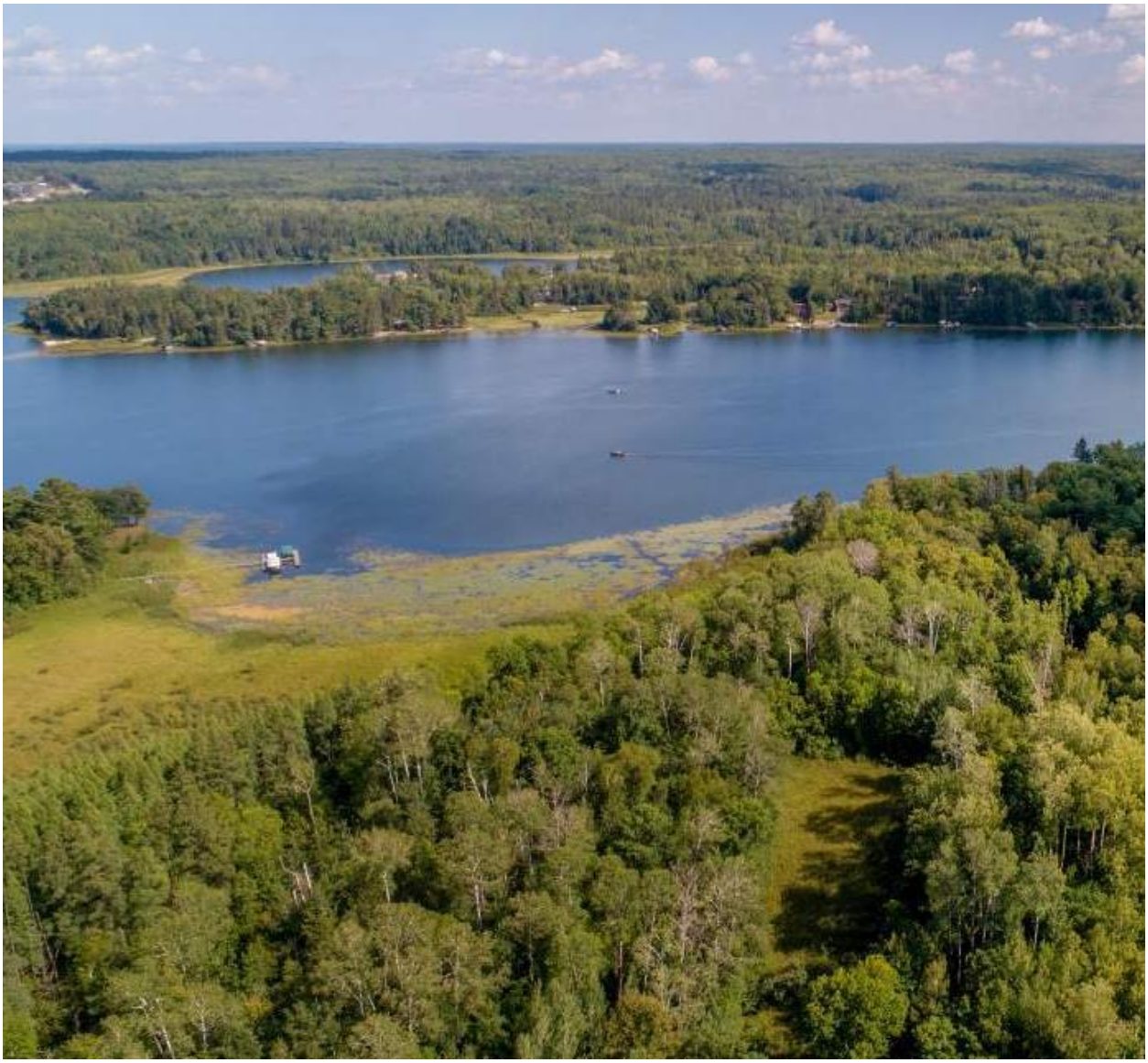
Leech Lake River Watershed Landscape Stewardship Plan



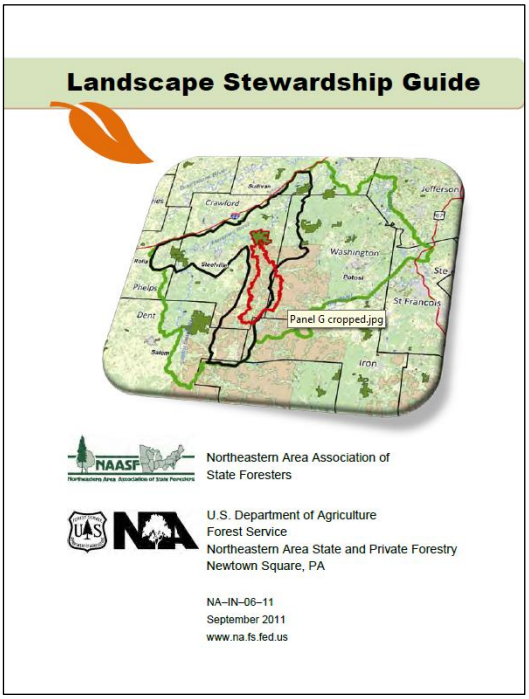
Aitkin SWCD *Cass County Environmental Services* *Hubbard SWCD*

Leech Lake Division of Resource Management *Northern Waters Land Trust*

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

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

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

Credits

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Cover photo: Leech Lake. Taken by Nels Norquist of Maple Leaf Photography.
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Minnesota Department of Natural Resources
Division of Forestry
500 Lafayette Road
St. Paul, Minnesota 55155

June 2020

Dear Citizens of the Leech Lake River Major Watershed:

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

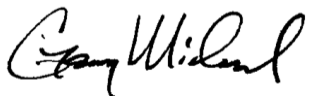
The primary purpose of this plan is to empower your team of service providers to work together with private landowners and land managers to protect working forest lands and promote private forest stewardship. This plan identifies and prioritizes opportunities for private landowners to engage in forest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

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

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

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

Sincerely,



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

Introduction

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

Purpose and Scope

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

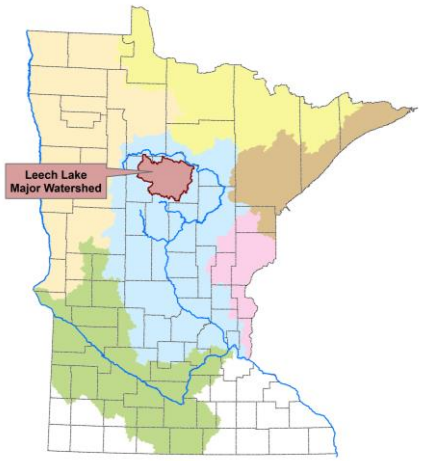
The Leech Lake River Major Watershed in North Central Minnesota is a lake rich watershed and the first major watershed to feed into the Mississippi River. Research of over 1,300 lakes by DNR Fisheries revealed impacts of land use disturbance in a watershed and importance of protecting private lands. There are few places better to advance the protection and management of working forest lands on a landscape level than this watershed.

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

- Public land ownership dominates the watershed. Private lands are concentrated in the northwest corner, which is on the outskirts of the City of Bemidji.
- Forests and wetlands are largely intact, especially in the center and eastern portions of the watershed. Land conversions are primarily agricultural uses moving in from the northwest.
- Management activities over many years have converted forests from conifer-dominated to deciduous-dominated cover types.
- High-quality water resources provide abundant recreation opportunities and source water for major populations centers downstream (St. Cloud and the Twin Cities). Water quality is dependent on maintaining significant levels of forest land cover across the watershed.



Linking Landscape Stewardship and Local Water Planning

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

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

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

Partners and Process

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

Plan Content – Using this Plan

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

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

Part 1: Analysis of Forest and Water Resources

Introduction

The first part of this plan provides background information on the setting of the Leech Lake 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 Leech Lake River Major Watershed is in the northern part of the Upper Mississippi Basin and near the headwaters to the Mississippi River. The Basin starts in Lake Itasca and ends at Lock and Dam Number 2 near Hastings. It covers about 20,100 square miles and is the only major drainage basin located entirely in Minnesota. The Upper Mississippi Basin is the most important source water in Minnesota – supplying both St. Cloud and the Twin Cities – as well as a contributor of source water for every major population center along the Mississippi River.

As its name implies, the Leech Lake River Major Watershed is home to Leech Lake, which is one of the foremost recreational lakes in Minnesota. The Leech Lake River Major Watershed drains about 1,341 square miles and is composed of six HUC 10 subwatersheds (Fig 2) which correspond to major streams and lakes in the region. The subwatersheds are further subdivided into 75 minor watersheds (HUC 14), each averaging 17.9 square miles.

Smaller than minor watersheds are catchments, which is the area between pour points, and it is also the level at which watersheds can be classified to a protection or restoration strategy as defined by the MN DNR Fisheries Lake Habitat Framework – see Fig 1 and Fig 3. Most of the catchments in the Leech Lake River Major Watershed fall into either the "Vigilance" or "Protection" categories, with "Full Restoration" catchments in the northwest corner.

Fig 1. Watershed categorization framework.

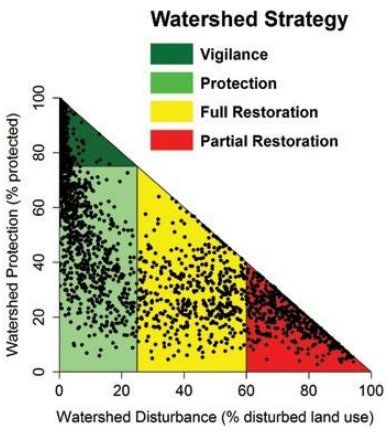


Fig 2. Leech Lake River major and subwatersheds.

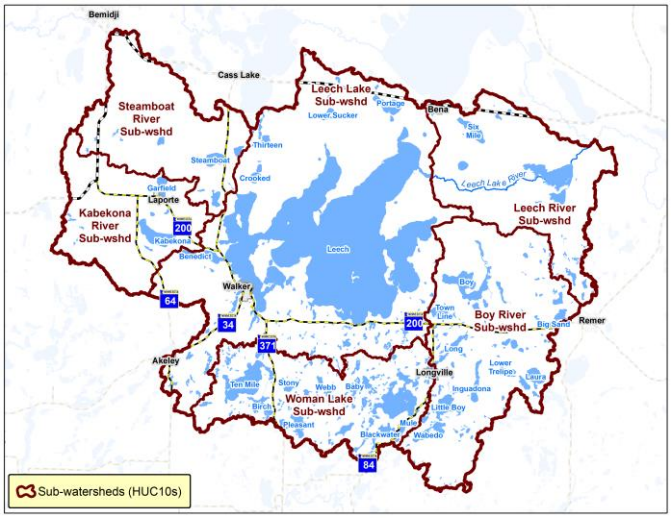
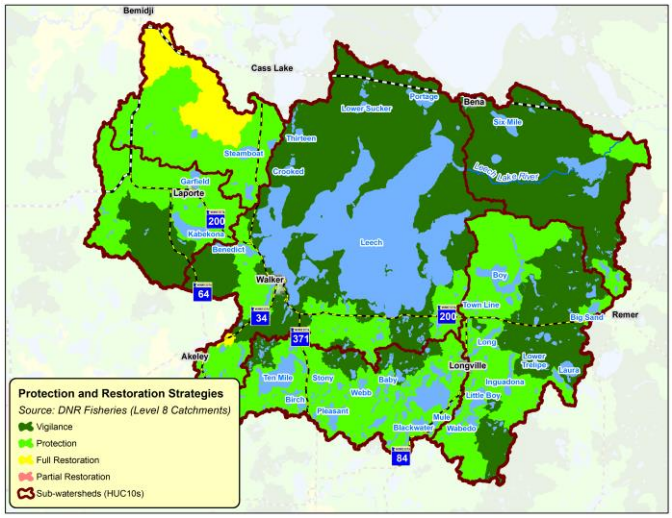


Fig 3. Protection/Restoration classifications.

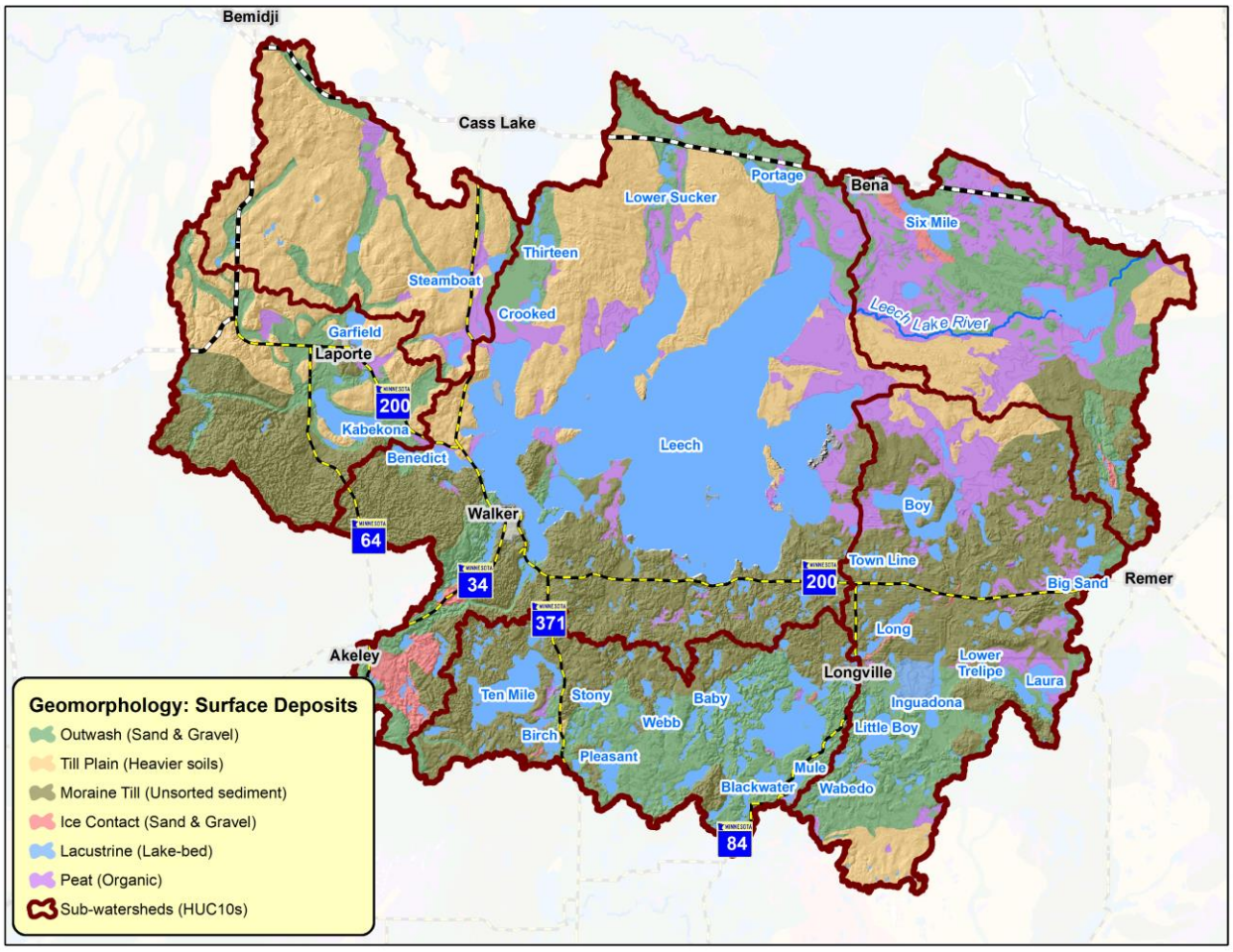


Geomorphology

From a geomorphological perspective the Leech Lake River Major Watershed is roughly divided into a southern and northern half. The southern half is dominated by the Itasca Moraine and is characterized by steep topography with significant amounts of relief. The northern half is less rugged and has level to gently rolling till plains dissected by ribbons of outwash in the northwest corner, and a nearly level area of outwash and lake plain to the northeast of Leech Lake. The Leech Lake River flows through the outwash and lake plain before meeting with the Mississippi River.

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 Leech Lake River Major Watershed.



Land Cover

Prior to European settlement, the Leech Lake River Major Watershed was covered by forests, wetlands, and lakes (Table 1 and Fig 5). Today, the landscape remains 65% forested with significant amounts of wetlands and open water, along with a moderate amount of agriculture and low levels of development. Overall, the land cover has been most modified in the northwestern corner the watershed, where much of the forest has been converted to agriculture (Fig 6). This is particularly noticeable in the Steamboat River Subwatershed. Conversely, all the other subwatersheds remain largely intact and have abundant forest, wetland, and water resources.

Table 1. Historic and current land cover comparison.

Land cover description	Pre-European settlement		2016	
	Acres	%	Acres	%
Urban and rural development	0	0%	23,278	3%
Cultivated land	0	0%	7,626	1%
Prairie – Hay/pasture/grassland	14,748	2%	30,979	4%
Forest	637,660	74%	558,507	65%
Upland shrub	0	0%	12,846	1%
Water	174,590	20%	163,197	19%
Bog/marsh/fen	30,965	4%	60,809	7%
Mining	0	0%	740	0%

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

Fig 5. Historic vegetation in the Leech Lake River Major Watershed.

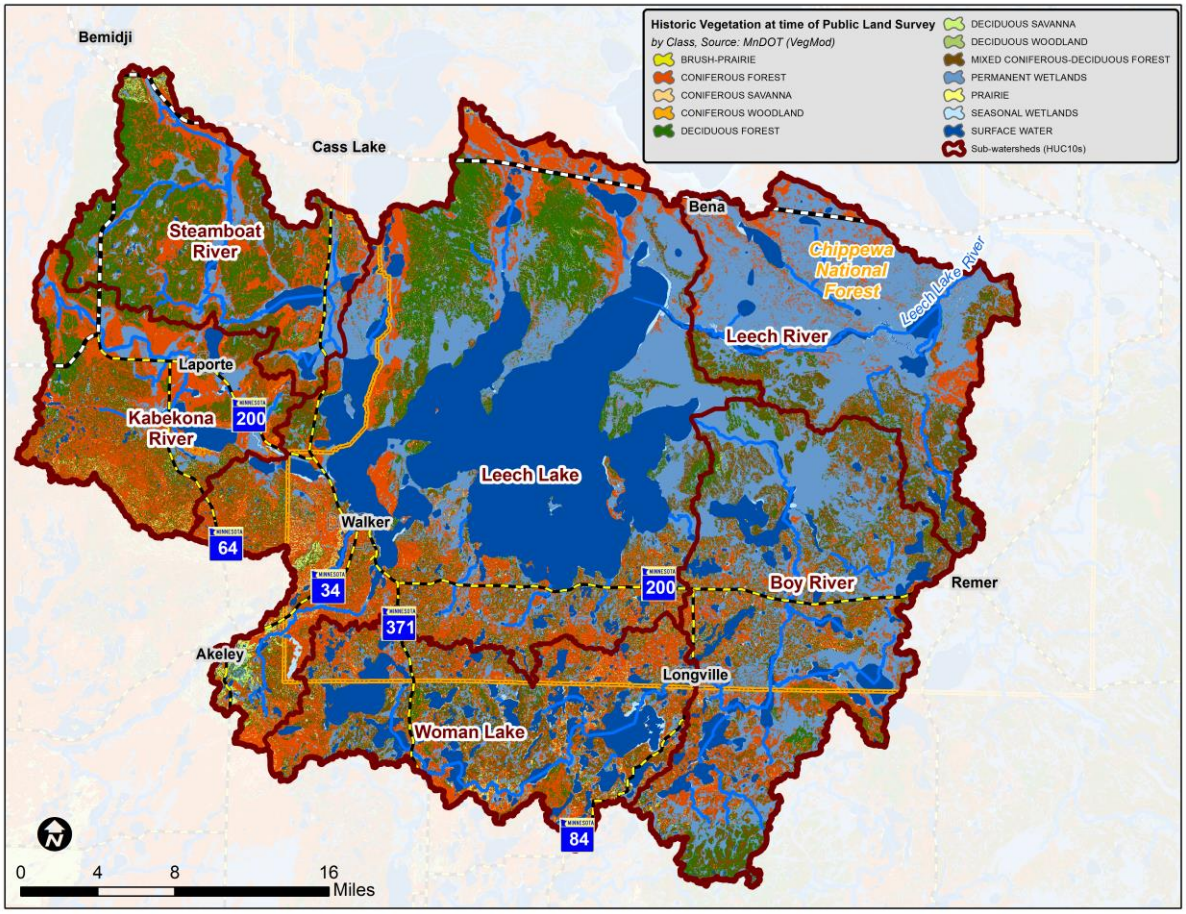
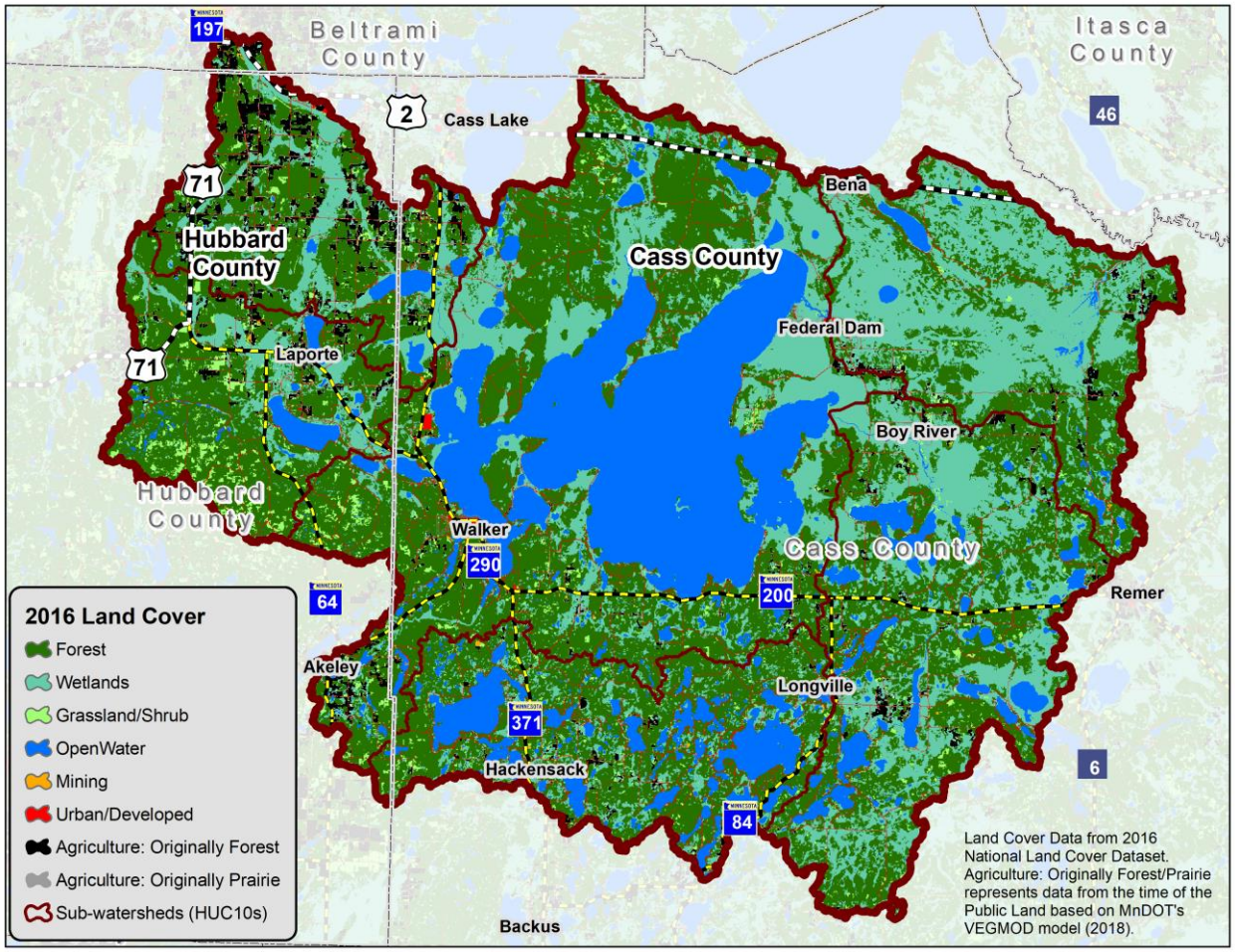


Fig 6. Current vegetation and areas of historic forest loss.

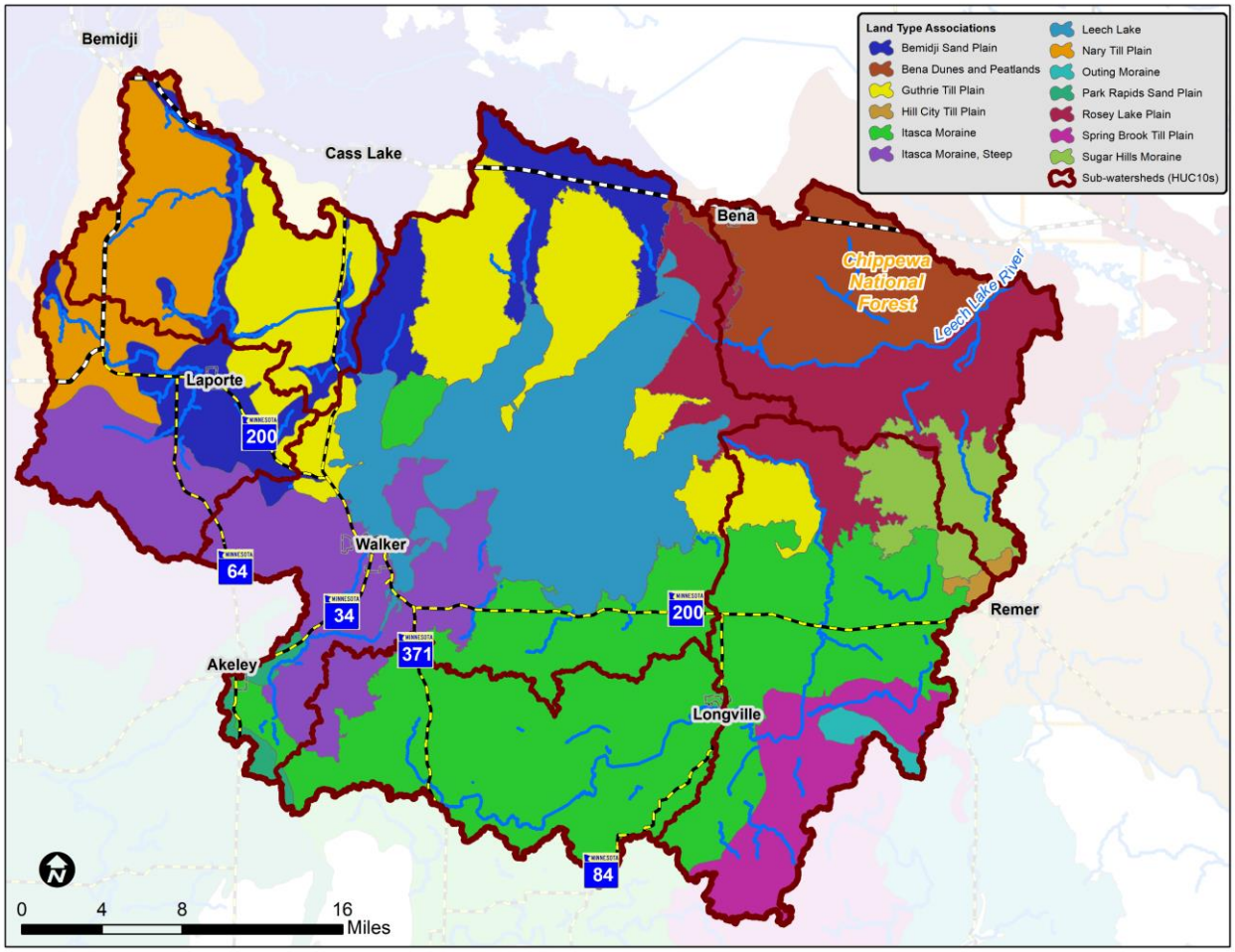


Ecological Setting

The Leech Lake River Major Watershed is uniquely situated at the western edge of the Laurentian Mixed Forest Province and the historical extent of the great white pine forest that stretched from eastern Maine to western Minnesota. This region is located entirely in the Minnesota Drift & Lake Plains ECS Section and is split by the Chippewa Plains ECS Subsection in its northern half and the Pine Moraines & Outwash Plains ECS Subsection in its southern half. A small portion also intersects with the Louis Moraines Subsection near its eastern border.

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 Leech Lake River Major Watershed has portions of 13 LTAs (Fig 7), although half of the area is covered by only three of them: the Itasca Moraine (25% of watershed), Guthrie Till Plain (13%), and Leech Lake (12%).

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



Prior to European settlement the vegetation was a mixture of conifer and deciduous forests. White pine and red pine were present on the moraines, and jack pine was the dominant cover type on outwash plains. Hardwoods grew on sheltered areas of the moraines, generally close to large lakes. Hardwoods and white pine also grew on the till plains to the north and west of Leech Lake. The area north and east of Leech Lake had abundant lowland forests that were occupied by black spruce, tamarack, white cedar, and black ash.

As a result of the 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 dramatically. In the area around the Leech Lake River Major Watershed the forest shifted away from conifers and towards deciduous species (Table 2). Aspen is now the most common trees species and is found in both pure and mixed stands throughout the watershed.

Table 2. Change in tree species composition in since presettlement.

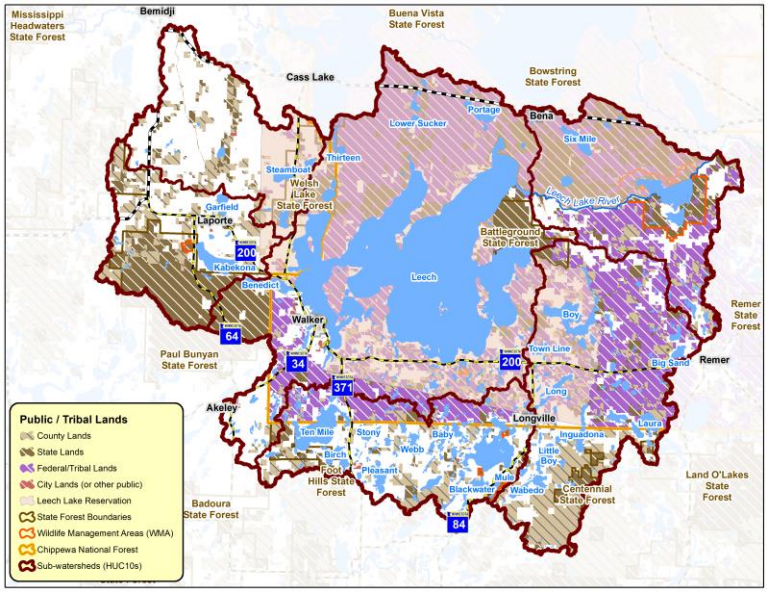
Species	Change	Species	Change
White spruce	Decline, 5 to 10-fold	Aspen	Increase, 2 to 3-fold
White pine	Decline, 3 to 5-fold	Red oak	Rare as bearing tree
Tamarack	Decline, 3 to 5-fold	Ash	Rare as bearing tree
Jack pine	Decline, 2 to 3-fold	Bur oak	Rare as bearing tree
Red pine	Decline, 2 to 3-fold	Basswood	Rare as bearing tree
Black spruce	Some decline	Sugar maple	Rare as bearing tree
White cedar	Some decline	Balm-of-Gilead	Rare as bearing tree
Paper birch	Some increase	Red maple	Rare as bearing tree
Balsam fir	Some increase	Elm	Rare as bearing tree

Source: DNR Division of Forestry, Resource Assessment.
Note: Results are summarized from Land Type Association (LTA)-level data that only includes LTAs that intersect with the Leech Lake River Major Watershed.

Land Ownership

Land ownership in the Leech Lake River Major Watershed is split between many different public and private entities, but for the most part it is a public landscape with 73% of the area under federal, state, or county management. Public ownership is especially high in the Boy River, Leech Lake, Leech River subwatersheds where the Chippewa National Forest has large holdings.

Fig 8. Private and public land ownership.



The State of Minnesota also owns significant amounts of land in the form of the Bowstring State Forest in the Leech River Subwatershed, as well as the Paul Bunyan State Forest in the Kabekona River Subwatershed. Lastly, county land departments manage the tax-forfeited lands, of which there is a large amount in the Boy River Subwatershed.

Private land is unevenly distributed across the landscape, often in blocks and pockets between public lands. Most of the private land occurs in south and northwest areas of the watershed and is especially high in the Steamboat River Subwatershed, which is 73% privately owned.

Social and Economic Context

Census data from 2010 estimates that the population of all minor civil divisions in the Leech Lake River Major Watershed is 37,878, or 0.7% of Minnesota's population. Despite its relatively low population, the Leech Lake River Major Watershed provides outsized social and economic services.

The Leech Lake River Major Watershed is a popular recreation destination in the heart of Minnesota's lake country, and tourists come from across the nation to visit its 450+ lakes and 300 miles of streams. The most famous of these is Leech Lake The Leech Lake River Major Watershed 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 major population centers in the rest of the state. In fact, in the Forests, Water, and People study by the Forest Service, the Leech Lake River Major Watershed was ranked as the sixth most important major watershed in all of Minnesota for providing drinking water.

In order to continue producing high quality drinking water, the forests and wetlands in the Leech Lake 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 9). Furthermore, natural cover greatly promotes infiltration and reduces runoff of sediment and potentially pollution-laden runoff (Fig 10).

Fig 9. Annual phosphorous exports by land use.

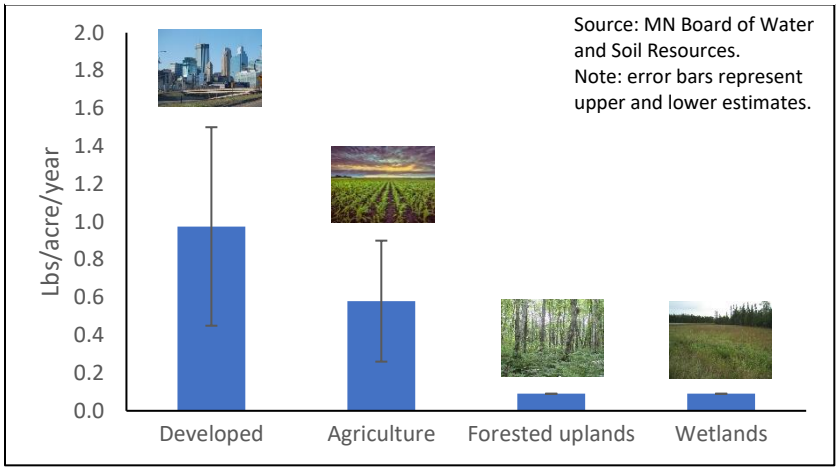
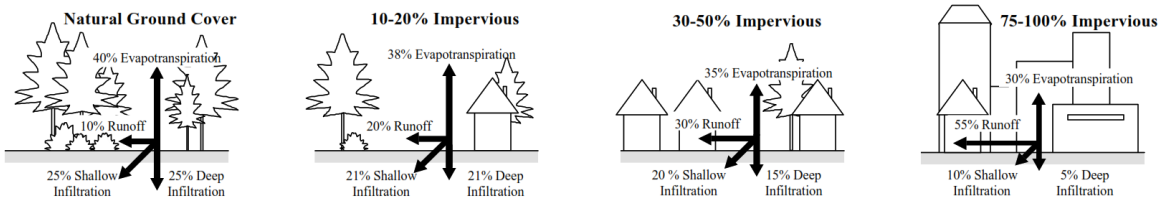


Fig 10. Effects of imperviousness on runoff and infiltration.



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.

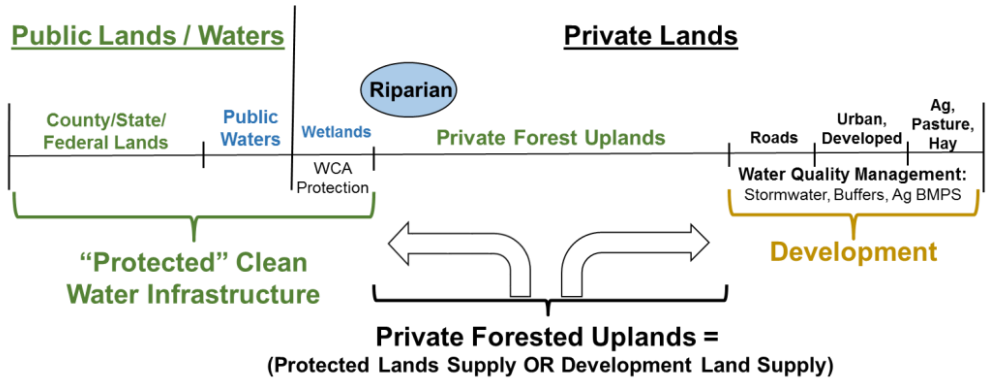


Fig 11. Generalized Land Protection Model.

What is Priority?

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

Table 3. Drivers of quality and risk in the Leech Lake River Major Watershed.

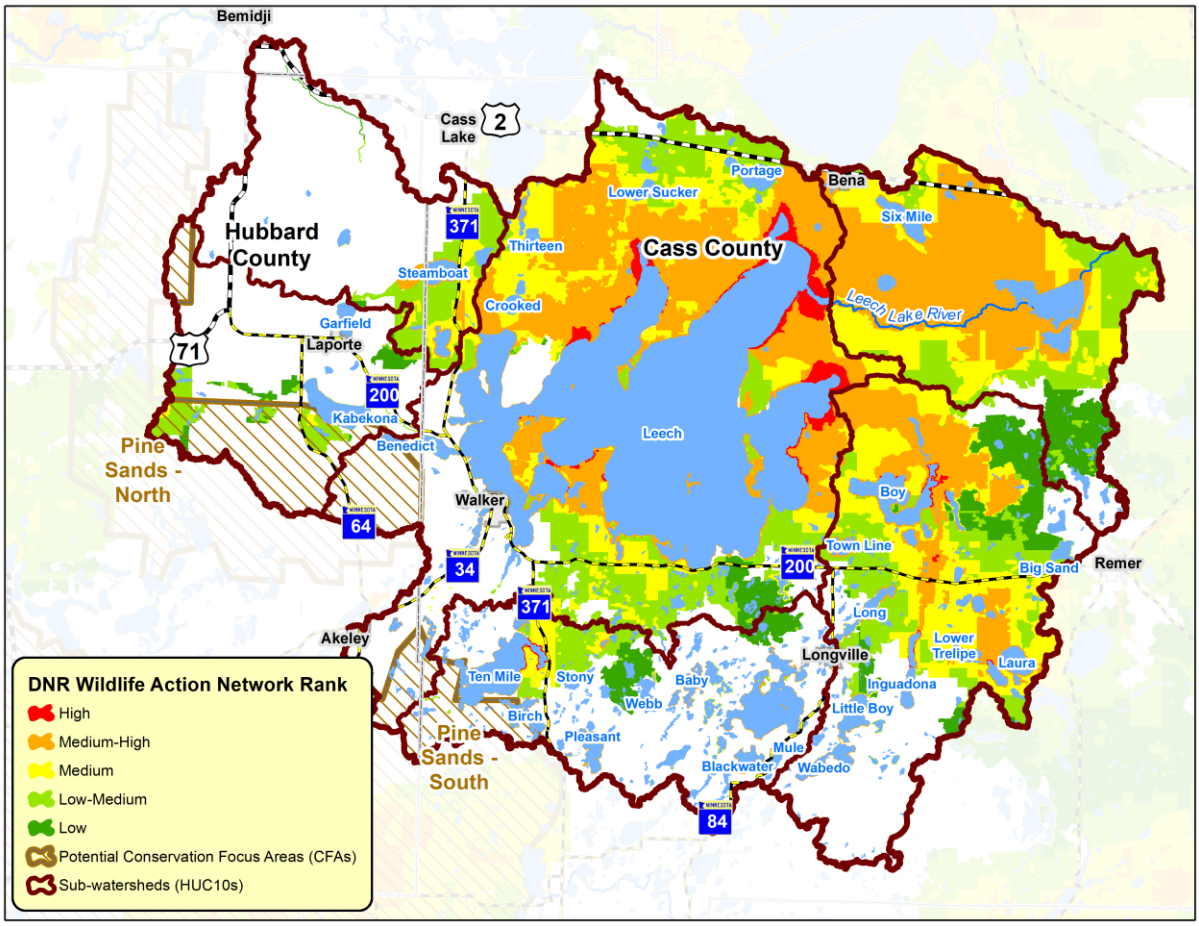
Subwatershed name	Drivers of quality	Drivers of risk
Steamboat River	Surface water (trout streams), forest/habitat	Ag: animal
Kabekona River	Surface water, forests/habitat, groundwater	Ag: animal, impairments, development
Woman Lake	Surface water, forests/habitat	Development, declining WQ
Boy River	Surface water, forests/habitat	Development, declining WQ, impairment
Leech Lake	Surface water, forests/habitat	Development
Leech River	Surface water, forests/habitat	Development

Forest Conservation Opportunity Areas

The following list of existing conservation priorities in the Leech Lake River Major Watershed have been identified by various state agencies and environmental organizations. As noted previously, these resources were consulted by the Leech Lake 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.
- Leech Lake River Watershed Restoration and Protection Strategies – MPCA.
- 25-Year Lessard-Sams Outdoor Heritage Council (LSOHC) Forest Habitat Vision – MFRC and MFRP.
- Zonation Model – DNR and TNC.

Fig 12. MN DNR Wildlife Action Network.

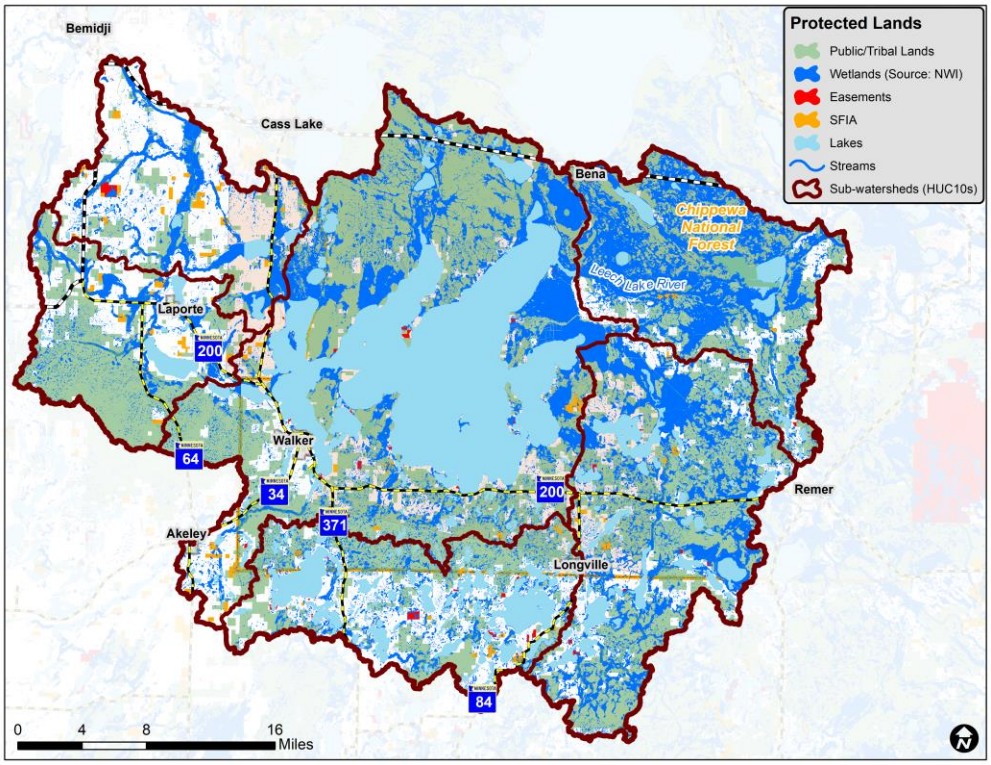


Key Observations and Conclusions

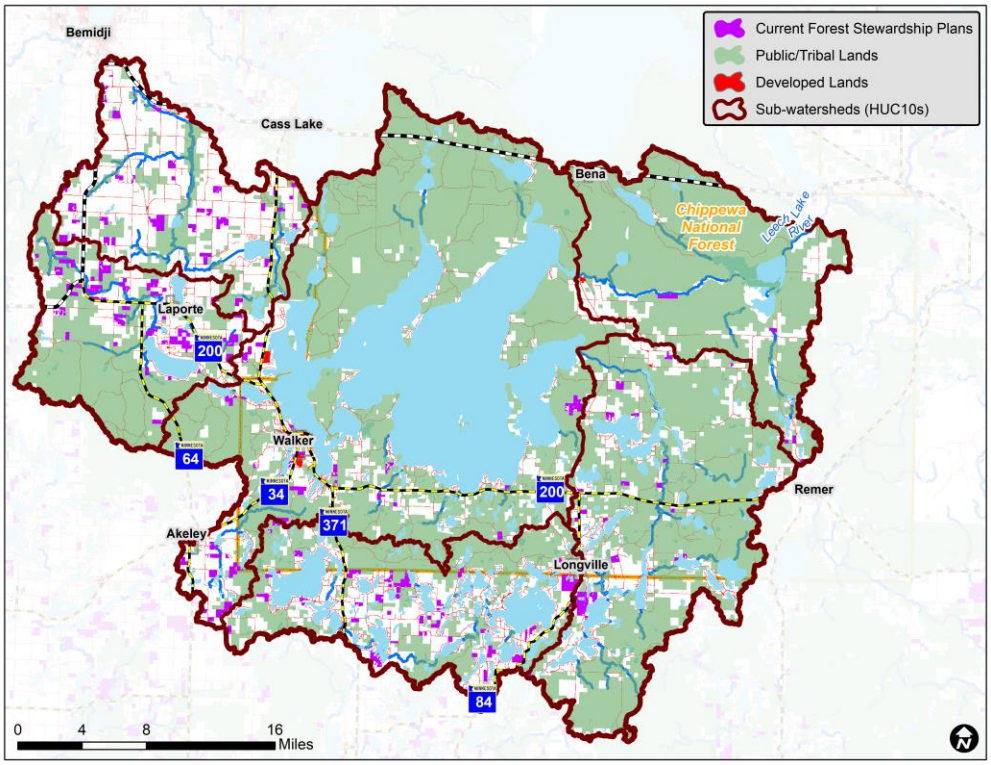
The following key observations and conclusions are based on the information gathered in the course of the planning process for this landscape stewardship plan:

- The Leech Lake River Major Watershed has some of the finest freshwater lakes in the country with good water quality thanks to an abundance of well drained soils, high forest cover, intact wetlands, flat slopes, and mostly natural (not channelized) streams.
- There is significant potential for loss of private forest lands and an increase in landscape disturbance in the northwest corner of the watershed. This area is adjacent to Bemidji, which is a growing major regional center.
- 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.
- No major forest industries are located within this watershed, although just to its north are several mills – Potlatch, Norboard, Cass Forest Products, Rajala, Lonza, Nelson Wood Shims, 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 carbon sequestration. Utilizing ecosystem-based forest management will improve carbon sequestration and storage.
- 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 North Central Landscape Plan approved by the Minnesota Forest Resources Council (MFRC) provides useful guidance for forest vegetation management based on native plant communities across the 10-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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Part 2: The Vision

Mission

To empower teams of service providers to work together with private landowners and land managers in the Leech Lake 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 Leech Lake 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 – 78%. Goal – 75%.
- Subwatershed levels (HUC 10): Current levels range from 39% to 90%. Goal – all subwatersheds 75%, except for Steamboat River (Subwd No. 1) – 49%.
- Minor watershed levels (HUC 14): Protection goals recommended by the LSP Planning Team. See Appendix and the LFT Workbook.

Goal 2: Promote Private Forest Stewardship

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

Coordinated Roles to Increase Forest Land Protection and Stewardship

Goal 1: Increase Forest Land Protection Levels

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

Goal 2: Promote Private Forest Stewardship

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

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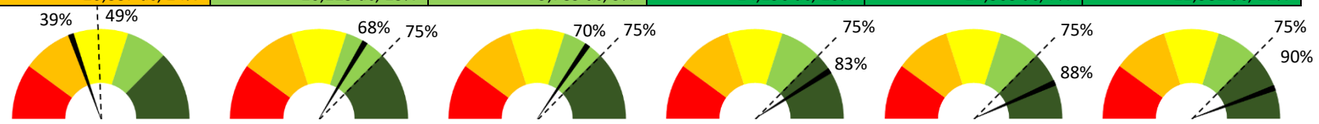
Goal 1: Forest Land Protection

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

	Subwd. No 1 (HUC 701010201) Steamboat River	**Subwd. No 2 (HUC 701010202) Kabekona River**	**Subwd. No 3 (HUC 701010203) Woman Lake**	**Subwd. No 4 (HUC 701010204) Boy River**	**Subwd. No 5 (HUC 701010205) Leech Lake**	**Subwd. No 6 (HUC 701010206) Leech River**
Area	85,826 ac	77,237 ac	104,319 ac	148,715 ac	332,672 ac	109,202 ac
Natural Factors						
Presettlement forest cover	93%	89%	66%	83%	60%	87%
Current forest cover	48%	60%	46%	50%	36%	39%
Lakes	12 lakes; 3%	14 lakes; 6%	162 lakes; 24%	126 lakes; 12%	126 lakes; 35%	30 lakes; 7%
Wetlands	19%	15%	14%	30%	18%	45%
Forest Land Protection Assessment						
Public waters	3,063 ac; 4%	4,825 ac; 6%	25,223 ac; 24%	18,781 ac; 13%	115,433 ac; 35%	8,662 ac; 8%
Public lands	20,084 ac; 23%	42,176 ac; 55%	38,725 ac; 37%	95,002 ac; 64%	166,809 ac; 50%	84,953 ac; 78%
Private wetlands	8,204 ac; 10%	4,194 ac; 5%	6,886 ac; 7%	8,267 ac; 6%	8,252 ac; 2%	4,748 ac; 4%
SFIA	1,978 ac; 2.3%	1,267 ac; 1.6%	1,012 ac; 1.0%	613 ac; 0.4%	1,892 ac; 0.6%	204 ac; 0.2%
Easements	408 ac; 0.5%	23 ac; 0.0%	835 ac; 0.8%	275 ac; 0.2%	499 ac; 0.2%	40 ac; 0.0%
Total protected area	33,738 ac; 39%	52,484 ac; 68%	72,716 ac; 70%	122,938 ac; 83%	292,888 ac; 88%	98,607 ac; 90%
Protection priority	Medium	High	High	Low	Low	Low
Forest Land Protection Cost Analysis						
Protection goal	49%; 8,316 ac to goal	75%; 5,443 ac to goal	75%; 5,523 ac to goal	75%; 0 ac to goal	75%; 0 ac to goal	75%; 0 ac to goal
Potential to protect	37,716 ac; 44%	16,870 ac; 22%	17,982 ac; 17%	17,008 ac; 11%	23,875 ac; 7%	8,557 ac; 8%
Average land value	$1,645/ac	$1,544/ac	$2,798/ac	$2,267/ac	$2,503/ac	$1,473/ac
Protection cost*	$9,359,863	$5,961,239	$8,127,185	$0	$0	$0
Forest Land Protection Priorities						
Quality Protection Factors						
Cisco lakes	0 lakes; 0%	1 lake; 3%	4 lakes; 6%	2 lakes; 1%	4 lakes; 0%	0 lakes; 0%
Trout lakes	0 lakes; 0%	1 lake; 0%	2 lakes; 0%	0 lakes; 0%	1 lake; 0%	0 lakes; 0%
Lakes of biodiversity significance (outstanding & high)	3 lakes; 2%	2 lakes; 4%	17 lakes; 16%	15 lakes; 8%	8 lakes; 34%	5 lakes; 4%
Priority shallow lakes	1 lake; 0%	2 lakes; 0%	6 lakes; 1%	11 lakes; 2%	9 lakes; 0%	4 lakes; 0%
Priority wild rice lakes	0 lakes; 0%	0 lakes; 0%	2 lakes; 0%	9 lakes; 4%	3 lakes; 0%	3 lakes; 1%
Trout steams	17 mi	30 mi	0 mi	0 mi	0 mi	0 mi
FFF mean composite score	95.7	102.4	97.9	102.4	100.4	91.9
Terrestrial biodiversity (MBS) (outstanding and high)	12,826 ac; 15%	4,900 ac; 6%	4,445 ac; 4%	36,554 ac; 25%	95,426 ac; 29%	62,245 ac; 57%
Wildlife Action Network (high & medium-high)	3,307 ac; 4%	529 ac; 1%	15,827 ac; 15%	33,962 ac; 23%	175,685 ac; 53%	52,502 ac; 48%
Risk Management Factors						
Lake phosphorous sensitivity (highest & higher)	2 lakes; 2,116 ac	3 lakes; 3,657 ac	26 lakes; 19,926 ac	17 lakes; 9,217 ac	15 lakes; 106,698 ac	2 lakes; 1,695 ac
Water quality trend (declining)	0 lakes; 0 ac	0 lakes; 0 ac	3 lakes; 708 ac	2 lakes; 1,324 ac	0 lakes; 0 ac	0 lakes; 0 ac
Land use disturbance	20,887 ac; 24%	10,125 ac; 13%	9,789 ac; 9%	14,196 ac; 10%	24,303 ac; 7%	12,382 ac; 11%

Protection Levels and Goals†



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

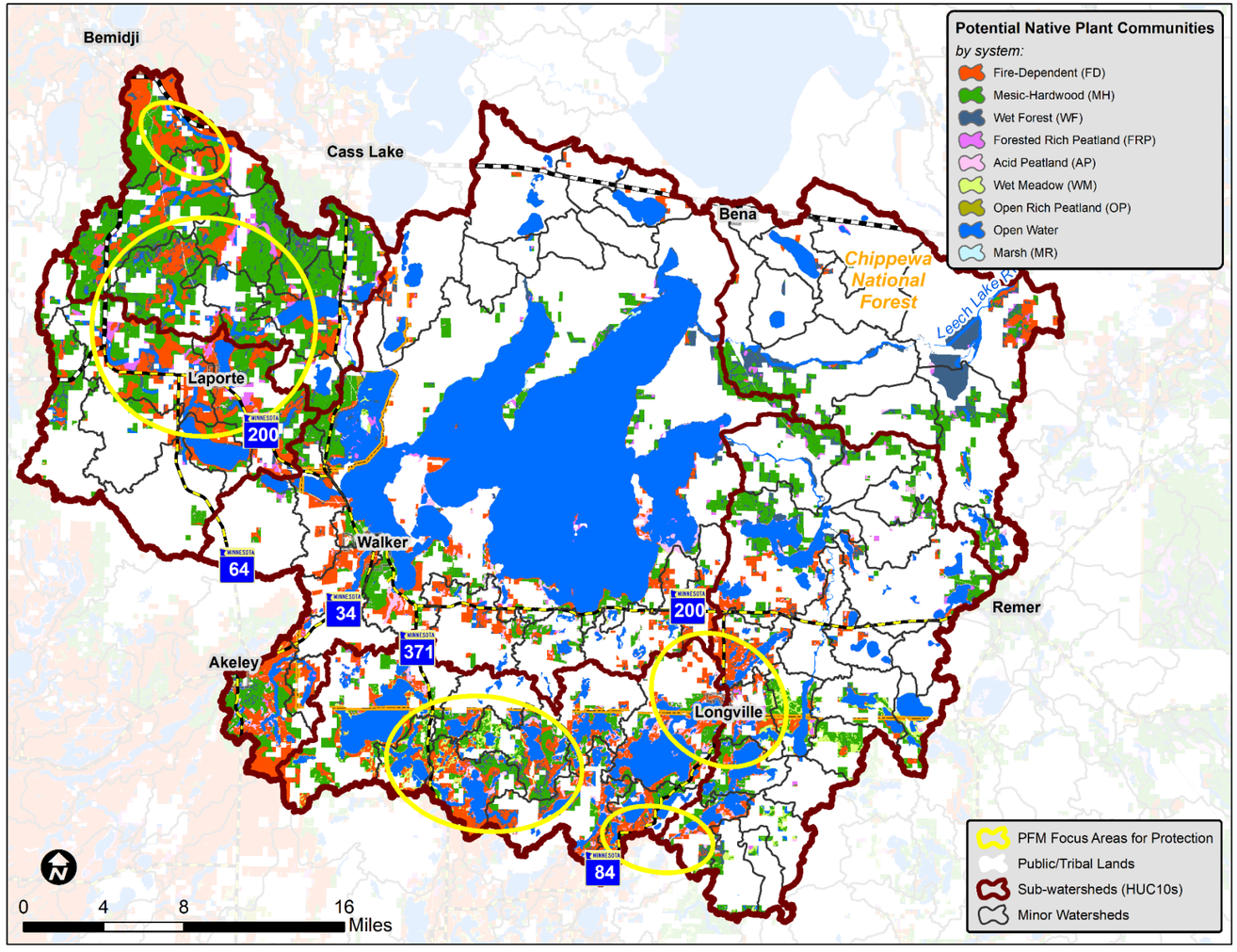
Goal 2: Promote Private Forest Stewardship

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

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

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

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



Growth Stage and Composition for Common Private Land NPCs

FDn33: Northern Dry-Mesic Mixed Woodland

Dominant Trees	Forest Growth Stages in Years							
	0 - 35		35 - 55	55 - 125		~ 125	> 125	
	Young		T1	Mature		T2	Old	
Quaking (Big-toothed) Aspen	40%	79%	| |	9%	48%	|	7%	37%
Jack Pine	15%	–	|	7%	–	|	2%	–
Red Pine	17%	1%	\	27%	1%	| |	16%	1%
Paper Birch	16%	5%	\	19%	26%	|	14%	18%
Balsam Fir	1%	7%	\	4%	11%	\	5%	15%
White (Black) Spruce	–	1%	\	5%	1%	\	13%	1%
White Pine	–	0%	\ \	19%	1%	\ \	30%	19%
Red Maple	–	4%		1%	9%		2%	0%
White Cedar	–	0%		2%	1%		2%	8%
Miscellaneous	11%	3%		7%	2%		9%	1%
Percent of Community in Growth Stage in Presettlement and Modern Landscapes	14%	30%	27% 30%	44%	39%		15%	1%

Natural growth-stage analysis and landscape summary of historic conditions is based upon the analysis of 6,807 Public Land Survey records for section and quarter-section corners. Comparable modern conditions were summarized from 2,615 FIA subplots that were modeled to be FDn33 sites.

MHn35: Northern Mesic Hardwood Forest

Dominant Trees	Forest Growth Stages in Years							
	0 - 55		55 - 95	95 - 205		205 - 295	> 295	
	Young		T1	Mature		T2	Old[2]	
Paper Birch	38%	9%	| |	28%	7%	| |	12%	0%
Quaking Aspen	20%	22%	| |	6%	4%	|	4%	0%
Red Oak	10%	6%	|	5%	11%	|	1%	0%
Balsam Fir	5%	4%	|	3%	2%	|	1%	0%
Basswood	6%	9%	\	9%	19%	|	6%	0%
White Spruce[1]	1%	1%	\ \	13%	0%	|	-	0%
Sugar Maple	11%	24%	\	14%	32%	\ \	29%	50%?
White Pine	1%	0%	\	7%	1%	\ \	31%	0%
American Elm	3%	2%	|	2%	3%	|	0%	0%
Red Maple	--	9%		--	4%		0%	0%
Ironwood	1%	7%		1%	7%		1%	0%
Bur Oak	1%	1%		2%	3%		0%	50%?
Miscellaneous	3%	6%		10%	7%		15%	0%
Percent of Community in Growth Stage in Presettlement and Modern Landscapes	39%	29%	51% 52%	8%	18%	1% 1%	1%	0%

Natural growth-stage analysis and landscape summary of historic conditions is based upon the analysis of 5,887 Public Land Survey records for section and quarter-section corners. Comparable modern conditions were summarized from 3,470 FIA subplots that were modeled to be MHn35 sites.

1. Important historically, white spruce is no longer a significant component of MHn35 forests and is not covered in the accounts of potential crop species.
2. Just 4 FIA trees contributed to the old growth-stage and the results are unreliable.

Forest Management Goals

Subwd 1 – Steamboat River
73% private; 27% public
764 parcels > 20 ac
53,431 ac > 20 ac
38 fsps; 4,130 ac

10 Yr PFM Goals:
102 fsps; 11,200 ac

Subwd 2 – Kabekona River
39% private; 61% public
506 parcels > 20 ac
23,743 ac > 20 ac
38 fsps; 4,575 ac

10 Yr PFM Goals:
64 fsps; 7,018 ac

Subwd 3 – Woman Lake
39% private; 61% public
629 parcels > 20 ac
26,530 ac > 20 ac
47 fsps; 4,600 ac

10 Yr PFM Goals:
72 fsps; 7,872 ac

Subwd 4 – Boy River
23% private; 77% public
593 parcels > 20 ac
26,289 ac > 20 ac
18 fsps; 2,305 ac

10 Yr PFM Goals:
12 fsps; 1,270 ac

Subwd 5 – Leech Lake
15% private; 85% public
684 parcels > 20 ac
33,723 ac > 20 ac
31 fsps; 3,274 ac

10 Yr PFM Goals:
27 fsps; 3,009 ac

Subwd 6 – Leech River
14% private; 86% public
278 parcels > 20 ac
12,243 ac > 20 ac
3 fsps; 376 ac

10 Yr PFM Goals:
3 fsps; 323 ac

Vision Summary

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

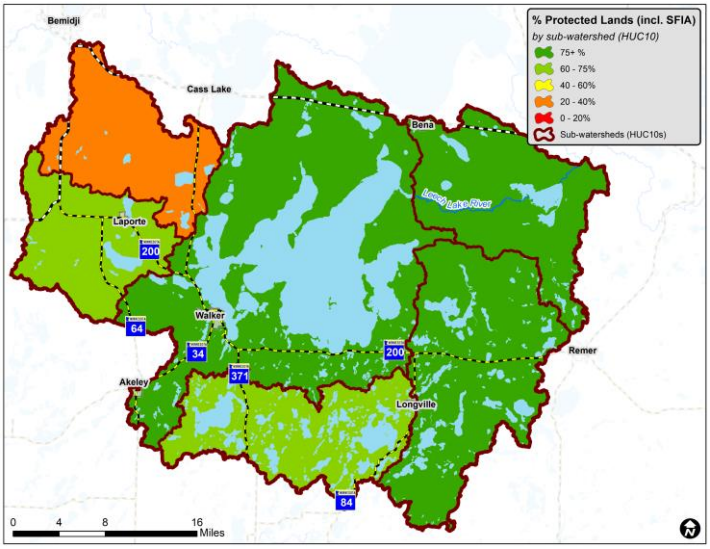
- Most of the private land occurs in the northwestern and southern portions of the Leech Lake River Major Watershed. The planning team selected priority minor watersheds in these two areas (see map with Goal 2 narrative and lists in the following Subwatershed Action Plans) to focus forest land protection / forest stewardship efforts and identified specific minor watersheds to concentrate landowner outreach efforts.
- Public lands dominate the center and eastern portions of the Leech Lake River Major Watershed, where the primary landowner is the Chippewa National Forest. These subwatersheds (Boy River, Leech Lake, and Leech River) have very high levels of public lands and are beyond the 75% forest protection goal as stated in Goal 1. These subwatersheds are also not priority for private forest management because few private forest acres are available. In addition to protecting the adjacent waters such as Leech Lake and Boy Lake, these federal lands are also managed under sustainable, ecologically based management regime.
- 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 watershed 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 major watershed 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.
- Private forest lands can help restore the upland native plant communities to older growth stages across the landscape if private landowners choose to manage for longer live conifers as a component in their forest stewardship plans.

Subwatershed Guidance

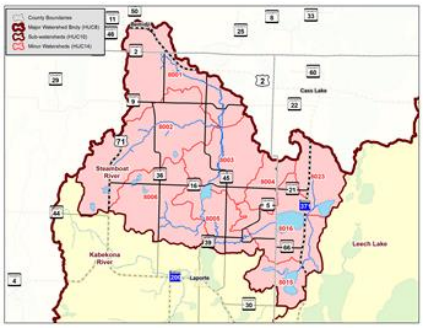
The purpose of the following nine narratives provide service providers and resource managers with a detailed description of subwatershed-level conditions and recommendations.

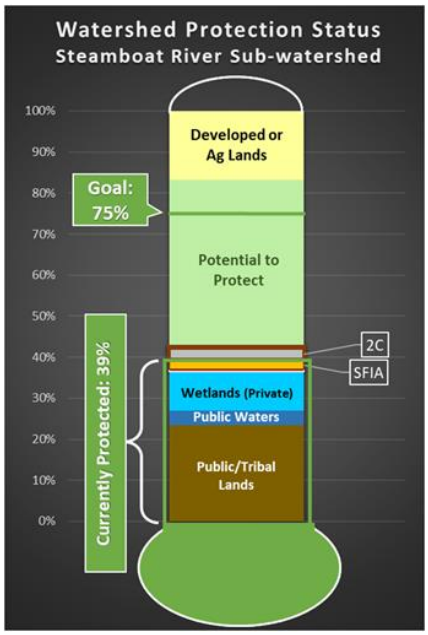
These 'subwatershed action plans' are intended to help service providers and managers identify and prioritize specific areas in the Leech Lake River Major Watershed so they can more effectively work together to implement activities that are likely to improve water quality, increase forest management,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

Fig 13. Subwatershed (HUC10) protection levels.



Subwatershed No. 1
Steamboat River (HUC 701010201)





Goal 1: Forest Land Protection Guidance

- Moderate amount of forest cover, 48%.
- Largely stream based watershed with relatively few lakes.
- Home to trout streams such as Bungoshine Creek and Necktie River.
- At risk from the outward growth of Bemidji to its north, a growing population, and agricultural conversion.
- Has the most land use disturbance (i.e. agriculture and development) of any subwatershed in the major watershed, about 50%.
- Medium priority for forest land protection, focus protection efforts along the trout streams.
- Forest land protection goal is 49%, current protection is 39%.

Goal 2: Forest Stewardship Guidance

- This subwatershed is covered by a till plain and dissected by ribbons of outwash formed by meltwater from the Des Moines Lobe glacier.
- Mesic hardwood forests are associated with the heavier soils of the till plains, while fire-dependent forests are more likely to occur along the outwash deposits. Wet forests and peatlands may be supported along the outwash deposits and peat formations that follow the rivers in this subwatershed.
- The current forest cover is dominated by deciduous species, which is expected given the large potential for mesic hardwood forests in this subwatershed. Small patches of conifers are scattered through the subwatershed.
- Large scale restoration of forest land is likely unfeasible in this subwatershed, but passive restoration of marginal agricultural land (i.e. allowing natural succession of fields to young forest) may be possible in some instances).
- See Ecological goal #2 from the 2nd Generation North Central Landscape Plan, as well as the Mesic Hardwood vegetation management goals in Section 7 of the plan.
- Forest stewardship goal – 102 plans, 11,200 acres.

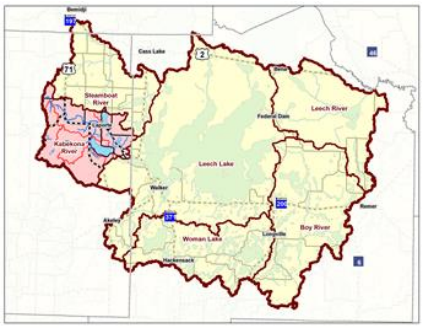
Table 4. Minor watershed info.

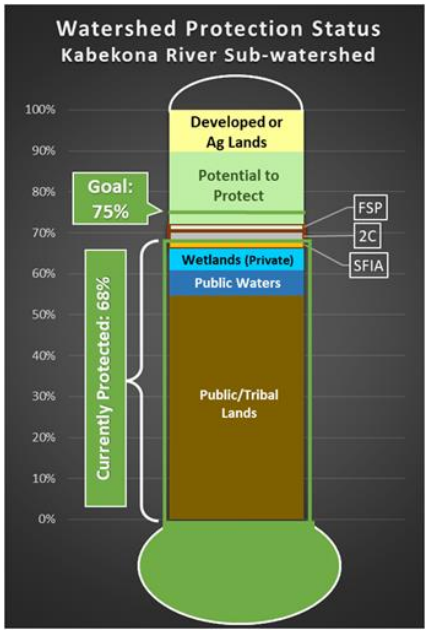
Minor wshd #	Acres	Current % protected	Protection goal %
8001	14,015	23.7%	75%
8002	18,256	32.7%	75%
8003	9,548	39.4%	75%
8004	3,789	22.1%	75%
8005	6,794	49.9%	75%
8006	11,536	39.4%	75%
8015	4,551	64.1%	75%
8016	10,576	52.8%	75%
8023	6,761	50.4%	75%

Priority Minor Watersheds

- Priority minor watersheds for protection are 8001 – 8006, 8015, and 8016.

Subwatershed No. 2
Kabekona River (HUC 701010202)





Goal 1: Forest Land Protection Guidance

- High amount of forest cover, 60%.
- Largely stream based watershed with relatively few lakes.
- Home to trout streams such as Stall Creek and Kabekona River.
- Some risk of development from the town of Laporte.
- E-coli impairment in the Kabekona River.
- High priority for forest land protection, focus protection efforts along the Kabekona River.
- Forest land protection goal is 75%, current protection is 68%.

Goal 2: Forest Stewardship Guidance

- The northern half of this subwatershed is covered by a till plain and split by a channel of outwash that contains the Kabekona River. The southern half is covered a highly rugged portion of the Itasca Moraine.
- In this subwatershed both the till plain and morainal deposits have the potential to support mesic hardwood forests, while fire-dependent forests are associated with the outwash deposits around Kabekona Lake and the town of Laporte.
- The forest cover is heavily deciduous, although some larger patches of conifers are present in the part of the subwatershed with the potential to support fire-dependent forests.
- See the Mesic Hardwood vegetation management goals from the 2nd Generation North Central Landscape Plan.
- Forest stewardship goal – 64 plans, 7,018 acres.

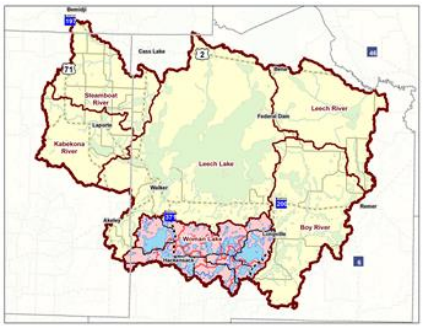
Priority Minor Watersheds

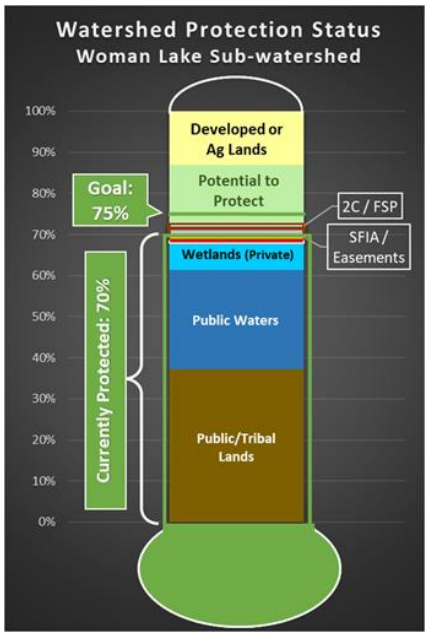
- Priority minor watersheds for protection are 8007, 8014, 8016, 8020.

Table 5. Minor watershed info.

Minor wshd #	Acres	Current % protected	Protection goal %
8007	17,532	47.3%	75%
8008	2,806	74.9%	75%
8009	12,785	75.8%	75%
8010	10,598	86.7%	75%
8011	13,154	94.5%	75%
8014	15,309	47.0%	75%
8016	10,576	52.8%	75%
8020	5,054	70.7%	75%
8023	6,761	50.4%	75%

Subwatershed No. 3
Woman Lake (HUC 701010203)





Goal 1: Forest Land Protection Guidance

- Moderate amount of forest cover, 46%.
- Loaded with lots of lakes, many of which are lakes of biodiversity significance, priority shallow lakes, and priority wild rice lakes.
- Some development risk from Hackensack and Longville.
- At risk from lakes with high phosphorous sensitivity and declining water quality.
- High priority for forest land protection. This subwatershed has many parcels with high RAQ scores, focus efforts on these parcels in the priority minor watersheds (Table 6).
- Forest land protection goal is 75%, current protection is 70%.

Goal 2: Forest Stewardship Guidance

- This subwatershed is about half covered by the Itasca Moraine and about half by outwash deposits. The outwash is more prevalent in the south and east portions of the subwatershed.
- The potential upland NPCs are a well-distributed mix of fire-dependent and mesic hardwood forests. The lowlands include small pockets of potential acid peatland and wet meadow NPCs. The wet meadows are more likely to occur towards the western half of this subwatershed, while the acid peatlands may be found throughout.
- The current forest cover is heavily deciduous, significantly more so than what occurred in this area historically and what would be expected in a landscape with unaltered native plant communities.
- Promote the regeneration of conifers and maintain conifers as a stand component whenever possible. See Fire-Dependent vegetation management goals #1-4 and Mesic Hardwood vegetation management goal #4 from the 2nd Generation North Central Landscape Plan.
- Forest stewardship goal – 72 plans, 7,872 acres.

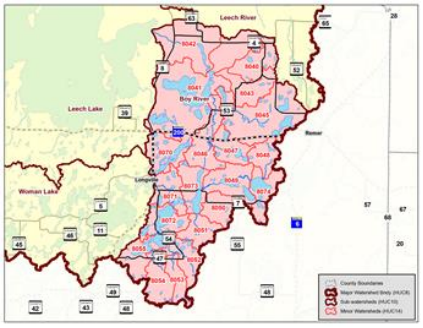
Table 6. Minor watershed info.

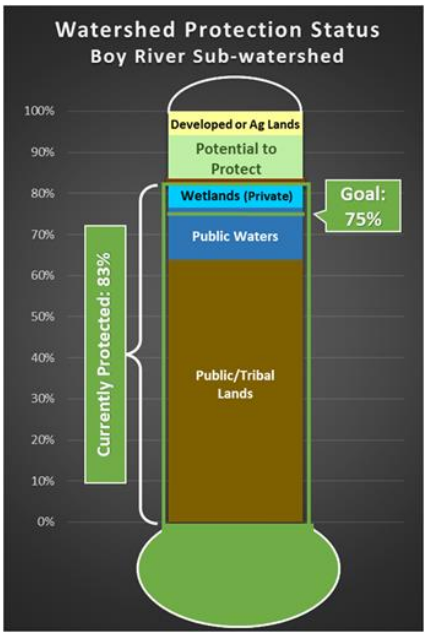
Minor wshd #	Acres	Current % protected	Protection goal %
8019	25,510	76.6%	75%
8056	7,113	61.1%	75%
8057	19,012	75.2%	75%
8058	12,519	70.5%	75%
8059	8,576	43.9%	75%
8060	4,992	57.0%	75%
8063	7,434	82.9%	75%
8065	9,634	53.8%	75%
8066	9,529	81.6%	75%

Priority Minor Watersheds

- Priority minor watersheds for protection are 8056, 8058, 8059, 8060, and 8065.

Subwatershed No. 4
Boy River (HUC 701010204)





Goal 1: Forest Land Protection Guidance

- High amount of forest cover, 50%.
- Loaded with lots of lakes, many of which are lakes of biodiversity significance, priority shallow lakes, and priority wild rice lakes.
- Some development risk from Longville.
- A few lakes are at risk from declining water quality.
- Low priority for forest land protection. Subwatershed is already highly protected.
- Forest land protection goal is 75%, current protection is 83% - goal met!

Goal 2: Forest Stewardship Guidance

- The upper half of this subwatershed is primarily covered by the Itasca and Sugar Hill Moraines along with some peat formations. The bottom half is mainly outwash and till plain.
- Most of the potential upland NPCs are mesic hardwood forests, and they are more likely to occur on the moraines and till plans. Fire-dependent forests may also be supported on the moraines, particularly near the center of the subwatershed.
- There is a large amount of potential lowland NPCs (~34% of the subwatershed), most of which is primarily forested peatlands and wet forest.
- The current upland forest cover is almost entirely deciduous, with little conifer cover.
- Promote the regeneration of white cedar on appropriate sites. See Forested Rich Peatland vegetation management goal #4 and Wet Forest vegetation management goal #4 from the 2nd Generation North Central Landscape Plan.
- Forest stewardship goal – 12 plans, 1,270 acres.

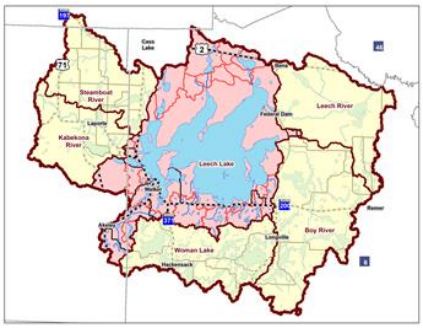
Priority Minor Watersheds

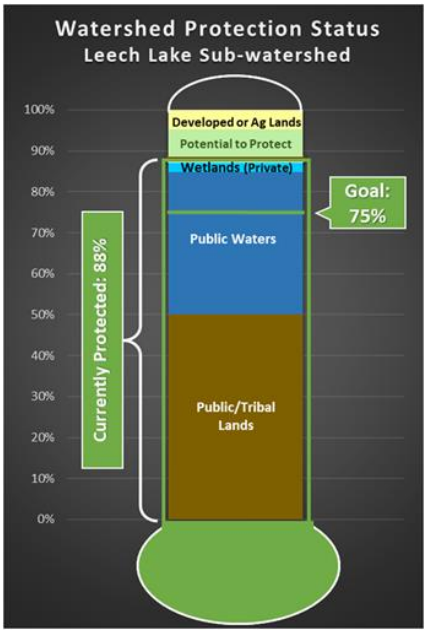
- Priority minor watersheds for protection are 8055, 8070, 8071, 8072, and 8073.
- Forest land protection and stewardship plan goals are met! Work with interested landowners with current PFM program services.

Table 7. Minor watershed info.

Minor wshd #	Acres	Current % protected	Protection goal %
8040	5,753	87.7%	75%
8041	27,008	79.8%	75%
8042	11,945	77.5%	75%
8043	5,908	90.4%	75%
8045	17,269	91.4%	75%
8046	7,196	94.7%	75%
8047	4,754	91.0%	75%
8048	3,884	100.0%	75%
8049	7,198	87.2%	75%
8050	4,447	70.7%	75%
8051	4,397	98.5%	75%
8052	5,186	91.2%	75%
8053	3,551	94.0%	75%
8054	5,817	83.1%	75%
8055	5,963	70.0%	75%
8070	6,664	67.4%	75%
8071	5,326	65.8%	75%
8072	5,635	70.4%	75%
8073	5,377	63.5%	75%
8074	5,438	86.5%	75%

Subwatershed No. 5
Leech Lake (HUC 701010205)





Goal 1: Forest Land Protection Guidance

- Moderate amount of forest cover, 35%.
- Home to the City of Walker, which is the largest city in the watershed, but still only has a population around 1,000.
- Loaded with lots of lakes, including the largest and most famous lake in the watershed – Leech Lake.
- Very high terrestrial biodiversity and Wildlife Action Network scores.
- Home to the Hole in the Bog Peatland SNA.
- Some development risk from Walker.
- Low priority for forest land protection. Subwatershed is already highly protected.
- Forest land protection goal is 75%, current protection is 88% - goal met!

Goal 2: Forest Stewardship Guidance

- The primary landforms to the north of Leech Lake are till plains that are split by channels of outwash and some large peat formations, while to the south of the lake is the Itasca Moraine.
- Mesic hardwood forests have the most potential on the till plains while fire-dependent forests are more common on the outwash deposits. On the Itasca Moraine both forest systems are intermingled. Wet forests, acid peatland, and forested rich peatland forests are more likely to occur on the peat formations.
- Like many other subwatersheds in the Leech Lake Major Watershed, the upland forest vegetation is largely deciduous with only small patches of conifer and mixed forest.
- Members of the LLR Forestry Technical Committee noted that many of the aspen stands to the north of the lake may not be the best suited species for the NPC site that they are currently growing on. Consider facilitating a transition of cover species where appropriate.
- Forest stewardship goal – 27 plans, 3,009 acres.

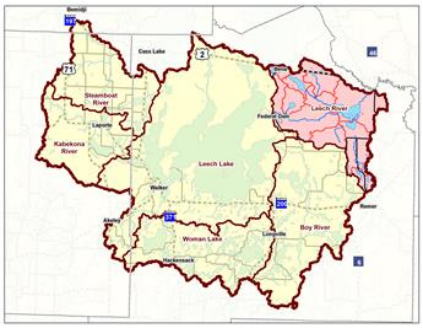
Priority Minor Watersheds

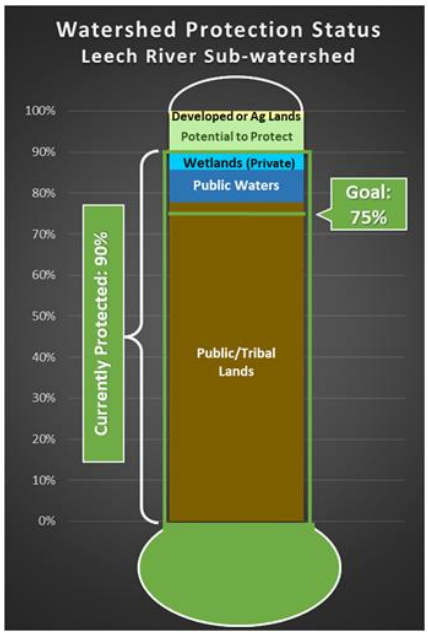
- Forest land protection and stewardship plan goals are met! Work with interested landowners with current PFM program services.

Table 8. Minor watershed info.

Minor wshd #	Acres	Current % protected	Protection goal %
8012	12,658	93.7%	75%
8013	8,138	68.8%	75%
8017	3,310	68.0%	75%
8018	5,670	86.6%	75%
8021	11,303	31.6%	75%
8022	199,607	91.8%	75%
8024	13,464	95.1%	75%
8025	4,370	99.7%	75%
8026	15,207	98.8%	75%
8027	2,042	97.4%	75%
8028	3,667	100.0%	75%
8029	4,271	96.4%	75%
8030	3,826	99.7%	75%
8031	5,839	92.7%	75%
8061	5,742	53.0%	75%
8062	11,001	78.7%	75%
8064	6,778	84.7%	75%
8067	7,792	86.9%	75%
8068	2,531	76.8%	75%
8069	5,457	73.9%	75%

Subwatershed No. 6
Leech River (HUC 701010206)





Goal 1: Forest Land Protection Guidance

- Moderate amount of forest cover, 39%.
- Abundant wetlands that cover 45% of the subwatershed.
- Very high terrestrial biodiversity and Wildlife Action Network scores.
- Low priority for forest land protection. Subwatershed is already highly protected.
- Forest land protection goal is 75%, current protection is 90% - goal met!

Goal 2: Forest Stewardship Guidance

- The geomorphology in this subwatershed is a diverse mixture of outwash, peat, till plain, moraine, and even ice-contact deposits. Generally, the outwash and peat formations are more common in the northern part of the subwatershed, while the till plain and moraines are in the south.
- The mesic hardwood forests have a strong association with the moraine and till plain features, while fire-dependent forests are likely to occur on the outwash deposits.
- The lowlands have a large potential for supporting vast stands of peatlands and wet forests. The wet forests are more likely to be near to the rivers and lakes, while the peatlands may be found occupying the remaining lowland areas.
- Promote the regeneration of white cedar on appropriate sites. See Forested Rich Peatland vegetation management goal #4 and Wet Forest vegetation management goal #4 from the 2nd Generation North Central Landscape Plan.
- Forest stewardship goal – 3 plans, 323 acres.

Priority Minor Watersheds

- Forest land protection and stewardship plan goals are met! Work with interested landowners with current PFM program services.

Table 9. Minor watershed info.

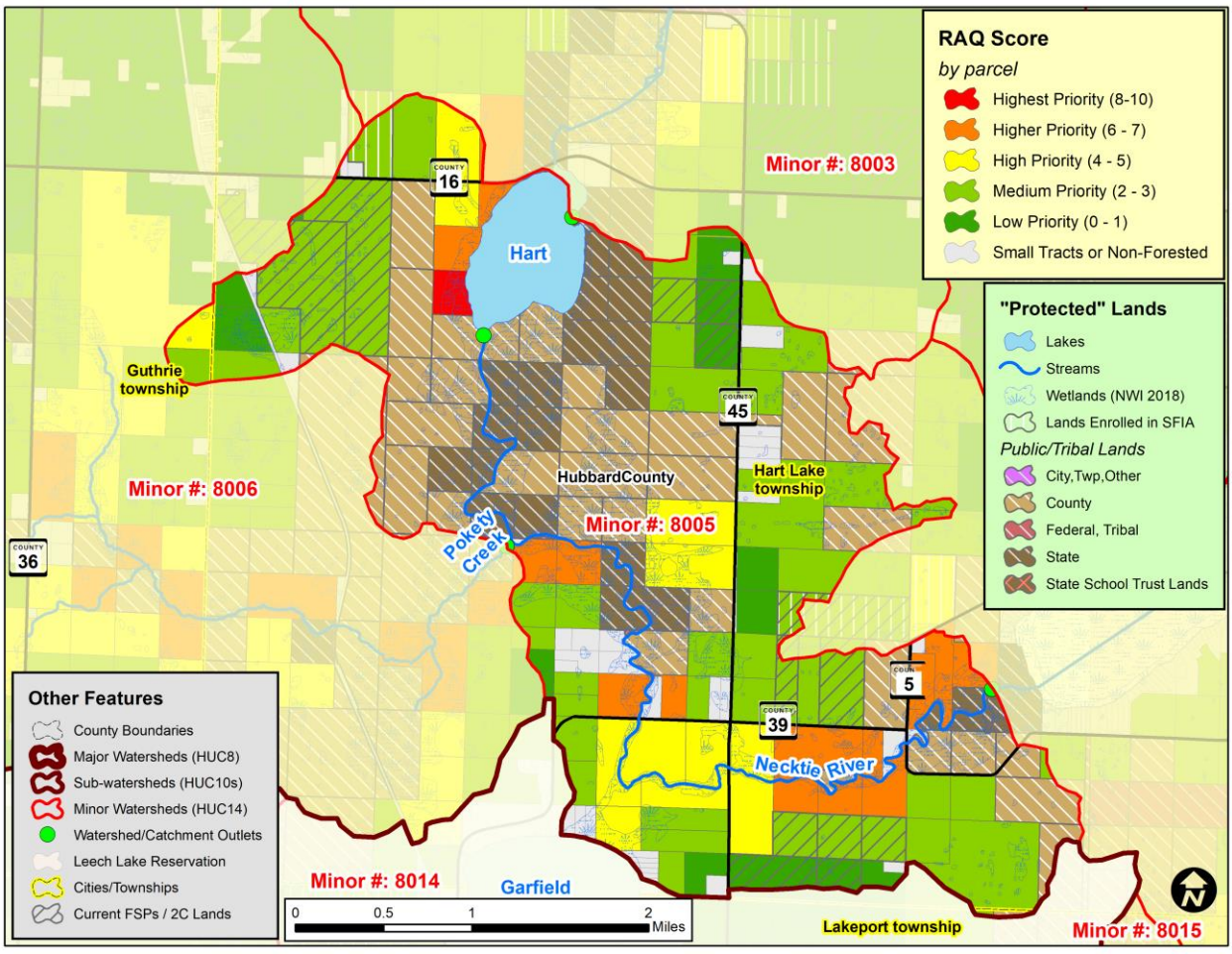
Minor wshd #	Acres	Current % protected	Protection goal %
8032	2,158	91.5%	75%
8033	11,804	99.6%	75%
8034	22,911	89.7%	75%
8035	6,617	99.3%	75%
8036	6,379	99.9%	75%
8037	25,674	86.9%	75%
8038	8,482	88.3%	75%
8039	15,656	83.7%	75%
8044	4,200	78.0%	75%
8075	5,323	98.0%	75%

Minor Watershed Methodology and RAQ Scoring

The overall Leech Lake River Major Watershed has a protection goal of 75%. Each of its nine subwatersheds have their own protection goals, which range from 49% in the Steamboat River Subwatershed to 75% in all the others. The subwatersheds have 7 to 20 minor watersheds, and each minor also has a protection goal that was determined by the Leech Lake 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 Leech Lake River Major Watershed. As a part of this assessment every minor watershed has a map showing its potential for protection, parcel and landowner RAQ scores (Riparian – Adjacency – Quality), and tables of information about individual parcels and landowners. An example of one of these resources is Fig 14, which shows the RAQ scores for parcels in minor watershed #8005 in the Steamboat River Subwatershed. We can see on this map that the parcels with the highest RAQ scores are clustered around Hart Lake and along the Necktie River. Protecting these parcels would provide the greatest return on investment. MWA maps and tables are provided in the LFT Workbook. The MWA priorities and RAQ scoring can also useful information to support local land use officials when developing their comprehensive plans and guidance on land use and public infrastructure decisions.

Fig 14. RAQ scores for parcels in minor watershed #8005.



Part 3: Making it Happen

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

Coordination Strategies

This plan calls for protecting 19,283 acres of private forest land and the preparation of 30,693 acres of forest stewardship plans across the 858,000-acre Leech Lake 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 Leech Lake 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.

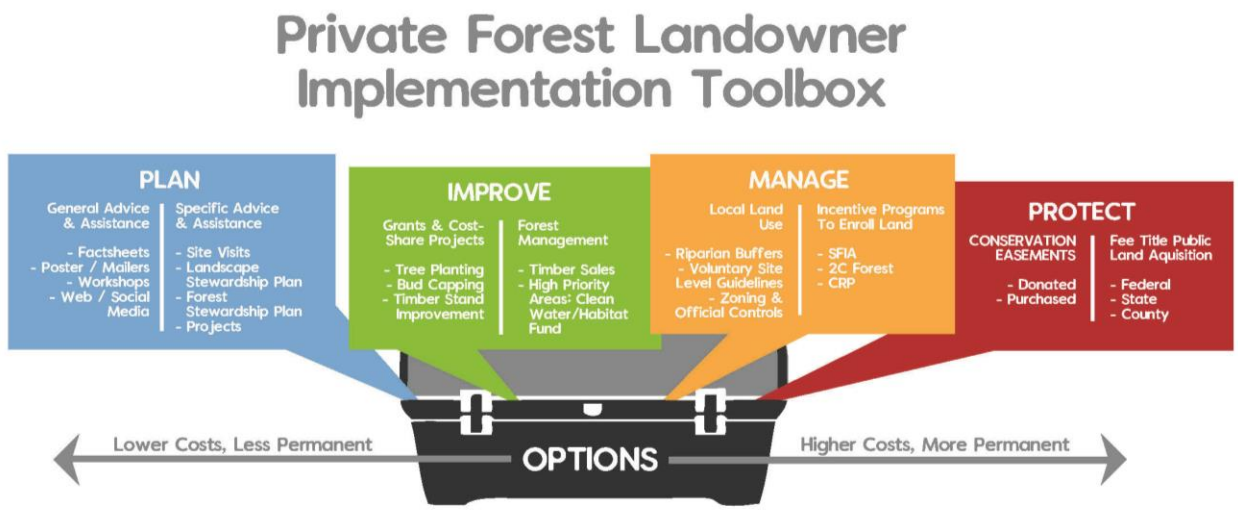
Coordination Strategy # 2 – Confirm the Project Coordinator

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 18 approved forestry professionals/plan writers have service areas in and near the Leech Lake 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 Leech Lake River 1W 1P. These interconnected public planning processes promote more active and cross boundary management of not only forest resources, but water resources along with fish and wildlife. This collaborative work is helping to strengthen working relationships with agency fish and wildlife managers as well as outdoor and sportsmen groups. Through the LSP and 1W1P, MN DNR Forestry and partners are shaping approaches to working more proactively with landowners and providing them with more options to:

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

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

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

10-Year Investment Plan

The table below summarizes acreage goals and estimated costs for implementing Goal 1 – Increase Forest Land Protection and Goal 2 – Promote Forest Stewardship. This information should be reviewed and integrated into the Leech Lake River 1W1P and used to help secure funding needed to implement the goals in this plan. It should be noted that the table below indicates 0 acres for forest land protection given the 75% metric at the subwatershed level. Although the Boy River, Leech Lake, and Leech River subwatersheds are over 75% protected, several of the minors are not. When conservation easements are desired and appropriate (higher RAQ scores) the Local Forestry Technical Team should review these with the Advisory Committee for the investing of RIM funds. Other PFM services should be made available to Interested landowners in these subwatersheds.

Table 10. 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	Steamboat River	8,316	$9,359,863	102 / 11,200	$81,600
2	Kabekona River	5,443	$5,961,239	64 / 7,018	$51,200
3	Woman Lake	5,523	$8,127,185	72 / 7,872	$57,600
4	Boy River	0	$0	12 / 1,270	$9,600
5	Leech Lake	0	$0	27 / 3,009	$21,600
6	Leech River	0	$0	3 / 323	$2,400
	Totals	19,283	$23,448,287	280 / 30,693	$224,000

[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 112 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 11. Annual PFM accomplishment report summary table - template.

	Steamboat River	Kabekona River	Woman Lake	Boy River	Leech Lake	Leech River
Baseline						
Total land area (acres)	85,826	77,237	104,319	148,715	332,672	109,202
Area of private ownership (acres; % of subwshd)	62,678; 73%	30,236; 39%	40,371; 39%	34,932; 23%	50,430; 15%	15,588; 14%
Private parcels <5 acres	622	1,053	4,870	2,001	5,057	464
Private parcels 5-20 acres	662	933	782	543	767	59
Private parcels >20 acres	764	506	629	593	684	278
Forest stewardship plans (#; acres)	38; 4,130	38; 4,575	47; 4,600	18; 2,305	31; 3,274	3; 376
General advice & assistance						
Mailings						
Workshops						
Specific advice & assistance						
Site visits						
Forest stewardship plans						
Grants/ cost-share projects						
Forest restoration						
Forest stand improvement						
Forest management						
Timber harvests						
Biomass harvests						
Land use controls						
Riparian buffer plantings						
Site-level guideline compliance						
Incentive programs						
SFIA						
2C						
Conservation easements						
Public						
Private/nonprofit NGO						
Fee title public land acquisition						
Public land acquisitions						
Land trades/ exchanges						

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

Coordination Strategy # 6 – Recommendations to Local and State Agencies

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

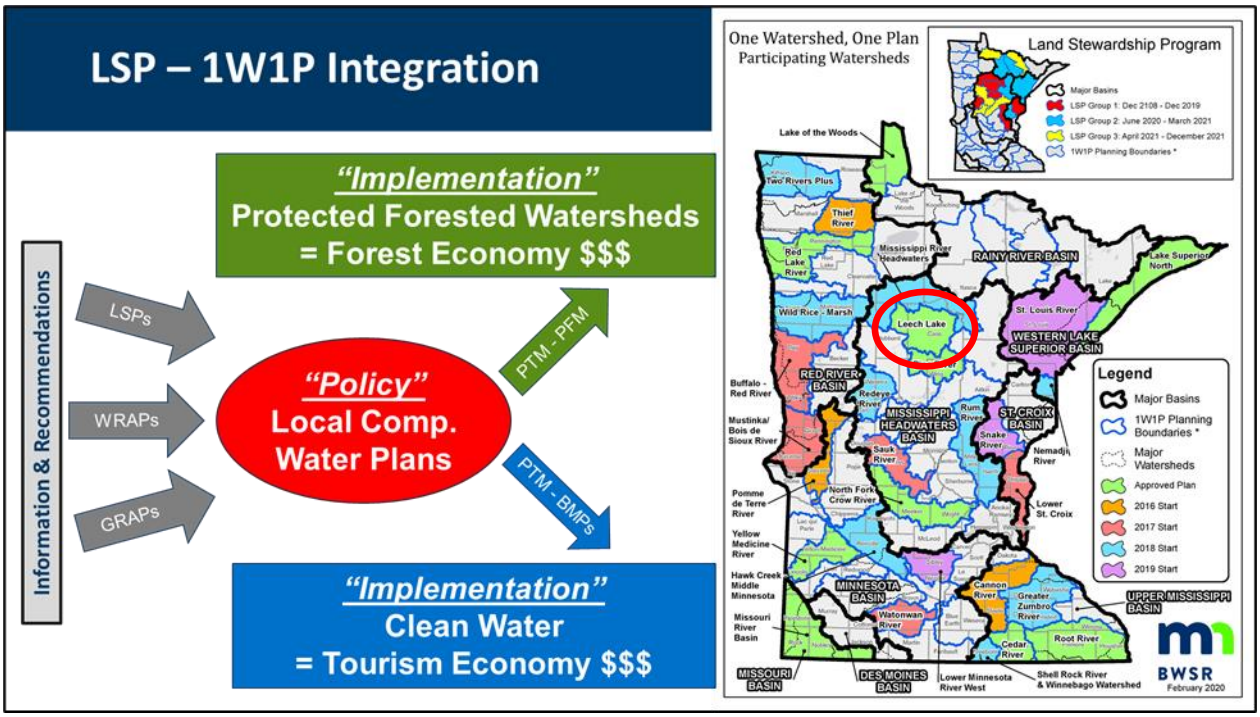
1. Integrate Landscape Stewardship Approaches into the PFM Program. Overall, encourage integrated service delivery between the broad range of agencies and organizations that serve private woodland owners to make delivery of their programs better coordinated, simpler and less costly in processing, and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

Demonstration Projects

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

Map no.	Project name and brief description	Subwd / project priority	Lead entity / support entities	Proposed timeline
	Steamboat River Subwatershed			
	Kabekona River Subwatershed			
	Woman Lake Subwatershed			
	Boy River Subwatershed			
	Leech Lake Subwatershed			
	Leech River Subwatershed			

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

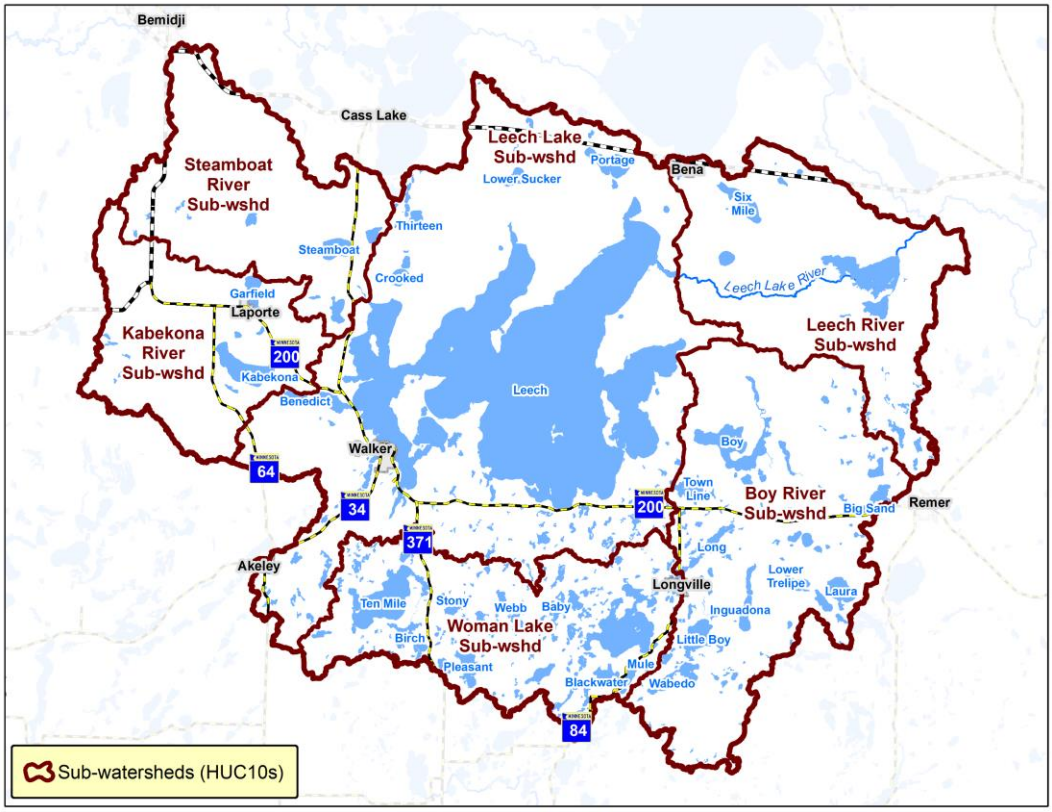


Note: Landscape stewardship plans (LSPs) like the MPCA Watershed Restoration and Protection Strategies (WRAPs) and the MDH Groundwater Restoration and Protection Strategies (GRAPs) provide an important information and relevant context from state water and forest resource programs to inform comprehensive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



Subwd No.	Subwatershed Name	HUC No.	Acres	No. of Minors
1	Steamboat River	701010201	85,826	9
2	Kabekona River	701010202	77,237	7
3	Woman Lake	701010203	104,319	9
4	Boy River	701010204	148,715	20
5	Leech Lake	701010205	332,672	20
6	Leech River	701010206	109,202	10
	Totals		**857,971**	**75**