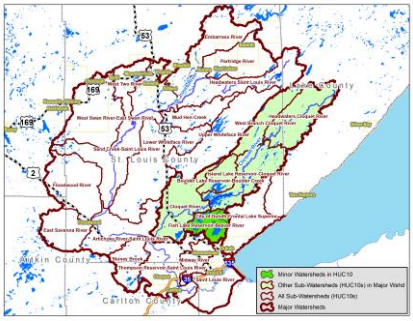
Goal 2: Forest Stewardship Guidance

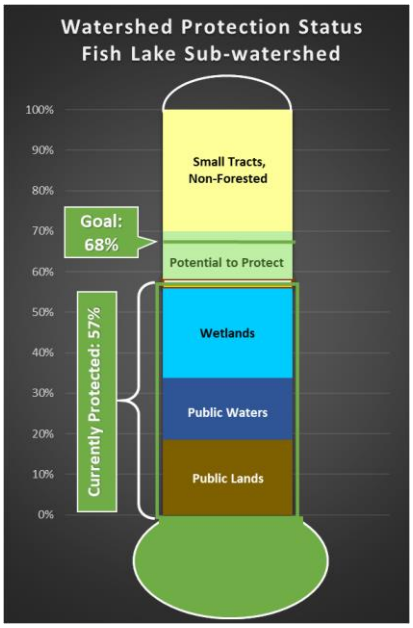
- Primary landform is a level to rolling moraine, although outwash plains are also present near Island Lake.
- Upland areas have the potential to support fire-dependent native plant communities (NPCs). The lowland areas may support a mix of forested rich peatland, acid peatland, and wet forest NPCs.
- The forest composition is a primarily a mixture of aspen-birch and spruce-fir cover types in the uplands, and lowland conifers (spruce, fir, cedar) in the lowlands. Northern hardwoods, lowland hardwoods, and pines are also locally important in areas.
- Spruce budworm, eastern larch beetle, and emerald ash borer are significant forest health risks.
- Refer to the vegetation management framework in the 2nd Generation Northeast Landscape Plan for more specific NPC-based guidance.
- Provide forest stewardship services to interested landowners.
- Minor watershed FSP goal total – 4,577 acres, estimated 21 plans.
- Subwatershed FSP goal – 2,313 acres. Subwatershed FSP goal is smaller than the minor watershed FSP goal and may be met while achieving the minor watershed FSP goal.

Table 6. Minor watershed info

Minor wshd #	Acres	Current % protected	Protection goal %
4016	5,139	87.4%	75%
4017	17,208	89.4%	75%
4024	13,837	92.8%	75%
4025	8,486	74.2%	75%
4033	13,454	95.4%	75%
4037	4,237	78.2%	75%
4039	21,006	64.9%	75%
4040	21,901	81.6%	75%
4047	4,721	73.6%	75%
4057	3,288	92.0%	75%

Subwatershed No. 5
Fish Lake Reservoir-Beaver River (HUC 401020205)





Goal 1: Forest Land Protection Guidance

- High forest and woody wetland cover, 75%.
- Home to only eight lakes but contains two lakes of high or outstanding biodiversity significance as well as three wild rice lakes.
- At risk from lakes with high phosphorous sensitivity and spreading development from nearby communities.
- High priority for forest land protection.
- Four minor watersheds have not met their protection goals – 4,824 acres of protection are required to meet all minor watershed protection goals. This would increase the overall subwatershed protection from 57% to 67%.
- Subwatershed forest land protection goal is 68% – if all minor watershed protection goals are met, then an additional 527 acres (5,350 total) are required to meet the overall subwatershed protection goal.

Goal 2: Forest Stewardship Guidance

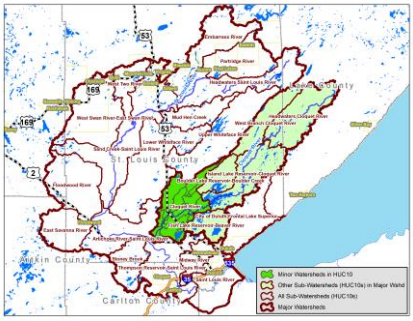
- Primary landform is an end moraine, although outwash plains, peatlands, and ice contact deposits are also present.
- Upland areas have the potential to support fire-dependent native plant communities (NPCs). The lowland areas primarily support forested rich peatland NPCs.
- The forest composition is a primarily a mixture of aspen-birch, and spruce-fir cover types in the uplands, and lowland conifers (spruce, fir, cedar) and lowland hardwoods in the lowlands.
- Eastern larch beetle and emerald ash borer are significant forest health risks.
- Refer to the vegetation management framework in the 2nd Generation Northeast Landscape Plan for more specific NPC-based guidance.
- Provide forest stewardship services to interested landowners.
- Minor watershed FSP goal total – 5,614 acres, estimated 26 plans.
- Subwatershed FSP goal – 6,141 acres, estimated 28 plans. This is 527 acres above and beyond the minor watershed FSP goal.

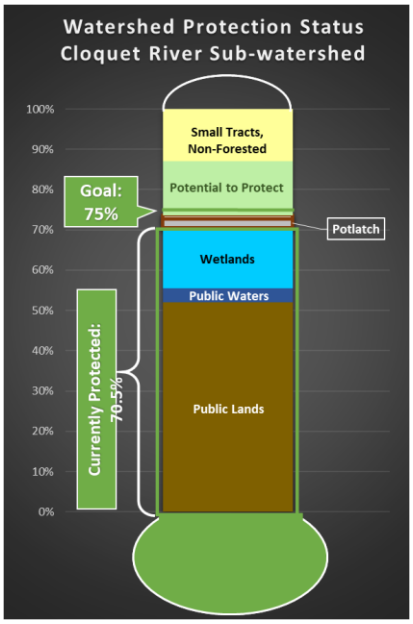
Table 7. Minor watershed info.

Minor wshd #	Acres	Current % protected	Protection goal %
4051	6,155	40.3%	50%
4052	21,394	64.3%	75%
4053	5,776	49.9%	60%
4055	15,146	56.0%	65%

Note: Priority minors are in bold red text

Subwatershed No. 6
Cloquet River (HUC 401020206)





Goal 1: Forest Land Protection Guidance

- Very high forest and woody wetland cover, 83%.
- Home to 23 lakes and 128 miles of streams, including 90 miles of trout streams.
- High priority for forest land protection.
- Nine minor watersheds have not met their protection goals – 8,569 acres of protection are required to meet all minor watershed protection goals. This would increase the overall subwatershed protection from 71% to 78%.
- Subwatershed forest land protection goal is 75% - this can be met while achieving the minor watershed protection goals.

Goal 2: Forest Stewardship Guidance

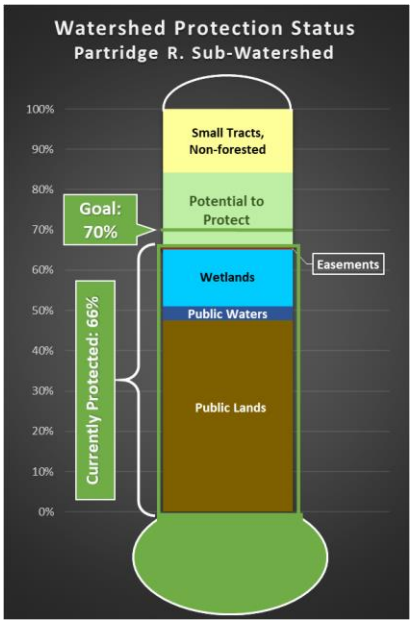
- Primary landform is a drumlin plain in the northern half of the subwatershed. Elsewhere is a mix of outwash plains, moraines, and peatlands.
- Most of the upland areas have the potential to support fire-dependent native plant communities (NPCs), although patches of mesic hardwood NPCs may be sustained as well. The lowland areas may support a mix of acid peatland, forested rich peatland, and wet forest NPCs.
- The forest composition is a primarily a mixture of aspen-birch, and spruce-fir cover types in the uplands, and lowland conifers (spruce, fir, cedar) in the lowlands. Northern hardwoods and lowland hardwoods are also locally important in areas.
- Eastern larch beetle and emerald ash borer are significant forest health risks.
- Refer to the vegetation management framework in the 2nd Generation Northeast Landscape Plan for more specific NPC-based guidance.
- Provide forest stewardship services to interested landowners.
- Minor watershed FSP goal total – 9,473 acres, estimated 44 plans.
- Subwatershed FSP goal – 6,181 acres. Subwatershed FSP goal is smaller than the minor watershed FSP goal and may be met while achieving the minor watershed FSP goal.

Table 8. Minor watershed info.

Minor wshd #	Acres	Current % protected	Protection goal %
4027	13,546	91.5%	75%
4028	23,323	69.6%	75%
4029	9,591	95.4%	75%
4030	4,124	98.2%	75%
4038	8,205	93.4%	75%
4041	**4,323**	**31.6%**	**50%**
4042	**4,423**	**36.5%**	**65%**
4043	**5,458**	**36.2%**	**50%**
4044	**3,672**	**68.0%**	**75%**
4045	11,218	84.9%	75%
4046	**9,520**	**59.9%**	**70%**
4048	**6,896**	**50.9%**	**75%**
4049	**8,437**	**52.6%**	**65%**
4050	**5,451**	**59.6%**	**70%**

Note: Priority minors are in bold red text

Subwatershed No. 7
Partridge River (HUC 401020101)



Goal 1: Forest Land Protection Guidance

- High forest and woody wetland cover, 79%.
- Largely steam-based watershed with relatively few lakes but 97 miles of streams.
- High terrestrial biodiversity scores.
- At risk from nearby mining activity.
- Medium priority for forest land protection.
- Six minor watersheds have not met their protection goals – 3,127 acres of protection are required to meet all minor watershed protection goals. This would increase the overall subwatershed protection from 66% to 69%.
- Subwatershed forest land protection goal is 70% – if all minor watershed protection goals are met, then an additional 1,163 acres (4,290 total) are required to meet the overall subwatershed protection goal.

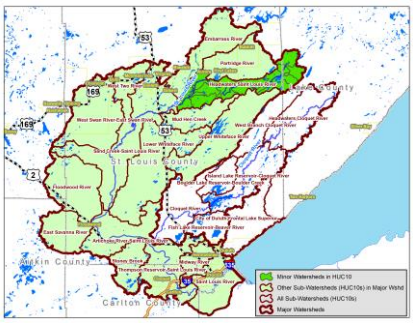
Goal 2: Forest Stewardship Guidance

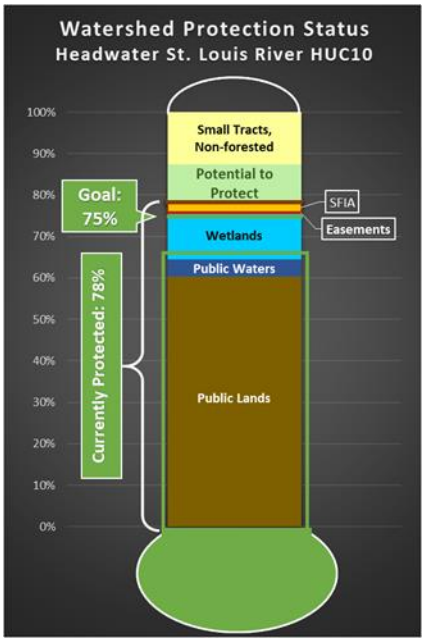
- Primary landforms are a mix of till plains, end moraines, and peatlands. Shallow bedrock is also present towards the subwatershed's northern border.
- Upland areas have the potential to support fire-dependent native plant communities (NPCs). The lowland areas may support a mix of acid peatland and forested rich peatland NPCs.
- The forest composition is a primarily a mixture of aspen-birch, and spruce-fir cover types in the uplands, and lowland conifers (spruce, fir, cedar) in the lowlands.
- Spruce budworm, eastern larch beetle, and emerald ash borer are significant forest health risks.
- Refer to the vegetation management framework in the 2nd Generation Northeast Landscape Plan for more specific NPC-based guidance.
- Provide forest stewardship services to interested landowners.
- Minor watershed FSP goal total – 4,339 acres, estimated 20 plans.
- Subwatershed FSP goal – 5,502 acres, estimated 25 plans. This is 1,163 acres above and beyond the minor watershed FSP goal.

Table 9. Minor watershed info.

Minor wshd #	Acres	Current % protected	Protection goal %
3142	2,327	99.0%	75%
3143	11,654	95.4%	75%
3144	7,638	90.3%	75%
3145	10,967	85.8%	75%
3146	6,206	55.2%	65%
3147	10,430	86.4%	75%
3148	7,014	68.4%	70%
3149	12,151	43.9%	60%
3150	11,384	33.1%	35%
3152	2,612	33.2%	40%
3155	17,508	49.7%	50%

Subwatershed No. 8
Headwaters St. Louis River (HUC 401020102)





Goal 1: Forest Land Protection Guidance

- Very high forest and woody wetland cover, 88%.
- Home to 28 lakes, many of which are lakes of high or outstanding biodiversity significance and wild rice lakes.
- High terrestrial biodiversity scores and Wildlife Action Network rankings.
- Low priority for forest land protection.
- Four minor watersheds have not met their protection goals – 8,446 acres of protection are required to meet all minor watershed protection goals.
- Subwatershed forest land protection goal is 75%, current protection is 78% – subwatershed protection goal met!

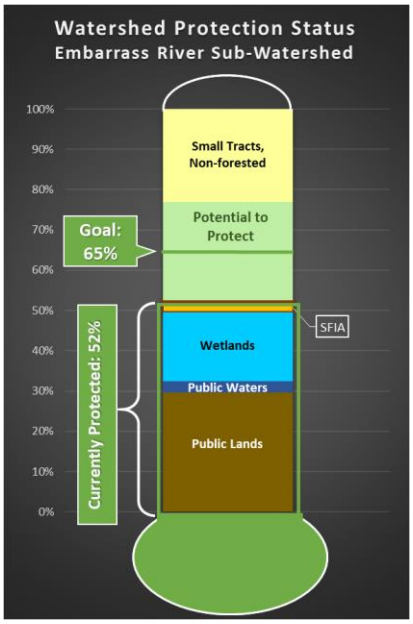
Goal 2: Forest Stewardship Guidance

- Primary landforms are a mix of peatlands, drumlin plains, and till plains. Lake plains are also present towards the western end of the subwatershed.
- Most of the upland areas have the potential to support fire-dependent native plant communities (NPCs), although patches of mesic hardwood NPCs may be sustained as well. The lowland areas may support a mix of acid peatland, forested rich peatland, and wet forest NPCs.
- The forest composition is a primarily a mixture of aspen-birch, and spruce-fir cover types in the uplands, and lowland conifers (spruce, fir, cedar) in the lowlands.
- Spruce budworm, eastern larch beetle, and emerald ash borer are significant forest health risks.
- Refer to the vegetation management framework in the 2nd Generation Northeast Landscape Plan for more specific NPC-based guidance.
- Provide forest stewardship services to interested landowners.
- Minor watershed FSP goal total – 15,505 acres, estimated 72 plans.
- Subwatershed FSP goal – 7,059 acres. Subwatershed FSP goal is smaller than the minor watershed FSP goal and may be met while achieving the minor watershed FSP goal.

Table 10. Minor watershed info.

Minor wshd #	Acres	Current % protected	Protection goal %
3002	12,613	98.8%	75%
3003	3,855	100.0%	75%
3004	8,633	100.0%	75%
3005	5,475	99.9%	75%
3006	18,799	96.7%	75%
3007	3,394	97.8%	75%
3109	12,917	41.1%	50%
3110	10,893	45.4%	70%
3138	14,266	47.7%	70%
3139	8,906	53.9%	70%
3140	17,376	85.1%	75%
3141	16,667	95.4%	75%

Subwatershed No. 9
Embarrass River (HUC 401020103)



Goal 1: Forest Land Protection Guidance

- High forest and woody wetland cover, 74%.
- Home to 28 lakes, many of which are wild rice lakes.
- At risk from lakes with declining water quality trends.
- Medium priority for forest land protection.
- Seven minor watersheds have not met their protection goals – 8,659 acres of protection are required to meet all minor watershed protection goals. This would increase the overall subwatershed protection from 52% to 59%.
- Subwatershed forest land protection goal is 65% – if all minor watershed protection goals are met, then an additional 7,329 acres (15,988 total) are required to meet the overall subwatershed protection goal.

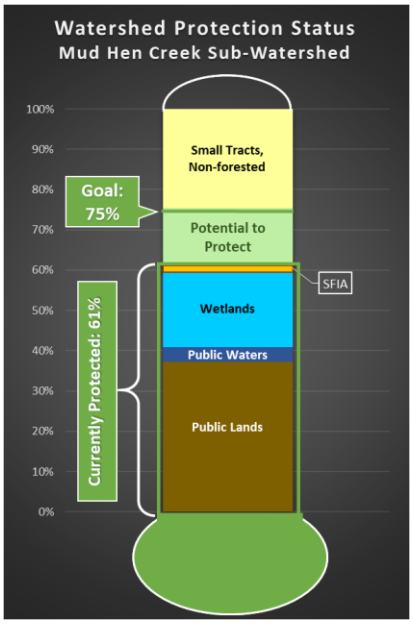
Goal 2: Forest Stewardship Guidance

- Primary landforms are a mix of outwash plains, till plains, peatlands, and shallow bedrock.
- Upland areas have the potential to support fire-dependent native plant communities (NPCs). The lowland areas may support a mix of acid peatland, forested rich peatland, and wet forest NPCs. The potential for wet forest NPCs is greater in the area to the south of Biwabik.
- The forest composition is a primarily a mixture of aspen-birch, and spruce-fir cover types in the uplands, and lowland conifers (spruce, fir, cedar) in the lowlands.
- Spruce budworm, eastern larch beetle, and emerald ash borer are significant forest health risks.
- Refer to the vegetation management framework in the 2nd Generation Northeast Landscape Plan for more specific NPC-based guidance.
- Provide forest stewardship services to interested landowners.
- Minor watershed FSP goal total – 13,919 acres, estimated 64 plans.
- Subwatershed FSP goal – 21,248 acres, estimated 98 plans. This is 7,329 acres above and beyond the minor watershed FSP goal.

Table 11. Minor watershed info.

Minor wshd #	Acres	Current % protected	Protection goal %
3136	12,147	36.2%	45%
3137	18,098	62.6%	75%
3153	32,227	48.2%	60%
3154	3,086	17.5%	30%
3156	12,106	34.3%	35%
3157	6,995	51.0%	60%
3158	12,141	41.4%	45%
3159	3,389	75.3%	75%
3160	20,292	75.1%	75%

Subwatershed No. 10
Mud Hen Creek (HUC 401020104)



Goal 1: Forest Land Protection Guidance

- Very high forest and woody wetland cover, 86%.
- Medium priority for forest land protection.
- Six minor watersheds have not met their protection goals – 4,489 acres of protection are required to meet all minor watershed protection goals. This would increase the overall subwatershed protection from 61% to 68%.
- Subwatershed forest land protection goal is 75% – if all minor watershed protection goals are met, then an additional 4,292 acres (8,782 total) are required to meet the overall subwatershed protection goal.

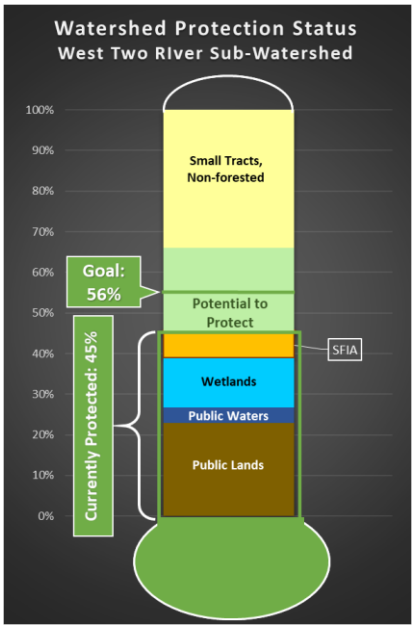
Goal 2: Forest Stewardship Guidance

- Primary landforms are till plains towards the eastern half of the subwatershed, and a mix of lake plains, peatlands, and moraines towards the western half.
- Most of the upland areas have the potential to support fire-dependent native plant communities (NPCs), although near the center of the subwatershed mesic hardwood NPCs also have good potential. The lowland areas may support a mix of acid peatland, forested rich peatland, and wet forest NPCs.
- The forest composition is a primarily a mixture of aspen-birch, and spruce-fir cover types in the uplands, and lowland conifers (spruce, fir, cedar) in the lowlands.
- Eastern larch beetle and emerald ash borer are significant forest health risks.
- Refer to the vegetation management framework in the 2nd Generation Northeast Landscape Plan for more specific NPC-based guidance.
- Provide forest stewardship services to interested landowners.
- Minor watershed FSP goal total – 6,851 acres, estimated 32 plans.
- Subwatershed FSP goal – 11,143 acres, estimated 52 plans. This is 4,292 acres above and beyond the minor watershed FSP goal.

Table 12. Minor watershed info.

Minor wshd #	Acres	Current % protected	Protection goal %
3104	15,603	72.4%	75%
3105	4,686	56.8%	75%
3106	6,011	32.9%	50%
3107	18,655	74.7%	75%
3108	11,984	43.3%	55%
3112	7,855	60.5%	70%

Subwatershed No. 11
West Two River (HUC 401020105)



Goal 1: Forest Land Protection Guidance

- High forest and woody wetland cover, 63%.
- At risk from mining, development, and agriculture.
- Medium priority for forest land protection.
- Four minor watersheds have not met their protection goals – 5,006 acres of protection are required to meet all minor watershed protection goals. This would increase the overall subwatershed protection from 45% to 55%.
- Subwatershed forest land protection goal is 56% – if all minor watershed protection goals are met, then an additional 480 acres (5,486 total) are required to meet the overall subwatershed protection goal.

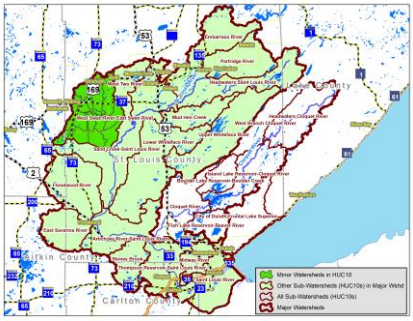
Goal 2: Forest Stewardship Guidance

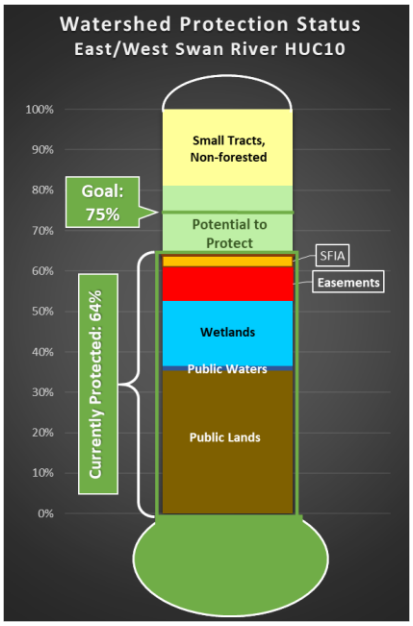
- Primary landforms are shallow bedrock and till plains in the northern end of the subwatershed, moraines in the middle, and lake plains near the southern end.
- Most of the upland areas have the potential to support mesic hardwood native plant communities (NPCs), although near the subwatershed's northern border fire-dependent NPCs also have good potential. The lowland areas may support a mix of acid peatland and wet forest NPCs.
- The forest composition is a primarily a mixture of aspen-birch, and spruce-fir cover types in the uplands, and lowland conifers (spruce, fir, cedar) in the lowlands. Northern hardwoods are also locally important in areas.
- Eastern larch beetle and emerald ash borer are significant forest health risks.
- Refer to the vegetation management framework in the 2nd Generation Northeast Landscape Plan for more specific NPC-based guidance.
- Provide forest stewardship services to interested landowners.
- Minor watershed FSP goal total – 10,625 acres, estimated 49 plans.
- Subwatershed FSP goal – 11,105 acres, estimated 51 plans. This is 480 acres above and beyond the minor watershed FSP goal.

Table 13. Minor watershed info.

Minor wshd #	Acres	Current % protected	Protection goal %
3119	14,441	43.5%	55%
3130	11,272	53.2%	70%
3133	11,653	32.3%	35%
3187	13,342	51.4%	60%

Subwatershed No. 12
West Swan River-East Swan River (HUC 401020106)





Goal 1: Forest Land Protection Guidance

- High forest and woody wetland cover, 74%.
- Largely stream-based watershed with relatively few lakes but 175 miles of streams.
- Many of the wetlands have been ditched and drained.
- At risk from development originating from the communities of Hibbing, Chisholm, and Buhl.
- High priority for forest land protection.
- Eight minor watersheds have not met their protection goals – 14,849 acres of protection are required to meet all minor watershed protection goals. This would increase the overall subwatershed protection from 64% to 73%.
- Subwatershed forest land protection goal is 75% – if all minor watershed protection goals are met, then an additional 2,744 acres (17,593 total) are required to meet the overall subwatershed protection goal.

Goal 2: Forest Stewardship Guidance

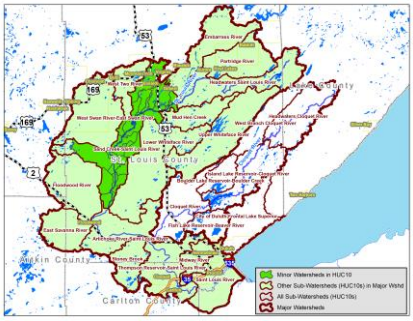
- Landforms include shallow bedrock, till plains, and moraines within the higher elevations of the subwatershed, and lake plains or peatlands within the lower elevations.
- Most of the upland areas have the potential to support fire-dependent native plant communities (NPCs), although mesic hardwood NPCs also have good potential near the middle and lower reaches of the West and East Swan River. The lowland areas may support a mix of acid peatland and wet forest NPCs.
- The forest composition is a primarily a mixture of aspen-birch, and spruce-fir cover types in the uplands, and lowland conifers (spruce, fir, cedar) in the lowlands.
- Eastern larch beetle and emerald ash borer are significant forest health risks.
- Refer to the vegetation management framework in the 2nd Generation Northeast Landscape Plan for more specific NPC-based guidance.
- Provide forest stewardship services to interested landowners.
- Minor watershed FSP goal total – 60,136 acres, estimated 278 plans.
- Subwatershed FSP goal – 62,880 acres, estimated 291 plans. This is 2,744 acres above and beyond the minor watershed FSP goal.

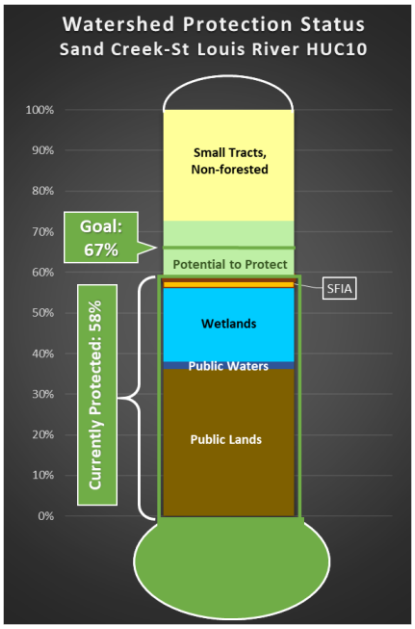
Table 14. Minor watershed info.

Minor wshd #	Acres	Current % protected	Protection goal %
3082	7,695	73.0%	75%
3083	12,795	88.8%	75%
3084	14,978	65.4%	75%
3121	13,680	85.1%	75%
3122	**22,955**	**44.5%**	**60%**
3123	**30,444**	**50.3%**	**70%**
3124	5,071	27.2%	40%
3125	5,909	29.6%	45%
3126	8,547	79.7%	75%
3127	5,655	95.9%	75%
3128	9,932	62.7%	75%
3129	10,854	61.8%	70%
3131	11,361	88.9%	75%

Note: Priority minors are in bold red text

Subwatershed No. 13
Sand Creek-St. Louis River (HUC 401020107)





Goal 1: Forest Land Protection Guidance

- Very high forest and woody wetland cover, 82%.
- Largely stream-based watershed with relatively few lakes but 182 miles of streams.
- At risk from lakes with high phosphorous sensitivity, agriculture, and development spreading from the cities of Virginia and Eveleth.
- Medium priority for forest land protection.
- 18 minor watersheds have not met their protection goals – 15,189 acres of protection are required to meet all minor watershed protection goals. This would increase the overall subwatershed protection from 58% to 65%.
- Subwatershed forest land protection goal is 67% – if all minor watershed protection goals are met, then an additional 3,647 acres (18,836 total) are required to meet the overall subwatershed protection goal.

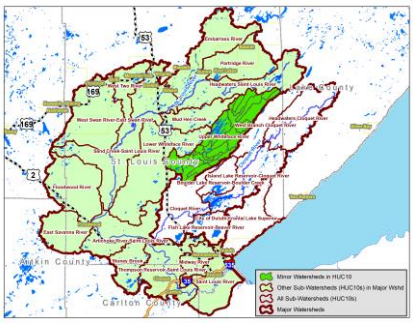
Goal 2: Forest Stewardship Guidance

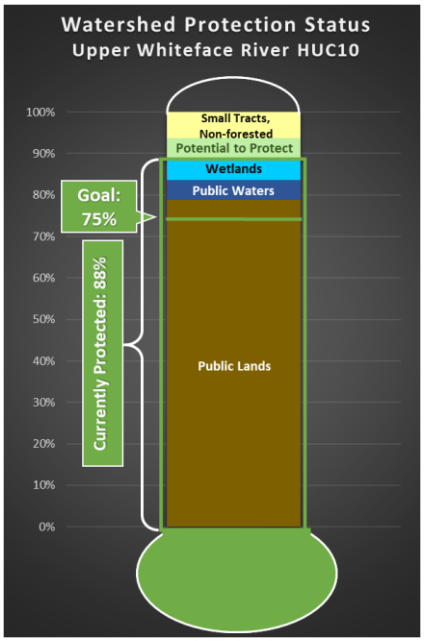
- Primary landforms are lake plains and peatlands, although till plains and moraines are also present towards the northern and western ends of the subwatershed.
- Upland areas around the Iron Range communities have good potential to support fire-dependent native plant communities (NPCs), but uplands elsewhere may be better suited towards mesic hardwood NPCs. The lowland areas may support a mix of acid peatland and wet forest NPCs.
- The forest composition is a primarily a mixture of aspen-birch, and spruce-fir cover types in the uplands, and lowland conifers (spruce, fir, cedar) in the lowlands. Northern hardwoods, pines, and lowland hardwoods are also locally important in areas.
- Eastern larch beetle and emerald ash borer are significant forest health risks.
- Refer to the vegetation management framework in the 2nd Generation Northeast Landscape Plan for more specific NPC-based guidance.
- Provide forest stewardship services to interested landowners.
- Minor watershed FSP goal total – 24,560 acres, estimated 114 plans.
- Subwatershed FSP goal – 28,207 acres, estimated 130 plans. This is 3,647 acres above and beyond the minor watershed FSP goal.

Table 15. Minor watershed info.

Minor wshd #	Acres	Current % protected	Protection goal %
3044	8,167	62.1%	65%
3052	12,940	68.8%	70%
3053	4,488	19.4%	25%
3054	4,655	28.6%	35%
3075	5,439	90.0%	75%
3076	4,089	67.1%	75%
3077	29,843	84.7%	75%
3085	3,709	54.4%	65%
3086	10,126	73.0%	75%
3087	1,593	91.3%	75%
3088	9,859	78.9%	75%
3096	3,477	82.3%	75%
3111	4,065	51.4%	75%
3113	12,737	43.9%	65%
3114	7,467	32.7%	40%
3115	15,389	52.8%	65%
3116	9,631	32.1%	45%
3117	5,364	40.1%	55%
3118	15,750	54.1%	70%
3120	3,610	85.9%	75%
3132	10,708	34.5%	45%
3134	17,353	37.8%	40%
3135	4,350	71.1%	75%
3167	4,506	52.1%	75%

Subwatershed No. 14
Upper Whiteface River (HUC 401020108)





Goal 1: Forest Land Protection Guidance

- Very high forest and woody wetland cover, 86%.
- Home to 29 lakes, many of which are lakes of high or outstanding biodiversity significance and wild rice lakes.
- Contains 207 miles of streams, including 24 miles of trout streams.
- Low priority for forest land protection.
- One minor watershed has not met its protection goal – 994 acres of protection are required to meet its goal.
- Subwatershed forest land protection goal is 75%, current protection is 89% – subwatershed protection goal met!

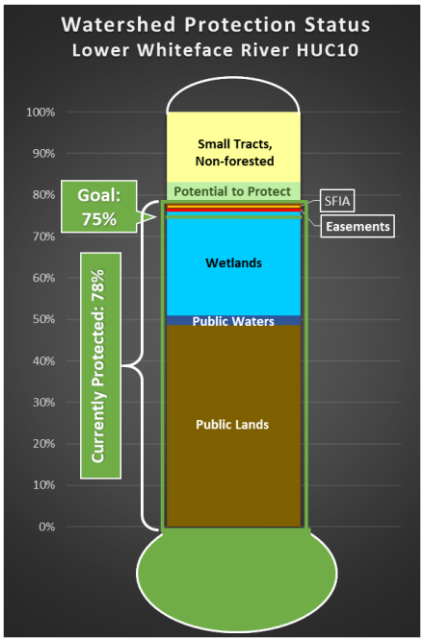
Goal 2: Forest Stewardship Guidance

- Primary landforms are drumlin plains interspersed with peatlands.
- Upland areas have the potential to support fire-dependent native plant communities (NPCs). The lowland areas may support a mix of forested rich peatland, acid peatland, and wet forest NPCs.
- The forest composition is a primarily a mixture of aspen-birch, and spruce-fir cover types in the uplands, and lowland conifers (spruce, fir, cedar) in the lowlands. Northern hardwoods and lowland hardwoods are also locally important in areas.
- Spruce budworm, eastern larch beetle, and emerald ash borer are significant forest health risks.
- Refer to the vegetation management framework in the 2nd Generation Northeast Landscape Plan for more specific NPC-based guidance.
- Provide forest stewardship services to interested landowners.
- Minor watershed FSP goal total – 2,163 acres, estimated 10 plans.
- Subwatershed FSP goal – 1,169 acres. Subwatershed FSP goal is smaller than the minor watershed FSP goal and may be met while achieving the minor watershed FSP goal.

Table 16. Minor watershed info.

Minor wshd #	Acres	Current % protected	Protection goal %
3008	3,959	98.9%	75%
3059	17,331	64.3%	70%
3060	9,075	90.8%	75%
3061	3,450	82.2%	75%
3062	8,368	97.9%	75%
3063	3,752	89.5%	75%
3064	7,334	93.0%	75%
3065	7,790	80.6%	75%
3066	4,005	88.5%	75%
3067	4,192	92.9%	75%
3068	3,437	98.3%	75%
3094	23,546	84.1%	75%
3095	5,682	84.4%	75%
3097	14,081	90.9%	75%
3098	5,014	99.0%	75%
3099	17,325	94.6%	75%
3100	8,772	95.8%	75%
3101	7,692	98.9%	75%
3102	8,887	97.0%	75%
3103	4,050	100.0%	75%

Subwatershed No. 15
Lower Whiteface River (HUC 401020109)



Goal 1: Forest Land Protection Guidance

- Very high forest and woody wetland cover, 87%.
- Home to 150 miles of streams and 41 lakes, many of which are lakes of high or outstanding biodiversity significance and wild rice lakes.
- Low priority for forest land protection.
- Six minor watersheds have not met their protection goals – 1,073 acres of protection are required to meet all minor watershed protection goals.
- Subwatershed forest land protection goal is 75%, current protection is 78% – subwatershed protection goal met!

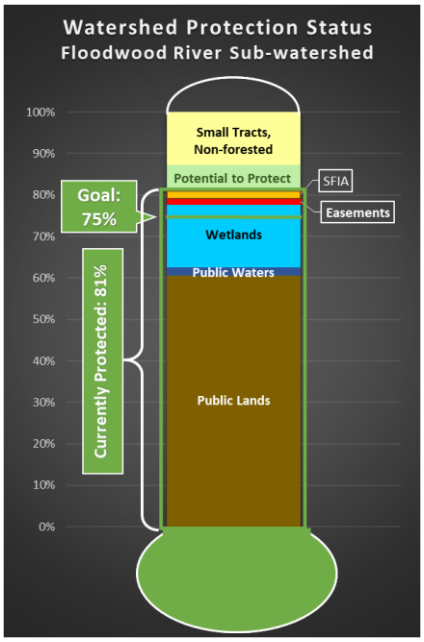
Goal 2: Forest Stewardship Guidance

- Primary landforms are a mix of lake plains, peatlands, and till plains.
- Upland areas around the northeastern end of the subwatershed have good potential to support fire-dependent native plant communities (NPCs), but uplands elsewhere may be better suited towards mesic hardwood NPCs. The lowland areas may support a mix of acid peatland and wet forest NPCs.
- The forest composition is a primarily a mixture of aspen-birch, and spruce-fir cover types in the uplands, and lowland conifers (spruce, fir, cedar) in the lowlands. Northern hardwoods and lowland hardwoods are also locally important in areas.
- Eastern larch beetle and emerald ash borer are significant forest health risks.
- Refer to the vegetation management framework in the 2nd Generation Northeast Landscape Plan for more specific NPC-based guidance.
- Provide forest stewardship services to interested landowners.
- Minor watershed FSP goal total – 16,955 acres, estimated 78 plans.
- Subwatershed FSP goal – 15,882 acres. Subwatershed FSP goal is smaller than the minor watershed FSP goal and may be met while achieving the minor watershed FSP goal.

Table 17. Minor watershed info.

Minor wshd #	Acres	Current % protected	Protection goal %
3036	21,977	81.4%	75%
3039	11,596	77.4%	75%
3040	6,010	80.6%	75%
3041	9,420	82.5%	75%
3042	4,483	52.6%	55%
3043	3,419	73.5%	75%
3055	9,990	55.6%	55%
3056	11,924	81.1%	75%
3057	5,473	80.5%	75%
3058	9,232	82.9%	75%
3069	4,829	74.1%	75%
3070	9,343	71.2%	75%
3071	11,227	66.7%	70%
3072	13,900	77.2%	75%
3073	3,757	66.1%	70%
3074	5,285	75.8%	75%
3089	38,505	83.8%	75%
3090	3,552	88.8%	75%
3091	9,683	75.3%	75%
3092	9,067	82.1%	75%
3093	5,078	97.4%	75%

Subwatershed No. 16
Floodwood River (HUC 401020110)



Goal 1: Forest Land Protection Guidance

- Very high forest and woody wetland cover, 81%.
- High terrestrial biodiversity scores.
- Many of the wetlands have been ditched and drained.
- Low priority for forest land protection.
- Three minor watersheds have not met their protection goals – 2,232 acres of protection are required to meet all minor watershed protection goals.
- Subwatershed forest land protection goal is 75%, current protection is 81% – subwatershed protection goal met!

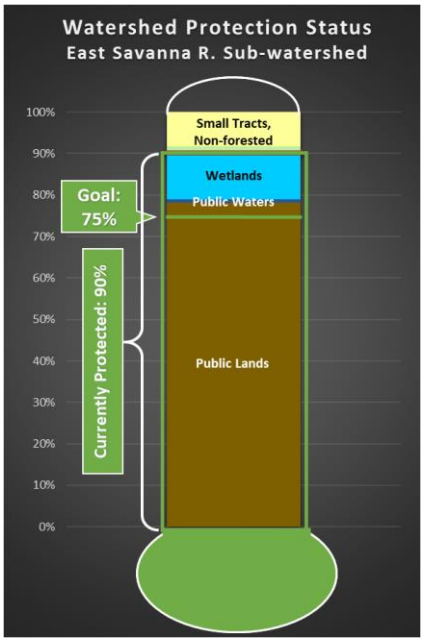
Goal 2: Forest Stewardship Guidance

- Primary landforms are peatlands and lake plains.
- Upland areas have the potential to support mesic hardwood native plant communities (NPCs). The lowland areas may support a mix of acid peatland, forested rich peatland, and wet forest NPCs.
- The forest composition is a primarily a mixture of aspen-birch, and spruce-fir cover types in the uplands, and lowland conifers (spruce, fir, cedar) in the lowlands. Northern hardwoods and lowland hardwoods are also locally important in areas.
- Eastern larch beetle and emerald ash borer are significant forest health risks.
- Refer to the vegetation management framework in the 2nd Generation Northeast Landscape Plan for more specific NPC-based guidance.
- Provide forest stewardship services to interested landowners.
- Minor watershed FSP goal total – 11,942 acres, estimated 55 plans.
- Subwatershed FSP goal – 9,710 acres. Subwatershed FSP goal is smaller than the minor watershed FSP goal and may be met while achieving the minor watershed FSP goal.

Table 18. Minor watershed info.

Minor wshd #	Acres	Current % protected	Protection goal %
3032	6,346	80.9%	75%
3033	15,587	64.0%	70%
3046	6,647	91.5%	75%
3047	5,457	88.3%	75%
3048	5,510	95.9%	75%
3049	17,494	87.6%	75%
3050	5,621	82.6%	75%
3051	11,141	90.4%	75%
3078	6,989	94.1%	75%
3079	12,030	84.0%	75%
3080	28,433	76.9%	75%
3081	7,418	92.4%	75%
3168	8,758	70.9%	75%
3169	5,483	84.5%	75%
3170	3,946	41.2%	65%

Subwatershed No. 17
East Savanna River (HUC 401020111)



Goal 1: Forest Land Protection Guidance

- Very high forest and woody wetland cover, 91%.
- Largely stream-based watershed with relatively few lakes.
- High terrestrial biodiversity scores and Wildlife Action Network rankings.
- Low priority for forest land protection.
- One minor watershed has not met its protection goal – 212 acres of protection are required to meet its goal.
- Subwatershed forest land protection goal is 75%, current protection is 90% – subwatershed protection goal met!

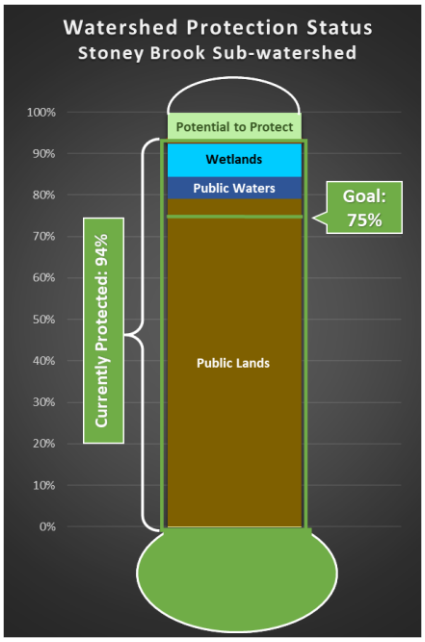
Goal 2: Forest Stewardship Guidance

- Primary landforms are peatlands and lake plains.
- Upland areas have the potential to support mesic hardwood native plant communities (NPCs). The lowland areas may support a mix of acid peatland, forested rich peatland, and wet forest NPCs.
- The forest composition is a primarily a mixture of aspen-birch, northern hardwoods, and spruce-fir cover types in the uplands, and lowland conifers (spruce, fir, cedar) in the lowlands. Lowland hardwoods are also locally important in areas.
- Eastern larch beetle and emerald ash borer are significant forest health risks.
- Refer to the vegetation management framework in the 2nd Generation Northeast Landscape Plan for more specific NPC-based guidance.
- Provide forest stewardship services to interested landowners.
- Minor watershed FSP goal total – 862 acres, estimated 4 plans.
- Subwatershed FSP goal – 650 acres. Subwatershed FSP goal is smaller than the minor watershed FSP goal and may be met while achieving the minor watershed FSP goal.

Table 19. Minor watershed info.

Minor wshd #	Acres	Current % protected	Protection goal %
3021	4,539	66.9%	65%
3022	18,580	97.6%	75%
3029	7,658	47.2%	50%
3030	26,931	98.6%	75%
3181	7,451	98.7%	75%
3182	5,798	85.5%	75%
3185	7,075	92.8%	75%

Subwatershed No. 18
Stoney Brook (HUC 401020112)



Goal 1: Forest Land Protection Guidance

- Very high forest and woody wetland cover, 85%.
- Home to 22 lakes, many of which are lakes of high or outstanding biodiversity significance, priority shallow lakes, and/or wild rice lakes.
- Low priority for forest land protection.
- One minor watershed has not met its protection goal – 293 acres of protection are required to meet its goal.
- Subwatershed forest land protection goal is 75%, current protection is 94% – subwatershed protection goal met!

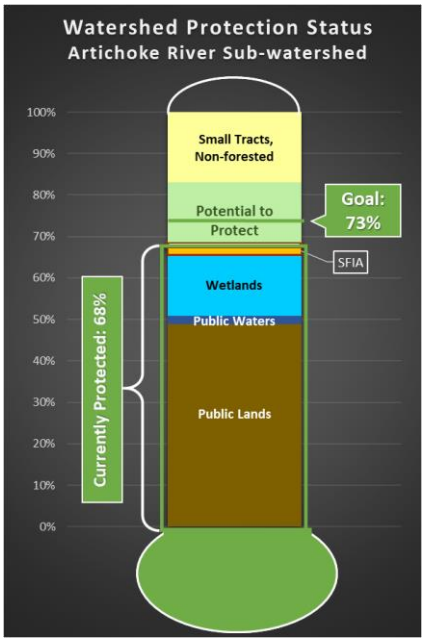
Goal 2: Forest Stewardship Guidance

- Primary landforms near the highest elevations are end moraines, and a mix of till plains and peatlands near the lower elevations.
- Upland areas have the potential to support mesic hardwood native plant communities (NPCs). The lowland areas may support a mix of forested rich peatland, acid peatland, and wet forest NPCs.
- The forest composition is a primarily a mixture of northern hardwoods and aspen-birch cover types in the uplands, and lowland conifers (spruce, fir, cedar) and lowland hardwoods in the lowlands.
- Eastern larch beetle and emerald ash borer are significant forest health risks.
- Refer to the vegetation management framework in the 2nd Generation Northeast Landscape Plan for more specific NPC-based guidance.
- Provide forest stewardship services to interested landowners.
- Minor watershed FSP goal total – 1,332 acres, estimated 6 plans.
- Subwatershed FSP goal – 1,039 acres. Subwatershed FSP goal is smaller than the minor watershed FSP goal and may be met while achieving the minor watershed FSP goal.

Table 20. Minor watershed info.

Minor wshd #	Acres	Current % protected	Protection goal %
3013	22,981	89.0%	75%
3014	11,840	97.0%	75%
3017	4,467	68.4%	75%
3178	12,478	96.0%	75%
3179	8,287	100.0%	75%
3180	4,657	100.0%	75%

Subwatershed No. 19
Artichoke River-St. Louis River (HUC 401020113)



Goal 1: Forest Land Protection Guidance

- Very high forest and woody wetland cover, 85%.
- Largely stream-based watershed with relatively few lakes.
- At risk from agriculture.
- Medium priority for forest land protection.
- Nine minor watersheds have not met their protection goals – 9,946 acres of protection are required to meet all minor watershed protection goals. This would increase the overall subwatershed protection from 68% to 77%.
- Subwatershed forest land protection goal is 75% - this can be met while achieving the minor watershed protection goals.

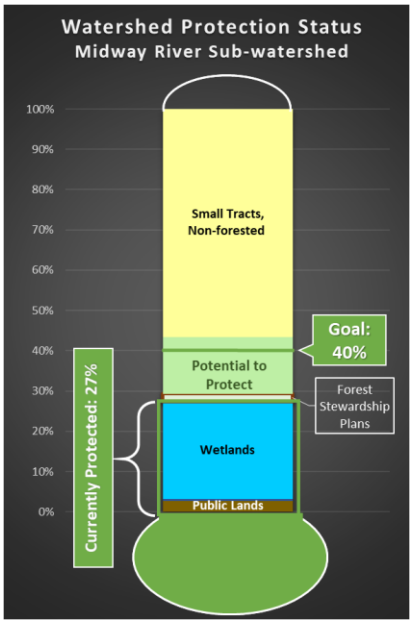
Goal 2: Forest Stewardship Guidance

- Primary landforms are moraines in the subwatershed's eastern half, and a mix of lake plains, till plains, and peatlands in the western half.
- Most of the upland areas have the potential to support mesic hardwood native plant communities (NPCs), although fire-dependent NPCs also have good potential towards the northeastern end of the subwatershed. The lowland areas may support a mix of acid peatland and wet forest NPCs.
- The forest composition is a primarily a mixture of northern hardwoods and aspen-birch cover types in the uplands, and lowland conifers (spruce, fir, cedar) and lowland hardwoods in the lowlands.
- Eastern larch beetle and emerald ash borer are significant forest health risks.
- Refer to the vegetation management framework in the 2nd Generation Northeast Landscape Plan for more specific NPC-based guidance.
- Provide forest stewardship services to interested landowners.
- Minor watershed FSP goal total – 14,213 acres, estimated 66 plans.
- Subwatershed FSP goal – 12,387 acres. Subwatershed FSP goal is smaller than the minor watershed FSP goal and may be met while achieving the minor watershed FSP goal.

Table 21. Minor watershed info.

Minor wshd #	Acres	Current % protected	Protection goal %
3018	9,567	78.1%	75%
3019	4,780	56.0%	75%
3020	12,841	71.1%	75%
3023	13,016	73.5%	75%
3024	7,417	72.6%	75%
3025	16,228	44.0%	75%
3026	4,482	89.6%	75%
3027	12,295	97.3%	75%
3028	6,343	52.0%	60%
3034	9,219	59.3%	65%
3035	4,229	83.3%	75%
3037	3,437	49.9%	65%
3038	5,159	44.4%	75%

Subwatershed No. 20
Midway River (HUC 401020114)



Goal 1: Forest Land Protection Guidance

- High forest and woody wetland cover, 76%.
- Largely stream-based watershed with relatively few lakes but 82 miles of streams, including 81 miles of trout streams.
- At risk from agriculture and development.
- High priority for forest land protection.
- Six minor watersheds have not met their protection goals – 4,822 acres of protection are required to meet all minor watershed protection goals. This would increase the overall subwatershed protection from 27% to 39%.
- Subwatershed forest land protection goal is 40% – if all minor watershed protection goals are met, then an additional 539 acres (5,361 total) are required to meet the overall subwatershed protection goal.

Goal 2: Forest Stewardship Guidance

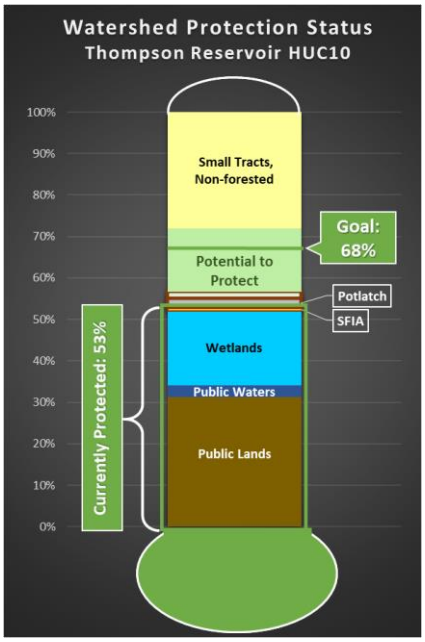
- Primary landforms are moraines in the northeastern two-thirds of the subwatershed, and till plains in the southwestern third.
- Most of the upland areas have the potential to support fire-dependent native plant communities (NPCs), although mesic hardwood NPCs also have good potential along the lower reaches of the Midway River. The lowland areas may support a mix of forested rich peatland and wet forest NPCs.
- The forest composition is a primarily a mixture of aspen-birch and northern hardwood cover types in the uplands, and lowland hardwoods in the lowlands.
- Eastern larch beetle and emerald ash borer are significant forest health risks.
- Refer to the vegetation management framework in the 2nd Generation Northeast Landscape Plan for more specific NPC-based guidance.
- Provide forest stewardship services to interested landowners.
- Minor watershed FSP goal total – 4,948 acres, estimated 23 plans.
- Subwatershed FSP goal – 5,487 acres, estimated 25 plans. This is 539 acres above and beyond the minor watershed FSP goal.

Table 22. Minor watershed info.

Minor wshd #	Acres	Current % protected	Protection goal %
3009	**7,598**	**23.0%**	**35%**
3011	7,803	29.0%	40%
3161	5,781	25.8%	45%
3162	**8,951**	**36.6%**	**45%**
3164	6,813	23.5%	35%
3173	**5,549**	**22.6%**	**30%**

Note: Priority minors are in bold red text

Subwatershed No. 21
Thompson Reservoir-St. Louis River (HUC 401020115)



Goal 1: Forest Land Protection Guidance

- High forest and woody wetland cover, 77%.
- Largely stream-based watershed with relatively few lakes but 159 miles of streams, including 100 miles of trout streams.
- At risk from agriculture and development.
- High priority for forest land protection.
- Eight minor watersheds have not met their protection goals – 12,897 acres of protection are required to meet all minor watershed protection goals. This would increase the overall subwatershed protection from 53% to 63%.
- Subwatershed forest land protection goal is 68% – if all minor watershed protection goals are met, then an additional 5,586 acres (18,484 total) are required to meet the overall subwatershed protection goal.

Goal 2: Forest Stewardship Guidance

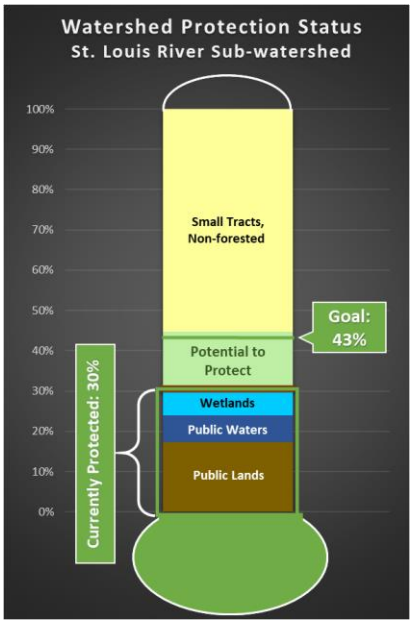
- Primary landforms are a mix of moraines, till plains, outwash plains, and lacustrine deposits.
- Upland areas have the potential to support both fire-dependent and mesic hardwood native plant communities (NPCs). The lowland areas may support a mix of forested rich peatland and wet forest NPCs.
- The forest composition is a primarily a mixture of aspen-birch, northern hardwoods, and spruce-fir cover types in the uplands, and lowland conifers (spruce, fir, cedar) and lowland hardwoods in the lowlands. Pines are also locally important in areas.
- Eastern larch beetle and emerald ash borer are significant forest health risks.
- Refer to the vegetation management framework in the 2nd Generation Northeast Landscape Plan for more specific NPC-based guidance.
- Provide forest stewardship services to interested landowners.
- Minor watershed FSP goal total – 14,909 acres, estimated 69 plans.
- Subwatershed FSP goal – 20,496 acres, estimated 95 plans. This is 5,586 acres above and beyond the minor watershed FSP goal.

Table 23. Minor watershed info.

Minor wshd #	Acres	Current % protected	Protection goal %
3012	14,178	78.6%	75%
3015	**9,514**	**36.4%**	**70%**
3016	7,583	60.2%	75%
3166	**20,250**	**32.4%**	**50%**
3172	5,214	40.1%	60%
3174	**14,236**	**36.8%**	**45%**
3175	15,169	53.8%	60%
3176	5,469	79.9%	75%
3177	10,884	43.4%	55%
3184	9,356	76.3%	75%
3188	10,309	69.1%	75%

Note: Priority minors are in bold red text

Subwatershed No. 22
St. Louis River (HUC 401020116)



Goal 1: Forest Land Protection Guidance

- Moderate forest and woody wetland cover, 55%.
- Largely stream-based watershed with relatively few lakes but 102 miles of streams, including 92 miles of trout streams.
- At risk from development.
- Medium priority for forest land protection.
- Eight minor watersheds have not met their protection goals – 6,112 acres of protection are required to meet all minor watershed protection goals. This would increase the overall subwatershed protection from 30% to 42%.
- Subwatershed forest land protection goal is 43% – if all minor watershed protection goals are met, then an additional 691 acres (6,803 total) are required to meet the overall subwatershed protection goal.

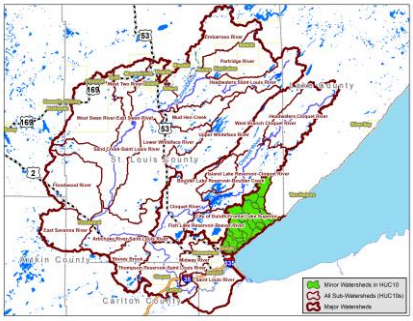
Goal 2: Forest Stewardship Guidance

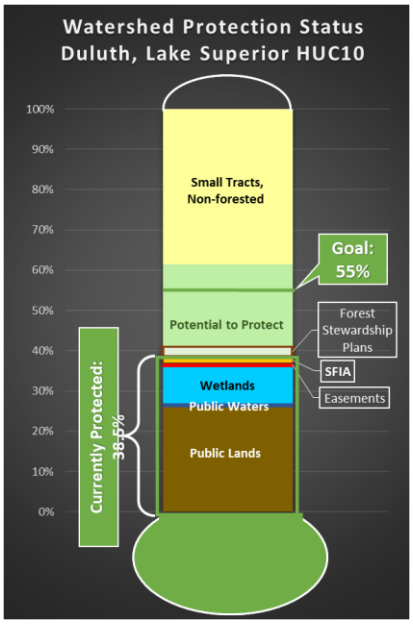
- Primary landforms include igneous (bedrock) features towards the subwatershed's center, end moraines near the highest elevations, and till plains and lacustrine deposits elsewhere.
- Upland areas have the potential to support both fire-dependent and mesic hardwood native plant communities (NPCs). The lowland areas may support a mix of forested rich peatland and wet forest NPCs.
- The forest composition is a primarily a mixture of northern hardwoods and aspen-birch cover types in the uplands, and lowland hardwoods in the lowlands.
- Emerald ash borer and terrestrial invasive plants (e.g., buckthorn, Japanese knot weed) are significant forest health risks.
- Refer to the vegetation management framework in the 2nd Generation Northeast Landscape Plan for more specific NPC-based guidance.
- Provide forest stewardship services to interested landowners.
- Minor watershed FSP goal total – 6,419 acres, estimated 30 plans.
- Subwatershed FSP goal – 7,110 acres, estimated 33 plans. This is 691 acres above and beyond the minor watershed FSP goal.

Table 24. Minor watershed info.

Minor wshd #	Acres	Current % protected	Protection goal %
3001	6,381	21.3%	25%
3010	7,011	28.6%	50%
3163	11,277	26.0%	30%
3171	3,826	45.0%	75%
3186	5,647	25.6%	30%
3189	13,857	28.5%	40%
3190	4,409	54.0%	65%
3901	1,438	38.6%	70%

Subwatershed No. 23
City of Duluth-Frontal Lake Superior (HUC 401010204)





Goal 1: Forest Land Protection Guidance

- High forest and woody wetland cover, 79%.
- Largely stream-based watershed with relatively few lakes but 205 miles of streams, including 191 miles of trout streams.
- At risk from parcelization, fragmentation, and development.
- High priority for forest land protection.
- 14 minor watersheds have not met their protection goals – 16,510 acres of protection are required to meet all minor watershed protection goals. This would increase the overall subwatershed protection from 38% to 55%.
- Subwatershed forest land protection goal is 55% – if all minor watershed protection goals are met, then an additional 389 acres (16,898 total) are required to meet the overall subwatershed protection goal.

Goal 2: Forest Stewardship Guidance

- Primary landforms are moraines in the higher elevations, and closer to the lake are till plains and igneous (bedrock) features.
- Upland areas have the potential to support both fire-dependent and mesic hardwood native plant communities (NPCs). The lowland areas may support a mix of forested rich peatland and wet forest NPCs.
- The forest composition is a primarily a mixture of aspen-birch, spruce-fir, and northern hardwood cover types in the uplands, and lowland conifers (spruce, fir, cedar) and lowland hardwoods in the lowlands.
- Spruce budworm, emerald ash borer, and terrestrial invasive plants (e.g., buckthorn, Japanese knot weed) are significant forest health risks.
- Refer to the vegetation management framework in the 2nd Generation Northeast Landscape Plan for more specific NPC-based guidance.
- Provide forest stewardship services to interested landowners.
- Minor watershed FSP goal total – 19,549 acres, estimated 90 plans.
- Subwatershed FSP goal – 19,938 acres, estimated 92 plans. This is 389 acres above and beyond the minor watershed FSP goal.

Table 25. Minor watershed info.

Minor wshd #	Acres	Current % protected	Protection goal %
2002	2,124	2.7%	0%
2027	10,125	90.6%	75%
2028	5,205	98.4%	75%
2029	4,029	77.5%	75%
2031	**4,782**	**41.9%**	**65%**
2032	**11,936**	**47.0%**	**75%**
2033	**12,635**	**44.3%**	**60%**
2034	**3,937**	**23.1%**	**55%**
2035	3,786	15.4%	40%
2036	**6,767**	**30.2%**	**55%**
2037	**5,194**	**23.7%**	**30%**
2038	5,496	16.2%	30%
2039	4,655	14.8%	20%
2040	**4,305**	**20.7%**	**30%**
2042	1,055	0.0%	0%
2043	2,325	2.3%	0%
2044	4,222	11.2%	35%
2045	2,399	5.5%	60%
2046	4,801	8.4%	40%
2047	2,361	12.3%	40%

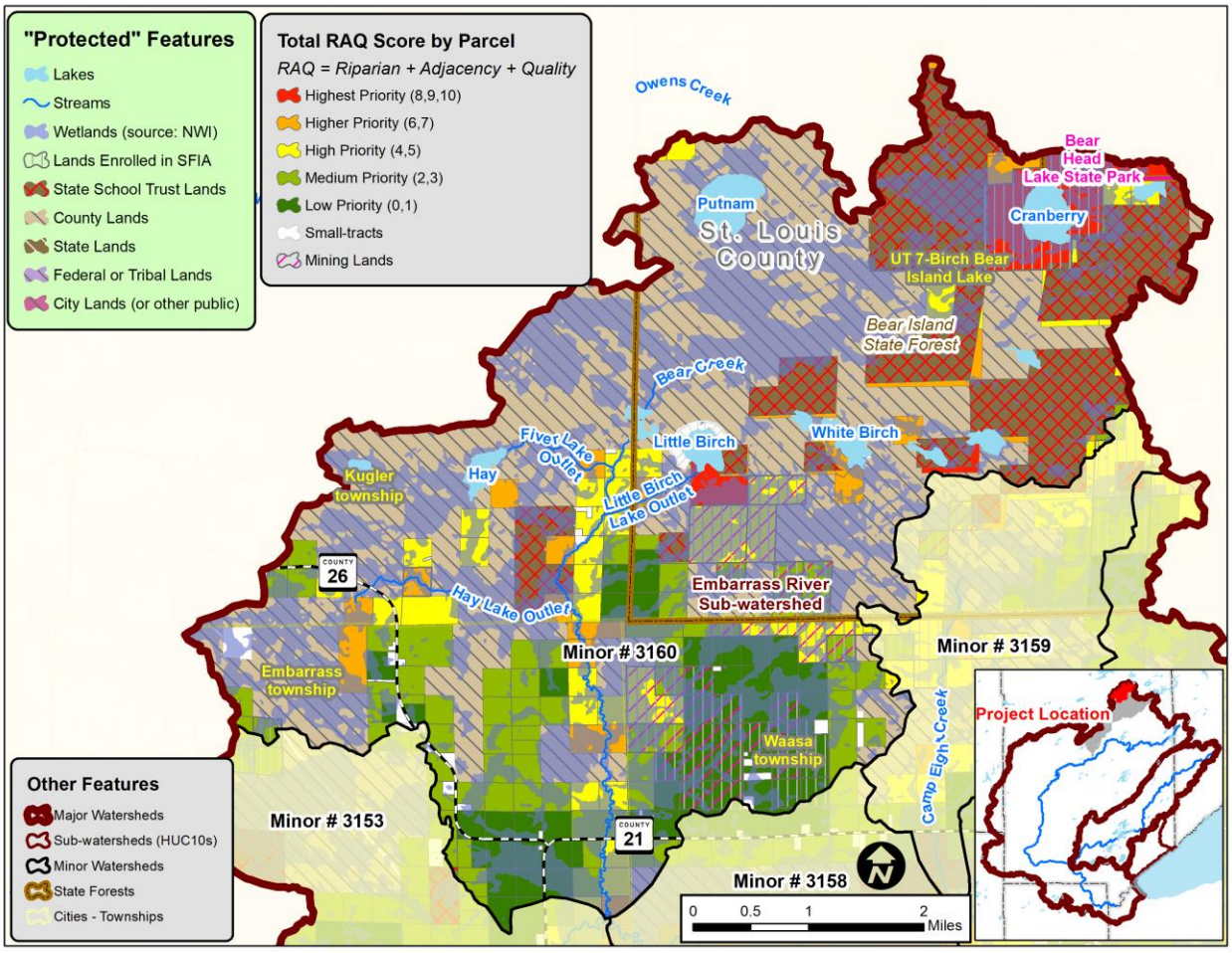
Note: Priority minors are in bold red text

Minor Watershed Methodology and RAQ Scoring

The overall St. Louis River LSP planning area has a protection goal of 75%. Each of its 23 subwatersheds have their own protection goals, which range from 40% in the Midway River Subwatershed to 75% in several others. The subwatersheds have 4 to 24 minor watersheds, and each minor also has a protection goal that was determined by the St. Louis 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 St. Louis River LSP planning area. 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 in the Bear Creek Minor Watershed within the Embarrass River Subwatershed. We can see on this map that the parcels with the highest RAQ scores are more concentrated along Bear Creek. Protecting these parcels would provide the greatest return on investment. MWA maps and tables are provided 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 watersheds #3158.



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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 64,088 acres of private forest land and the preparation of 74,314 acres of forest stewardship plans across the 1 million-acre St. Louis 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 St. Louis 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.

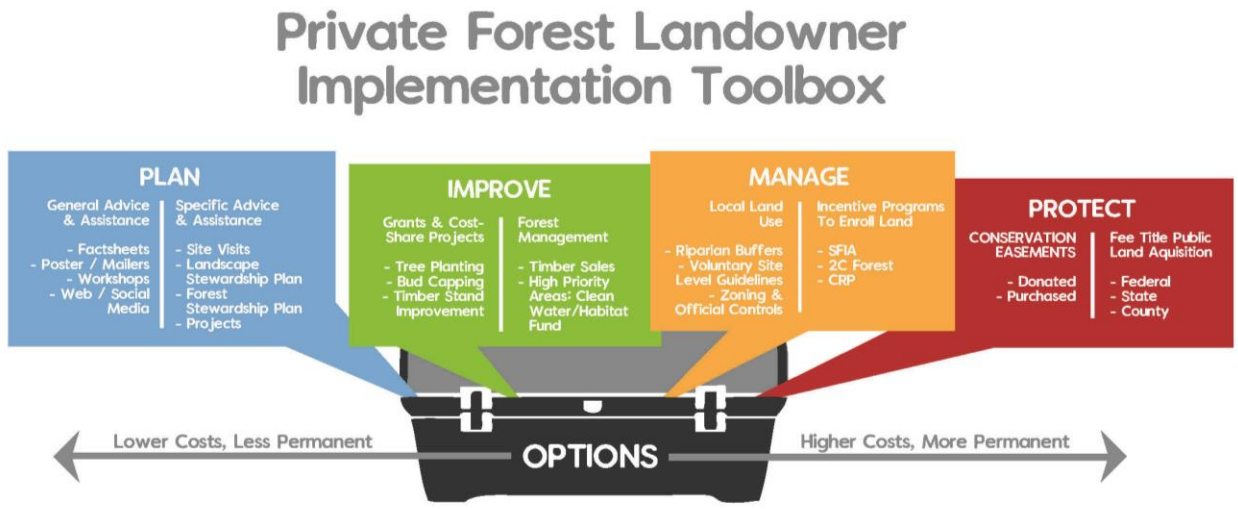
Coordination Strategy # 2 – Confirm the Project Coordinator

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 16 approved forestry professionals/plan writers have service areas in and near the St. Louis River Major Watershed. Their contact information can be found at http://www.myminnesotawoods.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 & assistance	#2 Specific advice & assistance	#3 Grants / cost-share project	#4 Forest management	#5 Land use controls	#6 Incentive programs	#7 Conservation easements	#8 Fee title public land acquisition
Mission and roles • Primary • Supporting								
Programs/projects • Geographic areas of interest • Topical interests								
Staffing/equipment • 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 St. Louis 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. The acres, plans, and public investment amounts are estimates to meet both the minor watershed (HUC 14) and subwatershed (HUC 10) level goals. This information should be reviewed and integrated into the St. Louis River 1W1P and used to help secure funding needed to implement the goals in this plan.

Table 26. 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	Headwaters Cloquet River	1,826	$1,746,523	46 / 9,843	$36,800
2	West Branch Cloquet River	71	$65,121	4 / 857	$3,200
3	Boulder Lake Reservoir-Boulder Creek	21	$19,556	2 / 390	$1,600
4	Island Lake Reservoir-Cloquet River	2,264	$3,177,552	21 / 4,577	$16,800
5	Fish Lake Reservoir-Beaver River	5,350	$6,376,185	28 / 6,141	$22,400
6	Cloquet River	8,569	$8,976,368	44 / 9,473	$35,200
7	Partridge River	4,290	$3,600,932	25 / 5,502	$20,000
8	Headwaters St. Louis River	8,446	$7,792,132	72 / 15,505	$57,600
9	Embarrass River	15,988	$13,672,782	98 / 21,248	$78,400
10	Mud Hen Creek	8,782	$7,783,426	52 / 11,143	$41,600
11	West Two River	5,486	$4,824,852	51 / 11,105	$40,800

No.	Subwatershed Name	Goal 1 – Increase Forest Land Protection		Goal 2 – Promote Forest Stewardship	
		Acres	Public investment[A]	Plans / acres	Public investment[B]
12	West Swan River-East Swan River	17,593	$14,941,748	291 / 62,880	$232,800
13	Sand Creek-St. Louis River	18,836	$16,753,715	130 / 28,207	$104,000
14	Upper Whiteface River	994	$873,493	10 / 2,163	$8,000
15	Lower Whiteface River	1,073	$930,767	78 / 16,955	$62,400
16	Floodwood River	2,232	$2,201,546	55 / 11,942	$44,000
17	East Savanna River	212	$200,947	4 / 862	$3,200
18	Stoney Brook	293	$278,044	6 / 1,332	$4,800
19	Artichoke River-St. Louis River	9,946	$9,627,646	66 / 14,213	$52,800
20	Midway River	5,361	$7,349,370	25 / 5,487	$20,000
21	Thompson Reservoir-St. Louis River	18,484	$20,244,915	95 / 20,496	$76,000
22	St. Louis River	6,803	$15,888,514	33 / 7,110	$26,400
23	City of Duluth-Frontal Lake Superior	16,898	$22,896,712	92 / 19,938	$73,600
	Totals	159,820	$170,222,849	1,328 / 287,368	$1,062,400

[A]Cost assumes 50% of area in conservation easement and 50% in SFIA for 100 years.
[B]Cost 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 216 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 27. Annual PFM accomplishment report summary table – template for the Cloquet River Major Watershed.

	Headwaters Cloquet River	West Branch Cloquet River	Boulder Lake Reservoir-Boulder Creek	Island Lake Reservoir-Cloquet River	Fish Lake Reservoir-Beaver River	Cloquet River
Baseline						
Total land area (acres)	116,853	67,656	43,127	113,277	48,471	118,186
Area of private ownership (acres; % of subwshd)	36,409; 31%	11,516; 17%	8,331; 19%	27,230; 24%	32,051; 66%	52,619; 45%
Private parcels <5 acres	368	149	20	1,403	1,149	1,124
Private parcels 5-20 acres	181	51	42	441	947	825
Private parcels >20 acres	922	260	97	514	513	952
Forest stewardship plans (#; acres)	19; 6,431	5; 629	2; 2,257	19; 3,030	10; 1,771	21; 2,461
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						

Table 28. Annual PFM accomplishment report summary table – template for the upper reaches of St. Louis River Major Watershed.

	Partridge River	Headwaters Saint Louis River	Embarrass River	Mud Hen Creek	West Two River	West Swan River-East Swan River	Sand Creek-Saint Louis River	Upper Whiteface River	Lower Whiteface River
Baseline									
Total land area (acres)	99,890	133,795	120,480	64,795	50,708	159,875	209,317	167,740	207,751
Area of private ownership (acres; % of subwshd)	49,057; 49%	47,907; 36%	81,628; 68%	38,673; 60%	37,192; 73%	102,204 ; 64%	130,471 ; 62%	27,530; 16%	102,913 ; 50%
Private parcels <5 acres	1,521	1,673	3,179	508	1,356	10,874	9,855	810	1,224
Private parcels 5-20 acres	196	431	508	322	401	1,243	1,148	256	534
Private parcels >20 acres	1,046	961	1,870	759	924	1,964	2,637	525	1,582
Forest stewardship plans (#; acres)	2; 736	12; 7,260	30; 5,682	7; 2,358	7; 4,821	22; 5,969	34; 8,901	9; 1,194	33; 6,178
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									

Table 29. Annual PFM accomplishment report summary table – template for the lower reaches of St. Louis River Major Watershed plus City of Duluth/Lake Superior Frontal Subwatershed.

	Floodwood River	East Savanna River	Stoney Brook	Artichoke River-Saint Louis River	Midway River	Thompson Reservoir-Saint Louis River	Saint Louis River	City of Duluth-Frontal Lake Superior
Baseline								
Total land area (acres)	146,859	78,032	64,710	109,012	42,494	122,162	53,848	102,141
Area of private ownership (acres; % of subwshd)	55,096; 38%	16,371; 21%	9,883; 15%	53,809; 49%	41,136; 97%	80,678; 66%	40,983; 76%	74,707; 73%
Private parcels <5 acres	902	74	559	226	3,181	8,539	24,727	23,386
Private parcels 5-20 acres	282	39	105	421	1,637	1,867	1,034	2,370
Private parcels >20 acres	1,079	303	311	1,064	563	1,380	359	855
Forest stewardship plans (#; acres)	35; 7,840	4; 1,221	8; 1,063	21; 5,454	17; 1,307	41; 4,500	11; 1,059	38; 5,919
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 tables are 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 Northeast Landscape Committee.

Coordination Strategy # 6 – Recommendations to Local and State Agencies

Recommendations to BWSR and SWCDs for the St. Louis 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 St. Louis River Watershed Landscape Stewardship Plan by reference for addressing forest land protection and forest stewardship topics in the St. Louis 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 St. Louis 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 St. Louis 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.

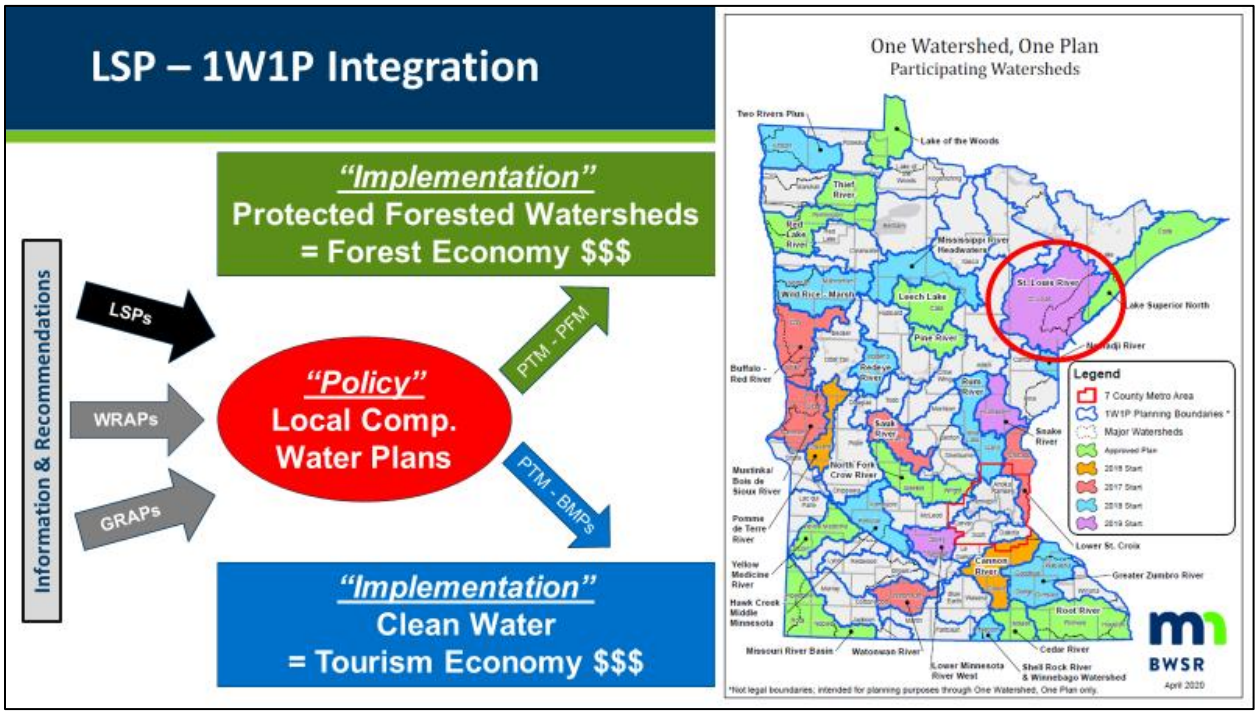
Demonstration Projects

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
	Headwaters Cloquet River Subwatershed			
	West Branch Cloquet River Subwatershed			
	Boulder Lake Reservoir-Boulder Creek Subwatershed			
	Island Lake Reservoir-Cloquet River Subwatershed			
	Fish Lake Reservoir-Beaver River Subwatershed			
	Cloquet River Subwatershed			
	Partridge River Subwatershed			
	Headwaters Saint Louis River Subwatershed			
	Embarrass River Subwatershed			
	Mud Hen Creek Subwatershed			
	West Two River Subwatershed			
	West Swan River-East Swan River Subwatershed			
	Sand Creek-Saint Louis River Subwatershed			

Map no.	Project name and brief description	Subwd / project priority	Lead entity / support entities	Proposed timeline
	Upper Whiteface River Subwatershed			
	Lower Whiteface River Subwatershed			
	Floodwood River Subwatershed			
	East Savanna River Subwatershed			
	Stoney Brook Subwatershed			
	Artichoke River-Saint Louis River Subwatershed			
	Midway River Subwatershed			
	Thompson Reservoir-Saint Louis River Subwatershed			
	Saint Louis River Subwatershed			
	City of Duluth-Frontal Lake Superior Subwatershed			

Linking Forest & Water Planning and Implementation through LSPs and 1W1Ps

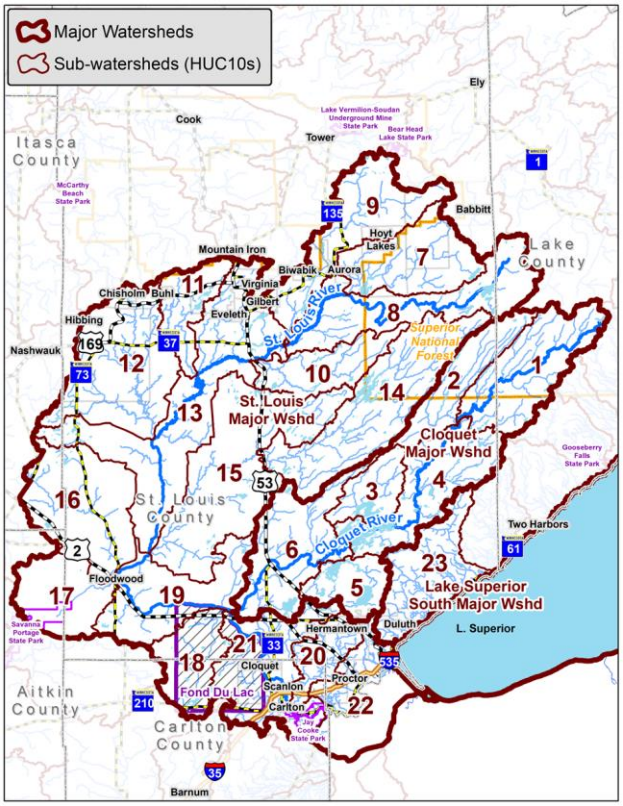


Note: Landscape stewardship plans (LSPs) like the MPCA Watershed Restoration and Protection Strategies (WRAPs) and the MDH Groundwater Restoration and Protection Strategies (GRAPs) provide an important information and relevant context from state water and forest resource programs to inform comprehensive 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 – Cloquet River and St. Louis River Major Watershed



Subwd No.	Subwatershed Name (HUC 10)	HUC No.	Acres	No. of Minors
Cloquet Major Watershed (HUC 8)				
1	Headwaters Cloquet River	401020201	116,853	15
2	West Branch Cloquet River	401020202	67,656	9
3	Boulder Lake Reservoir-Boulder Creek	401020203	43,127	6
4	Island Lake Reservoir-Cloquet River	401020204	113,277	10
5	Fish Lake Reservoir-Beaver River	401020205	48,471	4
6	Cloquet River	401020206	118,186	14
St. Louis Major Watershed (HUC 8 – Main Stem)				
7	Partridge River	401020101	99,890	11
8	Headwaters St. Louis River	401020102	133,795	12
9	Embarrass River	401020103	120,480	9
10	Mud Hen Creek	401020104	64,795	6
11	West Two River	401020105	50,708	4
12	West Swan River-East Swan River	401020106	159,875	13
13	Sand Creek-St. Louis River	401020107	209,317	24
14	Upper Whiteface River	401020108	167,740	20
15	Lower Whiteface River	401020109	207,751	21
16	Floodwood River	401020110	146,859	15
17	East Savanna River	401020111	78,032	7
18	Stoney Brook	401020112	64,710	6
19	Artichoke River-St. Louis River	401020113	109,012	13
20	Midway River	401020114	42,494	6
21	Thompson Reservoir-St. Louis River	401020115	122,162	11
22	St. Louis River	401020116	53,848	8
Lake Superior - South Major Watershed (HUC 8)				
23	City of Duluth / Lake Superior Frontal	401010204	99,862	20
	Totals		**2,438,900**	**264**