Kettle River Watershed
Landscape Stewardship Plan

Prepared for the Kettle River Watershed Partnership

April 2014

Minnesota Forest Resources Council (MFRC)

Information about the Minnesota Forest Resources Council and the Landscape Program can be found at www.frc.state.mn.us.

This information is available in an alternative format upon request.

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Executive Summary

Forests play an important role in keeping water clean. Clean water is vital to the ecological, economic and social health of the St. Croix River Basin. While links between healthy forests and clean water are generally well known, there have been few efforts that both document the significance of the relationship between forest land cover and water quality and quantity in the St. Croix River Basin and then develop collaborative ways to bring partners and stakeholders together in sustained ways to achieve shared goals within key basin communities. In response, a small group of resource professionals working in the Basin pursued federal funding to support this project. As a part of the project, this Plan was created to bring together natural resource practitioners in the Kettle River Watershed in their efforts to protect and improve forests and water resources with a focus on the connection between forest land cover and water quality and quantity.

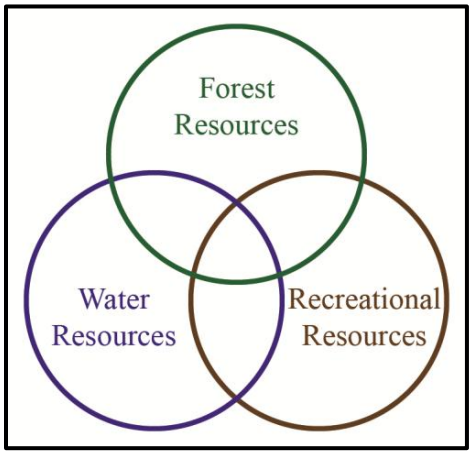
While the federal grant requires this project to be completed over a three-year timeframe (2012-2014), the broader intent of this landscape stewardship effort is to encourage long term collaboration across the Kettle River Major Watershed and ultimately the St. Croix River Basin that fosters sustainable forest management that protects and improves water quality. Healthy forests and clean waters will lead to benefits for wildlife, recreational opportunities, and forest based economic activities that will help to improve the quality of life of people living, working, and recreating in the Kettle River Major Watershed for years to come. Given that there is no one entity responsible for managing both forest and water resources in the Watershed and that land is mainly held by private landowners, partnering agencies and organizations will need to find more effective ways to work together on an ongoing basis to support the implementation of this plan throughout the watershed and ultimately support similar efforts across all lands throughout the St. Croix River Basin.

The Basin has been changed by human activities in significant ways since European settlers began to call it home. Our collective management of the land has had a noticeable impact on natural resources in many ways, particularly with respect to water quality. Along with point sources, changes to the landscape have resulted in enough additional nutrients (phosphorus) reaching Lake St. Croix at the mouth of the Basin to cause the Lake to become eutrophic and to warrant a designation of "impaired" from the Minnesota Pollution Control Agency and the Wisconsin Department of Natural Resources. Section 2 of the plan provides an overview of the physical setting of the Basin and the Watershed.

The loss of low phosphorus export land cover types such as forest (1.1 million acres lost) to high phosphorus export cover types such as agriculture and urban (0.73 million acres converted) is most pronounced at the southern and downstream portion of the Basin. The Kettle River Major Watershed sits at a transition point where this upstream movement of converted cover types slows. Protecting the remaining forests (as well as shrublands, grasslands, and lowland vegetation) in the Kettle River Major Watershed and other watersheds in the St. Croix River Basin will be critical for maintaining the water quality that the Upper St. Croix River Basin enjoys and to keeping the water quality in Lake St. Croix from declining further.

Watersheds for tributaries in the St. Croix River Basin each differ in the makeup of natural and cultural factors that drive the relationship between forests and water quality. This is also true for sub-watersheds in the Kettle River Watershed. To guide the project implementation portion of this plan, key drivers for the forest and water quality relationship were analyzed for each sub-watershed. Based on the results of that analysis, sub-watersheds were evaluated for the risk of water quality decline if strategic forest management activities are not employed. Section 3 summarizes this analysis.

While the primary focus of a landscape stewardship plan is forest resources, the strategic framework of this plan recognizes not only the critical connection of management of forest resources with the management of water resources but also with recreational resources. The intent of Sections 4 and 5 is to provide an overall vision as well as a detailed and integrated framework that defines how natural resource professionals and landowners can work together to better manage forest, water, and recreational resources in the watershed over the next ten to twenty years.



To guide strategic forest management activities, natural resource provider coordination, and outreach and education efforts, a set of working principles and desired future conditions were developed by the Kettle River Watershed Landscape Stewardship Planning Committee to frame up an overall vision of what needs to be done across the Watershed. Working principles cover planning, coordination, implementation, and monitoring. Desired future conditions (DFCs) include protected and improved water quality, protected and improved forest resources, and attractive and engaging recreational resources. These DFCS are then broken down into goals, objectives, and action items to further define how they will be achieved. Combined, the working principles, desired future conditions (DFCs), and goals and objectives make up a strategic policy framework that is the heart of this plan.

Successful implementation starts with a small group of committed people and requires timely and purposeful coordination. Coordination, before implementation, is one of the most overlooked and underestimated cost-saving management efforts in resource management. In an age of complex environmental and socio-economic issues and declining budgets for public and private conservation agencies, sharing resources and leveraging successes has never been more important. Services to private landowners must meet the needs of both the landowner and the needs of the community if we are going to address the forest and water quality issues of the watershed with increasing effectiveness.

Coordinating resources brings multiple benefits including making grant funding more likely due to multi-agency approaches, removal of duplication of services, and delivering consistent services and information to the people who live, work, and recreate in the watershed. Targeted outreach to landowners and targeted conservation efforts result in messages that resonate with individuals and communities alike and in actions that get the most bang for the buck.

There are four areas of coordination that resource managers and their landscape partners should address before diving into the implementation of a landscape stewardship plan: Partners and Partnerships, Implementation Programs and Priorities, Training and Funding, and Engaging Communities and Landowners. Moving from a paradigm of preparing and implementing single forest stewardship plans and projects for individual landowners to a landscape approach involving hundreds, perhaps thousands of landowners and their communities will require new ways of thinking and working together. Section 6 provides natural resource professionals responsible for the implementation of this plan with a suggested series of coordination strategies to follow.

Implementation of landscape stewardship plans will be as successful as the imagination, creativity, and commitment that partners and stakeholders bring to the overall process. To guide the process, a framework is provided for guiding the implementation of the Plan over the next 10 – 20 years (Section 7). Seven overall implementation strategies are provided as well as potential demonstration projects that were suggested by the Planning Committee. Sub-watershed Action Plans are then outlined as a start for guiding targeted implementation activities at the sub-watershed level that,

when further developed, can ultimately guide work down to a specific parcel of land. Recommendations to resource agencies are also provided to intentionally increase communications on how we can better integrate efforts by the various conservation agencies and organizations to help find ways to more effectively use limited technical and financial resources.

This Plan is just the beginning to bringing together natural resource practitioners in the Kettle River Watershed in their efforts to protect and improve forests and water quality and quantity. Successful planning also involves monitoring and evaluation that provides feedback to the implementation process for what course corrections are necessary to ensure the continued success of pursuit of the desired future conditions. Monitoring and evaluation will also provide the backbone for the narrative of how this Plan was successfully implemented. Through sound planning, cumulative coordination, strategic implementation, and meaningful monitoring and evaluation, we can more effectively ensure that forests and water quality are protected and improved to improve the quality of life of people living, working, and recreating in the Kettle River Major Watershed and the St. Croix River Basin.

Part 1 - Section 1 – Introduction

The purpose of this section of the Plan is to provide background information on how this project got started and funded, the landscape stewardship planning process, and how partners can use this plan to concurrently promote sustainable forest management and improve water quality and quantity.

A. Project Background

Forests play an important role in keeping water clean, which is vital to the ecological, economic and social health of the St. Croix River Basin. While links between healthy forests and clean water are generally well known, there have been few efforts that both document the significance of the relationship between forest land cover and water quality and quantity in the St. Croix River Basin and then develop collaborative ways to bring partners and stakeholders together in sustained ways to achieve shared goals within key basin communities.

In response, a small group of resource professionals working in the Basin pursued federal funding to support this project. The *Linking Forestry & Clean Water Quality, Upper St. Croix Project* was established on December 19, 2011with initial funding from the USDA Forest Service Northeastern Area State and Private Forestry (S&PF) Competitive Allocation program.

Scope of the USDA Forest Service Grant:

- Objective 1 – State of the Forest Report: Appendix D.
- Objective 2 – Landscape Stewardship Plan: This document.
- Objective 3 – Outreach & Education: Outlined in Part 3 – Section 7.
- Objective 4 – Demonstration Projects: Outlined in Part 3 – Section 7.

Specific involved organizations include:

- Minnesota and Wisconsin Departments of Natural Resources
- Minnesota Forest Resource Council
- St. Croix River Association
- Minnesota Soil and Water Conservation Districts
- Wisconsin Land and Water Conservation Departments
- Natural Resource Conservation Service
- The Nature Conservancy
- Universities in both states
- Minnesota Forestry Association and Wisconsin Woodland Owners Association
- Private landowners

This landscape stewardship project seeks to implement USDA Forest Service priorities: 1) conserve and manage working forest landscapes for multiple uses; 2) protect forests from threats; and, 3) enhance public benefits from trees and forests by linking forestry with water quality and quantity in the St Croix River Basin through the application of landscape stewardship principles and practices. The "Linking Sustainable Forestry with Water Quality in the Upper St. Croix Basin Project" and this Plan document represent a pilot effort by project partners with the MN DNR and Minnesota Forest Resources Council (MFRC) through its Landscape Program to develop and implement a model landscape stewardship plan for the state and the nation.

While the federal grant requires this project to be completed over a three-year timeframe (2012-2014), the broader intent of this landscape stewardship effort is to encourage long term collaboration across the Kettle River Major Watershed and ultimately the St. Croix River Basin that fosters sustainable forest management that protects and improves water quality. Healthy forests and clean waters will lead to benefits for wildlife, recreational opportunities, and forest based economic activities that will help to improve the quality of life of people living, working and recreating in the Kettle River Major Watershed for years to come. Given that there is no one entity responsible for managing both forest and water resources in the Kettle River Major Watershed and that land is mainly held by private landowners, partnering agencies and organizations will need to find effective ways to work together on an ongoing basis to support the implementation of this plan throughout the watershed and ultimately support similar efforts across all lands throughout the St. Croix Basin.

B. Landscape Stewardship: Collaboration that Works

The "***landscape approach to forest stewardship***" focuses on the needs and objectives of communities of place and communities of interest, which define a "landscape" as much as any geographical boundary. Landscape stewardship plans are developed to take into account a broader or "all lands" perspective that includes both shared community objectives and individual management activities. To be successful, landscape stewardship must be strategic and collaborative, it must appeal to stakeholder motivations and needs, it must manage for results, and it must encourage flexibility in all activities. Successful landscape stewardship builds agency, organizational, and community capacity through collaboration, increases landowner trust of agencies and organizations through streamlined management and communications, motivates landowners using messages and activities that resonate with their needs, and supports the application of science and knowledge through well informed policies and practices. Taken together, these activities work to make service delivery to private landowners more effective and efficient.

C. The Landscape Stewardship Planning Process

The general process used to develop this plan included:

- Assemble a planning team – Kettle River Watershed Landscape Stewardship Planning Team.
- Inventory and assess the resources in the watershed in technical support documents.
- Gathering of input from planning team members through a series of meetings.
- Building a strategic policy framework based on resource knowledge assembled and input from the planning team.
- Identify potential priority areas within the 672,000 acre major watershed and prioritize potential conservation projects to improve forest and water resources.

- Identify ways to enhance the effective delivery of conservation services on both private and public lands.
- Develop a 10-year project list that will implement the goals and objectives in the Plan.
- Establish a procedure to monitor, evaluate and report progress made in implementing the Plan.

A team of resource professionals was assembled in 2012 to guide the development of this Plan. Members of the planning team are listed in Appendix A. Their mission was to review data and scientific information gathered for the planning process and to provide input into the content of the Plan. The Planning Committee also reviewed and commented on various draft plan documents.

The Kettle River Watershed Landscape Stewardship Plan (LSP) was developed utilizing technical support documents created for the Kettle River Watershed Landscape Stewardship Planning Team by MFRC Staff. The complete documents can be found in the Appendix section of this Plan. The detailed resource information compiled and the analysis of that data helped facilitate the development of this Plan and formed the basis for informed decisions on what directions to take, what goals to pursue, and the rationale for implementing this Plan. Technical support documents used in the development of this plan included:

- **St. Croix River Basin – State of the Forest Report (Appendix D)**. Reviews the relationship between forests and water quality and analyzes the historical change in land cover across the St. Croix River Basin.
- **Kettle River Major Watershed – Resource Inventory and Assessment (Appendix E)**. Outlines the geography of the Kettle River Major Watershed and the state of the watershed in terms of land cover and water quality.
- **Kettle River Major Watershed – Sub-watersheds Resource Inventory and Assessment (Appendix F)**. Analyzes key geographic factors in the Major Watershed by seven sub-watersheds.

D. Organization and Uses of the Kettle River Watershed Landscape Stewardship Plan

Strategic planning asks three fundamental questions: 1) *Where have we been?*, 2) *Where do we want to go?*, and 3) *How do we get there?*

The *Kettle River Watershed Landscape Stewardship Plan* has been organized into a three-part format to address these basic questions and compliment the strategic nature of the landscape stewardship planning process. This format complies with the framework established by the USDA Forest Service in the document entitled, "*Landscape Stewardship Guide*." The three parts of this Plan are:

- **Part 1 – Plan Background**: addresses the fundamental questions of "where are we?" as presented in the context of "where have we been?"
- **Part 2 – Strategic Policy Framework**: outlines the vision in a written framework to help answer the question of "where do we want to go?
- **Part 3 – Plan into Action**: focuses on "how will we get there?" and is the portion of this Plan that establishes how the Kettle River Watershed Partnership, along with partners and other interested parties, will implement the strategic policy framework developed in Part 2.

This landscape stewardship plan can be used to inform:

- Forest Stewardship Plans and Implementation
- Water Resource Management Plans and Implementation
- Fish & Wildlife Management Plans
- Community Land Use Planning and Implementation
- Collaborative Project and Funding Development
- Connections to the Forest and Water Resource Policy Decision Makers

These are just a few of the Plan's applications and uses. This Plan is not intended to incorporate other planning efforts; it is meant to supplement and inform those efforts in a manner that promotes increased and improved collaboration among current and future partners and stakeholders to achieve the many public benefits of sustained forest health and improved water quality and quantity.

This version of the Plan is a condensed version. The Expanded Plan provides more detail on most of the sections in this Plan (however, some headings are identical). Parts, Sections, and headings in this version correspond to those in the Expanded Plan. If more information is needed on a particular topic, there is a good chance that the Expanded Plan will explain the topic in further detail.

E. Coordination with Other Conservation Efforts

The Kettle River Watershed Landscape Stewardship Plan provides an overview of the role of healthy forests for water quality and quantity in this major watershed. Below are some examples of other planning and implementation efforts that may benefit from this Plan, especially the concepts outlined in Section 6 relating to coordination strategies:

- Local Water Resources Management Plans in Kettle River Major Watershed Counties
- Kettle River Conservation Action Plan (TNC)
- Minnesota State Forest Action Plan (MN DNR Forestry)
- Lake St. Croix Nutrient Total Maximum Daily Load (MPCA, WDNR)
- Watershed Restoration and Protection Strategies (MPCA)
- St. Croix River Watershed Conservation Priorities Report (SCCC)
- Kettle River Watershed TMDL Phosphorus Reduction Project (Carlton County SWCD)
- East Central Landscape Forest Resource Management Plan (MFRC)

Part 1 – Section 2 – Physical Setting

Section 2 provides a description of the geography of watersheds and the relationship between forest land cover and water resources, and introduces the seven sub-watersheds within the Kettle River Major Watershed that this Plan uses as the first geographic screening tool or delineator in developing a strategic course of action for collaborative forest and water resource management.

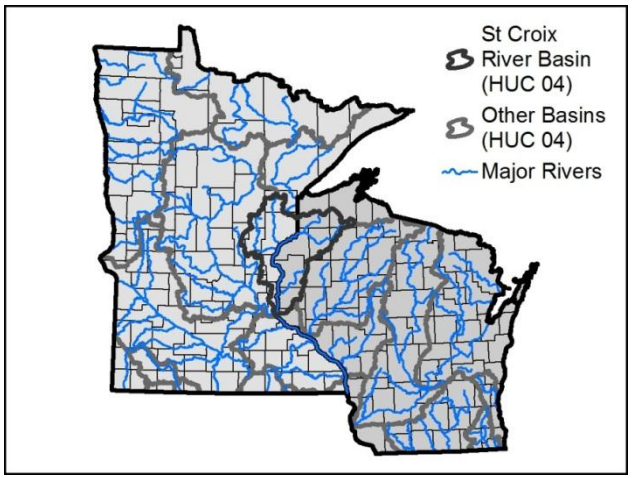
A. The Geography of Watersheds

To better establish the "language" of watersheds in this Plan, a brief overview is warranted. Please note that hydrology is a complex science and delineating watersheds is a complex task. The descriptions below are generic and are intended to provide a starting point for better understanding of the terminology of watersheds and how terms are being used in this Plan. So what is a watershed? A watershed is the area of land that drains into a surface water feature such as a stream, river, or lake and contributes to the recharge of groundwater. Further, a watershed is a geographic area of land, water, and biota within the confines of a drainage area. Both the quality and quantity of the water resources within a watershed can be greatly influenced by the land that the water flows through.

Watersheds come in different shapes and sizes. The term "watershed" is used to describe different scales or levels of hydrologic areas. In Minnesota, there are three general levels of watersheds: 1) basins, 2) major watersheds, and 3) minor watersheds. There are 10 basins that stretch across the State of Minnesota within which there are 84 major watersheds. And within the 84 major watersheds, there are approximately 5,000 minor watersheds across the state. The St. Croix River Basin is located along the border of Minnesota and Wisconsin. The Kettle River Major Watershed lies entirely within the St. Croix Basin and the State of Minnesota.

For the purpose of this Plan, the levels of watershed being described are:

- Basin = St. Croix River Basin (HUC 04)
- Major watersheds = Kettle River Major Watershed (HUC 08) in the St. Croix River Basin
- Tributary watersheds = Upstream areas for pour points of rivers and streams that empty into the St. Croix River (collection of HUC 12 watersheds) used in the State of the Forest Report
- Sub-watersheds = 7 Sub-watersheds* (HUC 10 or split HUC 10) in the Kettle River Major Watershed
- Minor watersheds = 31 minor watersheds** (HUC 12) in the Kettle River Major Watershed



*Note: The sub-watershed level is being used for this Plan because the major watershed level is too large to effectively focus planning and implementation efforts and the minor watershed level includes too many units to manage.

** Note: Minor watersheds do not coincide with DNR Division of Waters Minor Watershed Management Units circa 2009. Earlier delineations by state agencies utilized the basin, major watershed, minor watershed classification but have since been replaced by the HUC system.

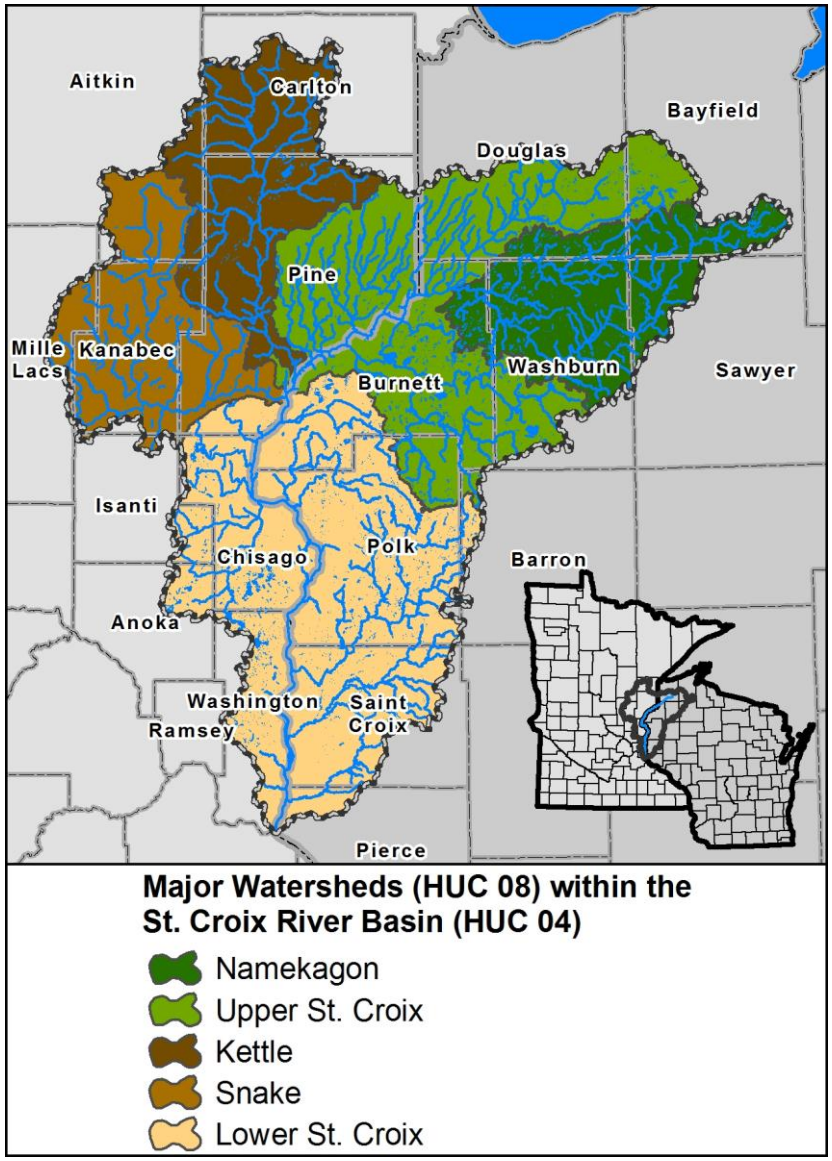
B. The St. Croix River Basin and the Kettle River Major Watershed

St. Croix River Basin (HUC 04)

The St. Croix River Basin reaches across ten counties in Minnesota and nine counties in Wisconsin. It covers approximately 7,700 square miles or 4,928,000 acres. Approximately 46 percent of the basin is in Minnesota. Within the St. Croix River Basin, there are five major watersheds including the Kettle and Snake in Minnesota; the Namekagon in Wisconsin; and the Lower and Upper St. Croix Majors which intersect both Minnesota and Wisconsin.

The St. Croix River is a national treasure. It provides clean water to the Mississippi River, high quality natural ecosystems, beautiful scenery, striking geologic features, unique cultural resources, and abundant recreational opportunities. Over 1 million people per year use the river for recreation. Yet there is mounting evidence that the river's health is at a tipping point. Lake St. Croix was recently designated as "impaired" for phosphorous pollution. Because the St. Croix's Wild and Scenic designation applies to only a thin ribbon of land along portions of the river, much of the river and its 7,700 square mile basin are vulnerable to actions that compromise the health of the River. The sheer size and complexities of the St. Croix River Basin are beyond any one organization's capacity to address all of the issues in the Basin in a comprehensive and effective manner.

While forested land cover is one of the most beneficial land uses to water resources, the forestry community has not been actively involved in these efforts in a coordinated or sustained way. Protecting, improving, and restoring forests throughout the Basin are keys to not only protecting and improving water quality and quantity, but to maintaining the ecological and socio-economic health of the Basin.



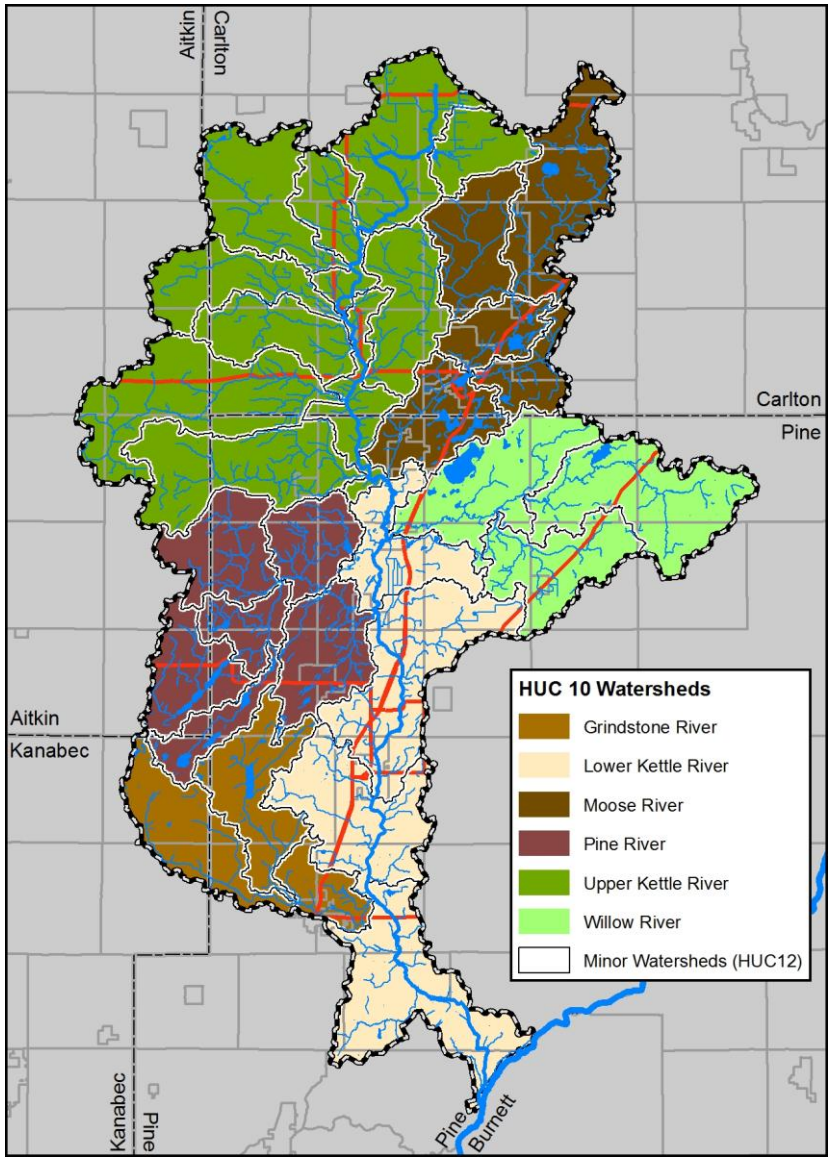
Kettle River Major Watershed (HUC 08) of the St. Croix River Basin (HUC 04)

In the next level of hierarchy, the Kettle River Major Watershed contains six HUC 10 watersheds and 31 minor watersheds (HUC 12). The Kettle River Major watershed can also be classified as a tributary watershed. When compared to other tributary watershed areas as described in the State of the Forest Report (Appendix D), the Kettle River is the largest.

Of the 672,927 acres in the Kettle River Major Watershed, 159,094 acres (23.6 percent) are publicly owned or in private conservancy, most of which (133,345 acres) is forest cover or lowland shrub. Of the 512,212 acres under private ownership, approximately 5.8 percent or 38,778 acres of these lands have a current forest stewardship plan that supports active forest management. There are 25,155 acres of private land with expired forest stewardship plans (plans that are 10 years or older). That leaves approximately 448,210 acres of private land with unknown conservation status (Appendix E).

Appendix E is the ***Kettle River Major Watershed Resource Inventory and Assessment***. The Resource Inventory provides a comprehensive outline of the geography of the Kettle River Major Watershed in terms of land cover and water quality. Within this outline is general information to orient the reader within the political, ecological and hydrological geographies followed by discussions and illustrations of the data concerning landforms, soils, and land cover framed against ownership and population. Following the Resource Inventory several Resource Assessment tools are discussed and illustrated.

One of the primary purposes of this landscape stewardship project is to significantly increase the amount of private land under active forest management for the purpose of increasing long-term private and public benefits, including water quality and quantity.



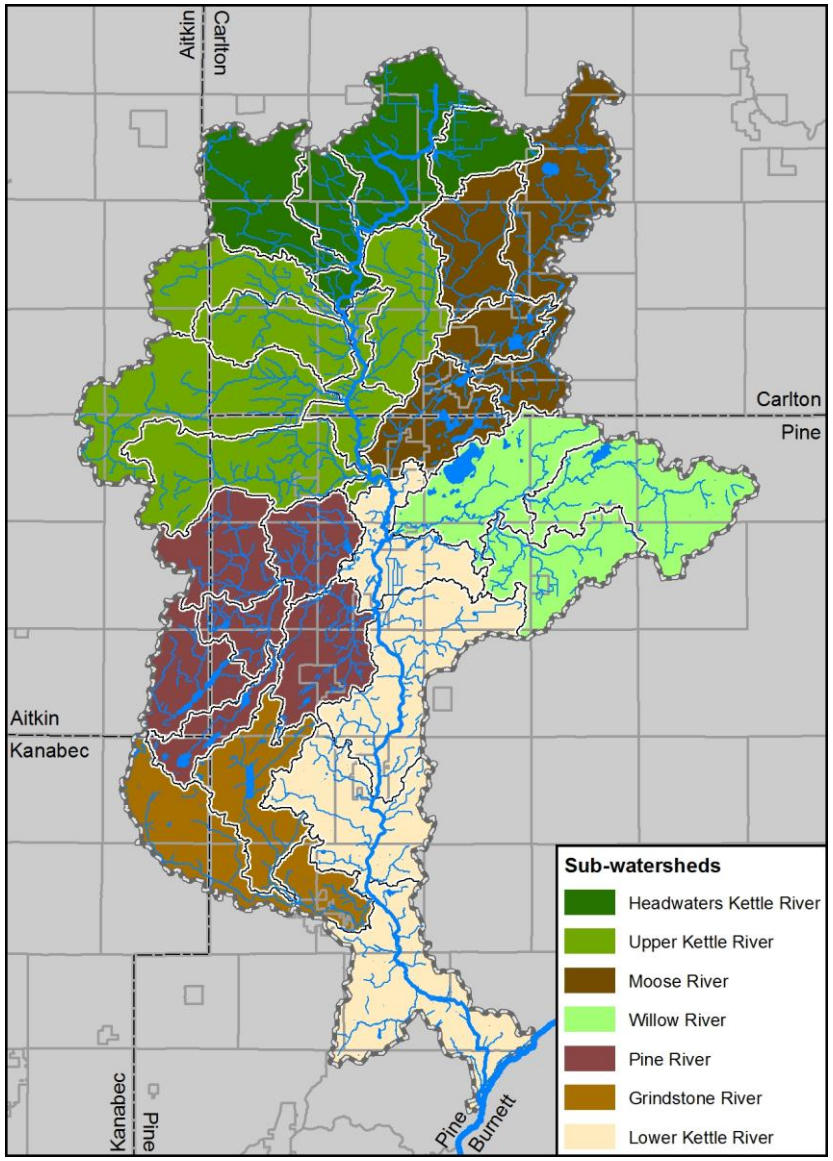
Seven Sub-Watersheds of the Kettle River Major Watershed

Planning specific site level implementation activities at the major watershed level can be complicated and ineffective because the major watershed is too large. Conversely, the minor watershed level includes too many units (31 minor watersheds) to manage. Therefore, this section of the Plan focuses on seven sub-watersheds.

These sub-watersheds were defined by the USGS HUC 10 watersheds (there are 6 in the Kettle River Watershed), except in the case of the Upper Kettle River HUC 10, which was split along HUC 12 boundaries into the Upper Kettle River and the Headwaters Kettle River Sub-watersheds to distribute the sub-watershed areas more evenly across the watershed.

Each of the seven sub-watersheds has its own blend of characteristics that affect how they contribute to the production of clean water to the Kettle River, the St Croix River and beyond. Some of these characteristics include position in the watershed, land cover, public and private landownership, slope, soils, and water conveyance and storage. Understanding how the sub-watersheds function in terms of water quality and quantity is critical. Forested land cover plays a key role in the production of clean water.

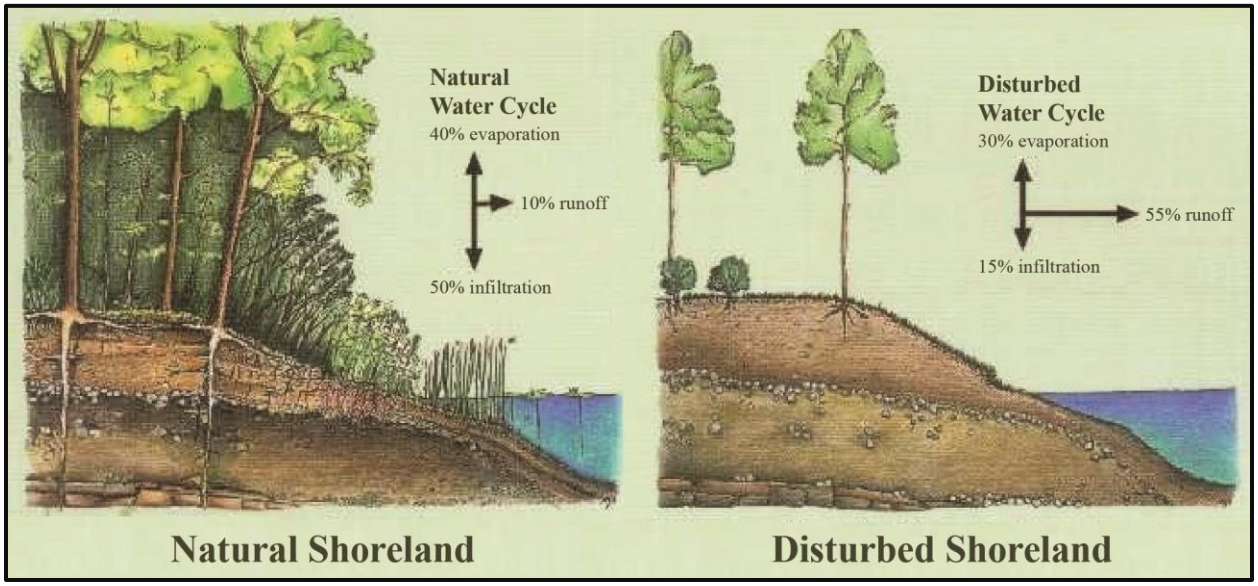
To support the development of targeted implementation projects across the 672,000 acre Kettle River Major Watershed, the planning team developed a detailed resource inventory and assessment at the sub-watershed scale Please refer to Appendix F, the ***Kettle River Major Watershed Sub-watershed Inventory and Assessment***, for detailed characteristics, narrative, figures, and analysis for each sub-watershed.



C. A Primer on the Land Cover/Water Quality Connection

Changes to land cover are important factors to examine when assessing the quality of water resources. Because of the extensive capacity that forest land cover has on both slowing down and filtering runoff, its removal has been a primary factor in the historical decline of water quality in most water resources in Minnesota. Removing forest land cover as well as other permanent vegetative covers (brushlands, grasslands) tends to increase the volume of runoff into water bodies.

Land use and development certainly can have a profound impact on the quality of water in lakes, rivers and streams, as well as to our drinking water. Impervious and cultivated surfaces such as fields, lawns, roads, driveways, and buildings increase the rate and volume of surface water flows that can carry phosphorus (when attached to soil particles), sediment, other excess nutrients, bacteria and other pathogens (animal waste/septic systems), and debris (natural or man-made) into a lake or stream. A primary impact from land use is the increased contribution of phosphorus through surface water runoff.



Phosphorus is a nutrient that can cause severe algal blooms and oxygen depletion when in excess in a water feature leading to degradation of water quality and diminished aesthetic and recreational enjoyment. The greater the phosphorus content in runoff water, the more the water quality in the receiving water is threatened. To get a general understanding of the impact of land cover on phosphorus loading, a measure called the Total Phosphorus Export Coefficient (TPEC) is used. The TPEC is measured as the mass of phosphorus export per area per year. Different land cover types have different values for TPEC. If the amount of area of a type of land cover is known, the TPEC can be applied to estimate the amount of phosphorus runoff.

Rates for TPEC can vary for a land cover type based on a variety of characteristics such as climate, soils, slope, proximity to water bodies, and in stream processes. To account for this variability, the models used to determine TPEC rates are typically calibrated by site measurements of actual phosphorus export. In the St. Croix River Basin, monitoring records are too sparse to calibrate TPEC models beyond a basin-wide accuracy. The table at right lists TPEC values used in the Lake St. Croix Nutrient TMDL report which were calibrated based on phosphorus loading to Lake St. Croix. The change in predicted phosphorus export is striking as land use changes from a natural setting – forest, shrubland, or grassland – to converted land uses such as agriculture or urban. Phosphorus export rates from agriculture and urban are 6 times greater than that of forest or shrubland.

Cover Type	TPEC (lbs/ac/yr)
Water	0.006
Forest	0.088
Shrubland	0.088
Grassland	0.197
Agriculture	0.561
Urban	0.561

Water quality can also be significantly affected by the quantity of runoff in a watershed. Cover from mature upland forests slows spring snow melts, thus mitigating peak flows that, when increased, can cause in-channel erosion during peak flow events. Areas of lowland vegetation and open water are also important; they act as a storage area for water during spring snow melts. Watersheds that have greater than 40% of their area covered by mature upland forests, lowland vegetation, and open water have enough shade (mature upland forests) and storage (lowland vegetation and open water) to keep peak flows from spring snow melts at levels that will not cause in-channel erosion in streams (Verry 2000).

When the land cover in the watershed drops below 40% of mature upland forests, lowland vegetation, and open water, that watershed will begin to see peak flows from spring snow melts increase in intensity. This increased peak flow will then cause in-channel erosion, which causes the streams to change. The changes in the streams result in sedimentation and aquatic habitat fragmentation. In watersheds where there is not enough storage (over 40% of the watershed) to manage spring snow melts, managing mature upland forests is important to ensure that there is enough shade to keep the watershed covered during spring snow melts.

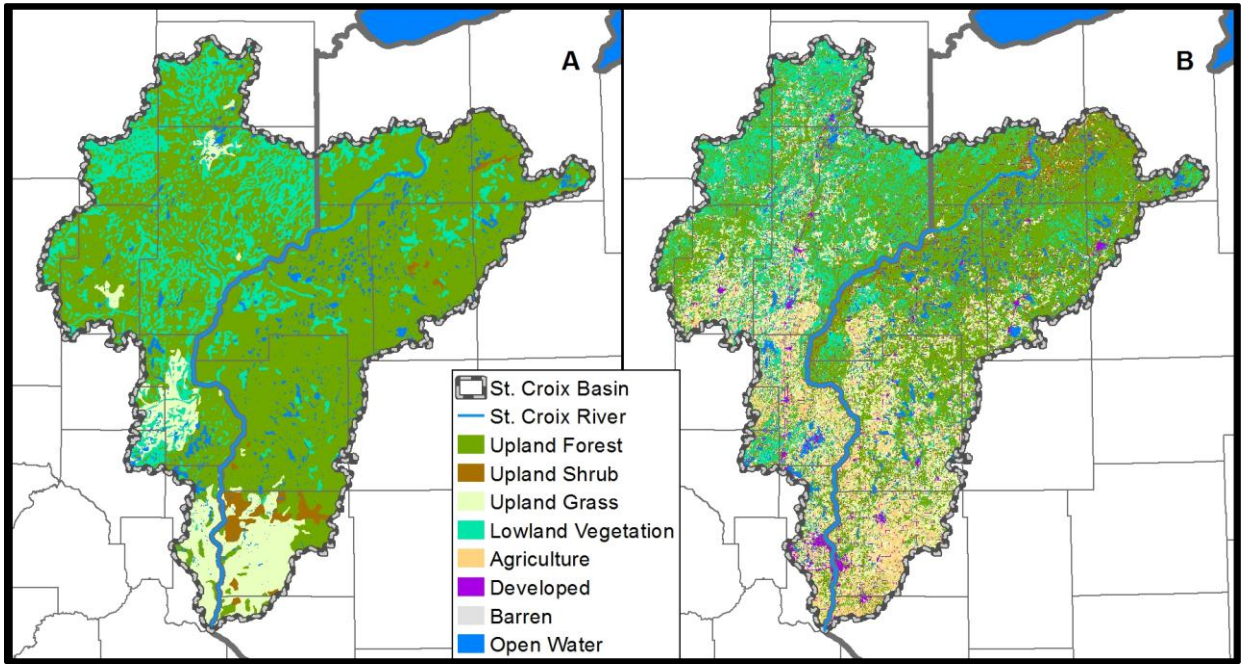
D. Historical Land Cover Analyses

St. Croix River Basin Historical Land Cover Change

The landscapes of the St. Croix River Basin (SCRB) in the mid-late 1800s (presettlement) were covered by upland forest and lowland vegetation in the north to grassland, prairie, and shrublands in the south and southwest (as can be seen in panel A in the map bottom right). Since then, much of the southern half of the basin has been converted to agriculture or developed lands, with pockets of non-cultivated lowland and upland vegetation remaining. The northern half has retained much of its presettlement land cover characteristics of upland forests and lowland vegetation, although the composition of large portions of the upland forests has been heavily altered by logging. In the northern portion of the watershed, only pockets of agriculture and developed cover types are present (panel B, map bottom right).

Analysis has shown that this land cover change has progressed upstream in the St. Croix River Basin. As human expansion has pushed upstream, change from low phosphorus export cover types such as forest, shrub, and grassland to high phosphorus export cover types such as cultivated crops and developed land has been the result. More recently (from 2001 to 2006), this downstream to upstream trend has become a change from cultivated crops to developed land. Upland forest continues to be lost.

The relationship of tributary watershed position within the watershed to change to converted land cover types is complex, but it exists and can be used to determine where to target particular types of water quality protection and improvement strategies. In the downstream portion of the basin, restoration and mitigation strategies will be important because a higher portion of the land cover has already been converted to higher phosphorus exporting land cover types. Mid-basin, protection strategies would be more appropriate to preserve some of the low-phosphorus export land cover types that still exist in abundance. Watersheds such as the Snake and the Kettle Rivers in Minnesota, and the Clam and the Yellow Rivers in Wisconsin are at the edge of this northeastward and upstream advance of converted lands. Failure to preserve low phosphorus export land cover types could mean failure to meet water quality goals in the SCRB (Appendix D. State of the Forest Report.).

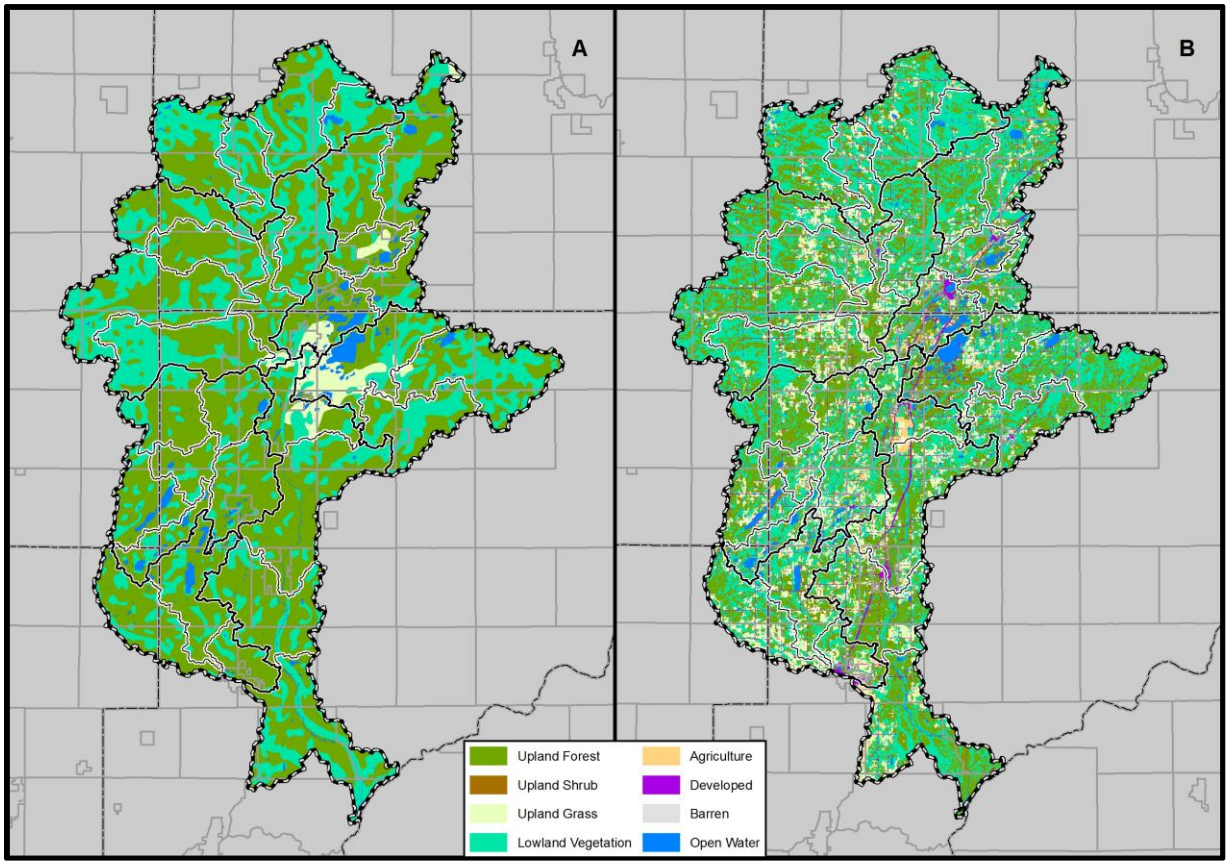


Kettle River Major Watershed Historical Land Cover Change

From presettlement to 2006, land cover in the Kettle River Major Watershed shifted from upland forest cover types to upland shrub, upland grass, lowland vegetation, agriculture, and developed cover types (as can be seen in the map below where panel A is presettlement cover and panel B is 2006 cover). Of the total area in the watershed, 24% has changed from upland forest to other cover types, which was slightly larger than the change in the percent cover in the St. Croix River Basin. The largest change from upland forest to another cover type was to upland grass. Most of the increase to upland grass was to pasture/hay (Appendix E, Table 9), as it was in the St. Croix River Basin.

Although the change in percent cover of upland forest in the Kettle River was larger than that in the St. Croix River Basin, increases in agriculture and developed cover types were not as large. Between these converted cover types, the largest increase was to developed cover types, which is a reverse of the change seen in the St. Croix River Basin overall where change to agricultural land cover was greater. Most of the increase to developed cover types was to open space and low intensity developed areas.

From 2001 to 2006, land cover in the watershed continued to shift from forested cover types to other cover types. Upland shrub also decreased in area. The largest increase was to emergent herbaceous wetlands. Agriculture, developed, and upland grass also continued to increase in area. Of the upland grass cover types, pasture/hay increased while grassland/ herbaceous decreased (Appendix E, Table 18). Of the converted cover types, agriculture had a higher increase in area than developed cover types, showing a reversal in the overall trend in the Watershed from presettlement to 2006. For the increase of developed cover types, the majority continued to be in open space and low intensity cover types.



E. Important Ecological Resources

Water flow and resulting water quality are bound by topography, and the areas that water flows from are delineated by watershed boundaries. Unlike the overland flow of water, biotic and environmental features are distributed by multiple factors. The Minnesota DNR Ecological Classification System (ECS) describes the land using associations of biotic and environmental factors, including climate, geology, topography, soils, hydrology, and vegetation to guide ecological management activities. The Kettle River Watershed sits in the Laurentian Mixed Forest Province with the majority of its area (82.8%) in the Western Superior Uplands section and the Mille Lacs Uplands subsection.

The Land Type Associations, which are the smallest ECS units currently mapped for the entire watershed, range from drumlin plains in the northwest, to till plains in the west central, to sand plains dotted across the central portion, to moraines along the eastern edge. The drumlin plains are composed of rolling hills oriented perpendicular to glacial retreat, with well drained soils in the uplands and poorly drained soils in the lowlands. The till plains are a patchwork of drainages, and the sand plains are typically well drained. The moraines form bowls where lakes have formed, and vary from well drained to poorly drained.

As part of the Minnesota State Forest Action Plan (Forest Resources Assessments and Strategies), the MN DNR created habitat models to help determine what remaining natural areas should be protected in the face of rapidly increasing development. A majority of the watershed (68.7%) was not given an ecological value. Of the areas given ecological values, moderate values were the most commonly assigned. Areas determined to have ecological value are mostly distribute along the upstream ends of the watershed and along the lower end of the main stem of the Kettle River.

Tomorrow's Habitat for the Wild and Rare: An Action Plan for Minnesota Wildlife, January 2006 (also known as Minnesota's Comprehensive Wildlife Conservation Strategy (CWCS) and the State Wildlife Action Plan (SWAP)) is a strategic plan focused on managing populations of "species in greatest conservation need." The plan offers some highlights for the Mille Lacs Uplands Subsection, which include:

- Extensive forest lands, riparian forests and open waters characterize the subsection. This mix of habitats supports bald eagles, common terns, sandhill cranes, ospreys, wood turtles, trumpeter swans, yellow rails, and sharptailed sparrows, as well as rare mussels like the winged mapleleaf, spike, and round pigtoe. Sand terraces and rock outcrops along the St. Croix River provide habitat for bullsnakes.
- This subsection is a major migratory corridor for waterbirds. It is also one of the most important subsections for forest-dwelling salamanders, such as four-toed and spotted salamanders, which use fishless, seasonal wetlands as breeding habitat.
- Existing protected areas important for SGCN located within the Kettle River Major Watershed include: state scientific and natural areas, state parks, state forests, state wildlife management areas, state aquatic management areas, national wildlife refuges, Kettle River Wild and Scenic River, the St. Croix Scenic Waterway, and other protected lands.

F. Conclusion

The St. Croix River Basin has been changed by human activities in significant ways since European settlers began to call it home. Our collective management of the land has had a noticeable impact on natural resources in many ways, particularly with respect to water quality. Along with point sources, changes to the landscape have resulted in enough additional nutrients (phosphorus) reaching Lake St. Croix at the mouth of the Basin to cause the Lake to become eutrophic and to warrant a designation of "impaired" from the MPCA and WI DNR.

The loss of low phosphorus export land cover types such as forest (1.1 million acres lost) to high phosphorus export cover types such as agriculture and urban (0.73 million acres converted) is most pronounced at the southern and downstream portion of the Basin. The Kettle River Major Watershed sits at a transition point where this upstream movement of converted cover types slows. Protecting the remaining forests (as well as shrublands, grasslands, and lowland vegetation) in the Kettle River Major Watershed and other watersheds in the St. Croix River Basin will be critical for maintaining the water quality that the Upper St. Croix River Basin enjoys and to keeping the water quality in Lake St. Croix from declining further.

The Kettle River Watershed lost approximately 162,000 acres (24% of the watershed) of upland forest from presettlment to 2006. While the loss of this low phosphorus exporting cover type has certainly had an effect on the quality of the water reaching Lake St. Croix, water quality issues related to phosphorus have not become a significant problem in the Kettle River or its tributaries. This loss of upland forest may have also had some effect on water quantity with increased peak flows from spring snow melts. However, in the Kettle River Watershed overall, there is enough area of storage (lowland vegetation and open water, a total of 41% of the watershed) to maintain stable peak flows from spring snow melts. While this is true for the watershed overall, in smaller portions of the watershed, tributaries may be at risk for increased peak flows if too much upland forest is lost (see Section 3 for more), and protecting forests in these smaller sub-watersheds will be important.

A protection strategy will be a key focus in the Kettle River Major Watershed, but protection alone will not go far enough. The Lake St. Croix Nutrient TMDL report calls for reduction of 12,236 lb/yr (15%) of phosphorus export in the Kettle River Watershed. According to the TPEC used in the TMDL, converting agriculture and urban to forest and shrubland results in a reduction of 0.47 lb/ac-year. To achieve the TMDL phosphorus export reduction goal by that type of land cover conversion alone would require conversion of approximately 26,000 acres (from 1990 land cover amounts) from agriculture and urban to forest and shrubland.

According to analysis in the TMDL, in 1992, 21,806 acres of the Kettle River Major Watershed was in agricultural land cover and 5,035 acres was in urban land cover. Reaching the TMDL goal by land cover restoration alone would have required returning nearly all of the converted land cover to natural vegetation. While agricultural land cover shows a decline in the 2006 land cover data to 14,938 acres, urban cover types have increased to 26,697 acres. Achieving the TMDL reduction goal by land cover conversion alone may not be possible, and the TMDL does call for other efforts to decrease phosphorus loading such as lower phosphorus export from agriculture and urban cover types. However, restoration strategies clearly need to be a part of the efforts to achieve water quality goals.

While total phosphorus export coefficients do a good job of calculating the distribution of phosphorus export loads across an area as large as the St. Croix Basin, they lose their effectiveness at finer scales. For example, phosphorus in runoff from a row crop has less chance of reaching a larger water body if it first runs through a naturally meandering stream rather than through a drainage ditch. Similarly, 100 acres

of afforestation that is miles from the nearest perennial stream will not have the same effect on water quality as 100 acres of afforestation that is next to that stream. Planning and management at finer scales will require better tools. Section 3, the Sub-watershed Analysis, zooms in on the Major Watershed by analyzing key natural and cultural factors that are drivers for water quality at the sub-watershed scale and is a first step towards finer scale planning that can guide activities in the Kettle River Major Watershed.

Forests and water quality are important and phosphorus export is a focal point of that relationship, but that interaction is only a part of the larger ecological and socio-economic system. In the ecological system, wildlife habitat, forest composition, invasive species, and climate change are important. In the socio-economic system, recreational activities, landowner goals, and the forest products industry are important. This Plan does not attempt to cover all of these issues in depth, but it also does not claim that the forest and water quality solution exists as an independent system. On the contrary, actions taken to protect, improve, and restore forests throughout the watershed are keys to not only protecting and improving water quality and quantity, but to maintaining the ecological and socio-economic health of the Basin.

Protecting and improving forests and water quality is a complex issue that no single agency can handle on its own. Humans have altered the ecological systems in ways never seen before. The socio-economic system continues to become more complex as we grow as individuals and as communities. To address the issues involved with forests and water quality, we will need a shared vision on where we want to go. Part 2 of the plan outlines this shared vision.

Part 1 – Section 3 – Sub-watershed Analyses

The purpose of this section is to provide resource managers with a detailed analysis of conditions and forest land cover/water relationships that exist on a sub-watershed basis. Strategically analyzing watersheds for conservation opportunities is hard work. This analysis is intended to help managers identify and prioritize specific areas in the Kettle River Major Watershed so they can more effectively promote and implement forest management practices that are more likely to result in improving water quality and to achieve other public and private benefits.

A. Overview

Watersheds were not created equal, nor do they function equally in their "production" of clean water. As introduced in Section 2, each of the major watersheds of the St. Croix Basin has its own unique set of hydrologic and ecological conditions as well as its own mix of land use activities that define water quality conditions in lakes, streams and rivers. Correspondingly, each of the seven sub-watersheds as well as the 31 minor watersheds within the sub-watersheds have their own distinct in characteristics; varying greatly in size, shape, and function which affect their ability to produce clean water. Informed with an understanding of these general watershed characteristics, resource managers can set logical, rational priorities to guide their use of public funds.

The following narrative provides a more detailed description and a list of key findings for each of the sub-watersheds that seeks to expose the "drivers" of water quality in relation to land cover. The narrative also provides an overall assessment of risk in terms of impacts on water quality if forest management activities are not strategically implemented. With this detailed information it becomes easier to better understand how these sub-watersheds currently function in their production of clean water. With this understanding, the assessment of the sub-watersheds becomes an excellent foundation for shaping resource management policy and priorities on a local level.

B. Sub-watershed Assessment Criteria

Throughout the landscape stewardship planning process, members of the planning committee reviewed and discussed a wide range of data, maps and reports detailing the land cover and water resource connections. Data on several key "natural" factors such as area of the sub-watershed, stream length, slope, and soils were assessed. Numerous "cultural" factors, manmade activities across the landscape, were also assessed. Cultural factors included items such as land ownership, disturbed lands, historic loss of upland forests, and impaired waters.

C. Kettle River Sub-watershed Historical Land Cover Change

See the Expanded Plan for a summary and Appendix F for the complete report including narrative, key findings, tables, and maps regarding sub-watershed land cover change. Key factors regarding land cover change are included in the assessment criteria summary table below. Users of the Plan are reminded that the impacts of land cover change, over time, can be either negative or positive.

D. Individual Sub-watershed Assessments

Maps and more detailed information for each of the seven sub-watersheds are provided in the Expanded Plan (pages 3-6 to 3-19). A series of key findings statements are listed for each sub-watershed followed by an overall sub-watershed risk assessment rating. This rating provides resource managers using this plan with an initial interpretation of the risks that the particular sub-watershed has in negatively affecting water quality if forest management activities are not strategically implemented. High risk translates to high priority for forest management activity. These ratings are summarized in the initial screening of sub-watersheds below.

E. Assessment Criteria Summary Table

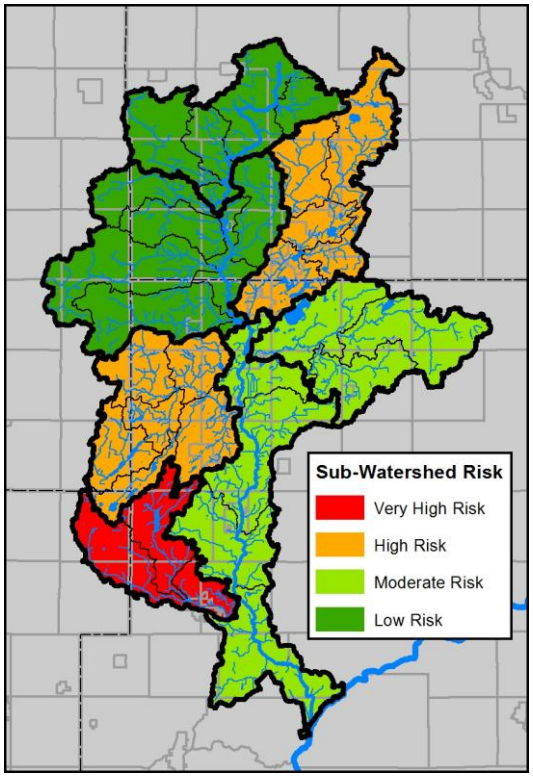
In order to draw some conclusions for management priorities and to help compare each sub-watershed with the others on each given resource issue, the resulting calculations of the key assessments were placed into a table format. The table below summarizes the results of the calculations made for each sub-watershed and for each natural or cultural factor developed through the sub-watershed assessment process. Rankings were assigned based on qualitative assessment of the range of values in the major watershed. Sub-watersheds were compared against each other, thus the priorities only apply within the context of the watershed.

Kettle River Sub-watershed Assessment Criteria Summary

	Lower Kettle River (SubWD # 1)	**Grindstone River (SubWD # 2)**	**Pine River (SubWD # 3)**	**Willow River (SubWD # 4)**	**Moose River (SubWD # 5)**	**Upper Kettle River (SubWD # 6)**	**Headwaters Kettle River (SubWD # 7)**
Area	124,403 acres	55,558 acres	92,197 acres	85,750 acres	90,326 acres	143,810 acres	80,882 acres
Natural Factors							
Position in watershed	**H** Main stem, low	**M** Trib, low	**L** Trib, mid	**L** Trib, mid	**L** Trib, hi	**L** Main stem, hi	**L** Main stem, hi
Stream density	**H** 1.21 miles/sqmi	**L** 0.87 miles/sqmi	**H** 1.17 miles/sqmi	**L** 0.83 miles/sqmi	**H** 1.16 miles/sqmi	**H** 1.11 miles/sqmi	**M** 1.06 miles/sqmi
Sub-wd Slope	**M** 6.1%	**M** 4.7%	**H** 7.1%	**M** 6.2%	**H** 8.0%	**L** 4.7%	**L** 4.3%
Cultural Factors							
Upland forest loss	**M** 23.8%	**H** 42.9%	**H** 35.4%	**L** 9.4%	**H** 33.0%	**L** 16.0%	**M** 18.5%
Converted lands	**H** 9.5%	**H** 8.7%	**M** 6.0%	**M** 5.2%	**H** 7.8%	**L** 3.9%	**L** 3.0%
Public lands	**M** 22.8%	**H** 5.0%	**H** 15.5%	**M** 24.1%	**H** 12.8%	**M** 30.3%	**L** 45.8%
Protected upland forest	**M** 39%, 18,858 ac	**H** 14%, 2,393 ac	**H** 27%, 9,057 ac	**M** 39%, 12,189 ac	**H** 21%, 5,856 ac	**M** 42%, 22,499 ac	**L** 53%, 11,606 ac
Potential PFM	**M** 62%, 44,915 ac	**H** 86%, 20,981 ac	**H** 72%, 41,308 ac	**M** 59%, 32,557 ac	**H** 76%, 43,147 ac	**L** 54%, 53,224 ac	**L** 41%, 24,576 ac
Impaired streams (other than mercury)	**L** 0.1 miles	**H** 33.1 miles	**L** 0.0 miles	**L** 0.0 miles	**L** 0.0 miles	**L** 0.0 miles	**L** 0.0 miles
Impaired waters (other than mercury)	**L** 0 acres	**L** 0 acres	**L** 0 acres	**L** 0 acres	**L** 0 acres	**L** 0 acres	**L** 0 acres

Notes: H = High Priority for forest management action, M = Medium Priority for forest management action, L = Low Priority for forest management action. The shaded box priorities represent the sub-watershed that had the highest ranking of all seven for the given factor being assessed.

F. Initial Screening of Sub-watersheds



Based on this analysis, the seven sub-watersheds are ranked below in order of priority from the highest risk to impacts on water quality to the lowest.

1. *Grindstone River Sub-watershed – very high risk.* Least amount of public landownership, greatest loss of upland forest, highest potential PFM, second highest average watershed slope, high length of impaired streams.
2. *Moose River Sub-watershed – high risk.* Low public land ownership, third largest loss of upland forest, high PFM potential, steepest average watershed slope.
3. *Pine River Sub-watershed – high risk.* Low public ownership, high loss of upland forests, high potential PFM, second steepest average watershed slope.
4. *Willow River Sub-watershed – moderate risk.* Moderate amount of public landownership, moderate amount of potential PFM, moderate slope.
5. *Lower Kettle River Sub-watershed – moderate risk.* Moderate amount of public landownership with much of it located along the main stem, moderate amount of upland forest loss, high potential PFM, moderate average watershed slope.
6. *Upper Kettle River Sub-watershed – low risk.* Moderate amount of public landownership, low amount of upland forest loss, low amount of potential PFM, low average watershed slope.
7. *Headwaters Kettle River Sub-watershed – low risk.* Very high amount of public landownership, low amount of upland forestland lost, low average watershed slope.

This initial ranking of sub-watersheds, while somewhat subjective, begins the process of interpeting the organized collection of data and the setting of priorities. The comments provided in the ranking above reflect the application of general knowledge about the seven sub-watersheds. This risk assessment exercise using existing data and information may be basic, but it is low cost and relatively easy to develop. This analysys can help resource managers make more informed decisions as to where to prioritize efforts. Questions managers will likely be facing include:

- Where should I plant that tree to maximize the positive impacts on water quality?
- If we only had enough money to restore 1,000 acres of forestland, where should we spend the money?

Part 2 of this Plan will address the strategic planning question, "where do we want to go?" and establish and long range vision for managing forests in the Kettle River Major Watershed. Part 3 will address the "how will we get there question?" and explain in more detail what efforts should be done in the seven sub-watersheds to efficiently and concurrently manage forests and improve water quality.

Part 2 – Section 4 – The Vision

In Section 4, the Plan begins to outline the vision and pathway for the future of the Kettle River Major Watershed as established by the Planning Committee through a series of working principles and desired future conditions.

A. Working Principles

At a series of meetings in 2012 and 2013, the Planning Committee formulated a series of working principles to summarize how they generally viewed the context of the forests and water quality in the Kettle River Major Watershed over time and how they would recommend interested partners and stakeholders pursue sustainable forest management that protects water quality in the future. The working principles were developed to provide an initial shared or agreed upon set of perspectives as they developed Part 2 of the Plan. This part of the Plan, the strategic policy framework, represents the heart of the Plan. Users of the Plan are encouraged to closely read through these principles to gain that shared perspective with the Planning Committee.

The following summarizes the Planning Team's working principles:

Planning Principles

- The Planning Committee recognizes that forest land cover is key to good water quality. The Committee members also believe that diverse, healthy forests are key to healthy aquatic and terrestrial wildlife populations.
- The Planning Committee recognizes that the forests in the Kettle River Major Watershed in presettlement times were diverse and changing, dependent on climate and natural disturbances along with activities by Native Americans. The Planning Committee recognizes that since the late 1800s, much of the Kettle River Major Watershed has been significantly altered. The condition and composition of the forests have been changed and often more than once, by a variety of more intensive land use activities from logging to agriculture, urban, shoreland, and rural residential land development. Forest land cover has declined overall in the major watershed but there are varying amounts of reductions of forestland on a sub-watershed basis.
- Although the forests have changed significantly over the past 100 years, the Committee recognizes that there are parts of the watershed that are in good ecological condition. Protecting forests in these areas from conversion to agriculture or land development and maintaining these high quality forests will help to keep levels of phosphorus transported into the river from rising, which will result in better water quality over time. Other forests are not in as good condition and the Committee encourages that these should be improved and restored.
- The Planning Committee recognizes from a water quality perspective, one of the best strategies is to reestablish forests on lands that have been converted to other uses. (Presettlement Upland Forest has been converted into Upland Grass, Upland Shrub, Agriculture and Developed land covers.) Most of the Upland Forest lost since presettlement (162,000 acres) is now in an open landscape setting and classified as Upland Grass, an increase of 73,000 acres (from 19,000 acres to 92,000 acres). Restoring forested land cover on these sites will help improve water quality. Tree planting, forest stand improvement, and riparian buffer projects can help improve water quality.
- The Planning Committee recognizes that while reestablishing forests on lands that have been converted is the best strategy from a water quality perspective, planting forests in areas where wildlife habitat would be jeopardized as a result should be avoided if possible.

- The Planning Committee recognizes the continuum of forestry practices and that forest management involves a number of conditions and approaches (old growth forests, successional forests, extended rotation, plantations, etc.). Each landowner has a different set of goals and motivations in the types and intensity of forest management they will follow.
- The Planning Committee recommends an ecologically-based approach -- growing "the right kinds of trees on the right sites" -- to forest management in the watershed. The Planning Committee recommends the use of the MFRC site level guidelines, the MN DNR native plant communities (NPC) field guides, and the Climate Change Response Framework as a means to guide forest management activities across the watershed.

Coordination Principles

- The Planning Committee believes that sustained coordination between service providers in the Kettle River Major Watershed will lead to greater capacity from pooled resources and increased funding opportunities and to more targeted and effective landowner services and interactions.
- The Planning Committee believes that there is room for improvement towards sustained coordination in the Kettle River Major Watershed.
- The Planning Committee believes that analyzing the sub-watershed functions can help provide clues on how to target and deliver limited public resources to improve forests and water quality as well as provide other public benefits and that additional tools will be helpful to fine tune that prioritization.
- The Planning Committee will advocate stable and consistent funding for not only implementation dollars but for increased levels of coordination and staff capacity to get the job done.
- The Planning Committee believes that existing technologies and collaboration can greatly extend our reach to the thousands of private landowners in the Kettle River Major Watershed and strongly encourages all partners and stakeholders to pool and coordinate efforts and resources over the next ten years to implement this Plan.

Implementation Principles

- **Good forest management** = **good water quality** = **good wildlife resources** = **good recreation opportunities**.
- The Planning Committee encourages the sustainable management and use of forest resources to promote better water quality, improved wildlife habitat and ecological resources, and enriched recreational opportunities through **outreach and education**.
- The Planning Committee encourages the use and application of sound scientific approaches, technologies, and methods to address forest, water, wildlife, ecological, and recreation resource management issues through **coordinated private incentive programs**.
- The Planning Committee through their public agencies, agree to use and apply sound resource management approaches, technologies, and methods to address forest, water, wildlife, ecological, and recreation resource management issues by supporting **public improvement projects** that are implemented by partnering agencies in the watershed.
- The Planning Committee supports the prudent development and/or updating of **regulatory controls** and enforcement mechanisms when appropriate and necessary, to address and protect public health and safety in relation to forest, water, wildlife, ecological, and recreation management issues. The highest amount of investments should be made in education, followed by incentives, improvements, and regulations, respectively.

Monitoring/Evaluation Principles

- Through a shared vision and application of these principles, steady progress can be made towards the desired future conditions of forests in the Kettle River Major Watershed. The Planning Committee is committed to developing a practical and useful monitoring program for reviewing the implementation of this Plan.

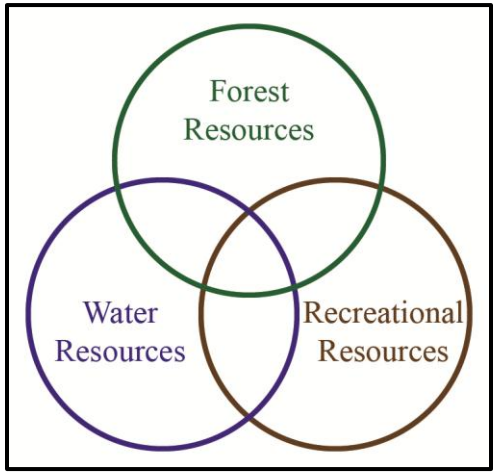
B. Desired Future Conditions

The strategic policy framework for the Kettle River Watershed Landscape Stewardship Plan continues with the desired future conditions (DFCs). DFCs are statements that are long-range in nature. They are intended to provide an overall sense of direction or perspective in a relatively short concise format and are general in scope or content. A one hundred year horizon was used as the suggested timeframe. DFCs then filter down to Goals, Objectives, and Action Items in Section 5 of the Plan.

By achieving these desired future conditions, people living, working and recreating the Kettle River Major Watershed will enjoy a high quality of life more closely connected to the forests, water resources, and the overall watershed. People will have a greater awareness of the importance of healthy forests and high water quality from ecological, economic and social perspectives. This high quality of life could be considered an over-arching desired future condition.

In one hundred years, the Kettle River Watershed Partnership envisions a watershed that has:

- ***Protected and Improved Water Quality*** – landowners and local units of government will recognize together that healthy forests in this watershed are key to protecting good water quality and quantity. Forest land cover will be an integral component in water resource initiatives. In one hundred years, there will be no impaired waters in the Kettle River Major Watershed.
- ***Protected and Improved Forest Resources*** **–**will include:
  - Healthy and Sustained Forests and Ecological Resources – forests in the Kettle River Major Watershed will be healthy and sustained for the long term in an ecologically appropriate manner. The Kettle River Watershed Partnership envisions a forest that 1) is structurally, functionally, and compositionally diverse, 2) exhibits spatial patterns consistent with the watershed's ecology, 3) supports natural communities of plant and animal species native to the watershed, and 4) provides diverse habitat that maintains natural communities and viable populations for the plant and animal species in the watershed.
  - Multiple Uses of Forest Resources – a full range of forest products will be produced in the watershed in a sustainable manner that protects and improves existing ecological resources and allows for a balance between economic and recreational interests.



- ***Attractive and Engaging Recreational Resources*** – a broad range of recreational opportunities in the watershed will be available to the public consistent with the respect for private property rights, the high quality of life enjoyed by residents, and the protection of the natural resource base. Forests and waters will be attractive for recreational activities to residents, tourists and outdoor enthusiasts and will provide educational opportunities that engage the people who recreate in the watershed to understand the importance that forests and water quality play in protecting recreational resources, the natural resource base, and a high quality of life.

Achieving these desired future conditions will require the following management conditions, which will be applied to each of the DFCs:

- ***Balanced and Managed Land Development*** – land use and development across the landscape will be managed in both urban and rural areas so as to respect and sustain healthy forests and water quality. Forest management policies and practices will be integrated into local land-use planning processes.
- ***Coordinated Collaborative Management*** – the 10-year landscape stewardship process for the Kettle River Major Watershed will have entered into its tenth generation. Coordinated and collaborative management of the forest and water resources will be thoroughly established. All partners and stakeholders including landowners, local officials, and agency staff will work collaboratively both on the planning and management of the forest and water resources to achieve the goals set forth in this Plan.

Part 2 – Section 5 – Goals and Objectives

A. Overview

This section provides an initial outline on the approaches that the Coordination / Implementation Committee will take to promote the management of healthy forests in the Kettle River Major Watershed that are critical to protecting and improving water quality and quantity as well as providing other public and private ecological, social, and economic benefits.

The goals, objectives, and action items for this Plan address the following DFCs:

- Water Resources – DFC: Protected and Improved Water Quality
- Forest Resources – DFC: Protected and Improved Forest Resources
- Recreational Resources – DFC: Attractive and Engaging Recreational Resources

B. Goals and Objectives

The following tables summarize the Goals and Objectives from the Expanded Plan which are grouped by the type of strategy used to address the Goals. In the Expanded Plan, Goals and Objectives are organized by DFCs, which are grouped as columns in the following tables for Water Resources, Forest Resources, and Recreational Resources. The intention of the change in organization used in this Plan is to illustrate that there are two overarching themes: the Desired Future Conditions and the Strategies to address them. Action Items for Objectives can be found in the Expanded Plan.

Water Resources	Forest Resources	Recreational Resources
Strategy 1 – Protect and enhance existing high quality resources…		
Goal 1 – Protect Healthy Water Ecosystems and Features	**Goal 1 – Protect Healthy Forest Ecosystems**	**Goal 1 – Protect Forest-Related Public Recreation/Tourism**
Objective A – Protect Forested Riparian Corridors. Support the protection and enhancement of existing forested riparian corridors.	**Objective A – Public Forestlands**. Support the maintaining and enhancing of public forestlands using priorities established in the sub-watershed analyses.	**Objective A – Public Recreation Lands**. Support programs and projects that protect and promote state owned lands (state forests, state parks, SNAs, etc.)
Objective B – Protect Undeveloped Shorelands. Support the protection and maintenance of undeveloped and native shorelands.	**Objective B – Private Forestlands**. Implement projects that maintain and enhance private forestlands using priorities established in the sub-watershed analyses.	**Objective B – Scenic Roadways**. Support programs and projects that protect and enhance scenic roadways and view corridors in the watershed.
Objective C – Protection BMPs. Advocate and support the implementation of Best Management Practices (BMPs) that guide the use and maintenance of existing forested riparian corridors and shoreland areas.	**Objective C – Forest Health.** Participate in programs and projects that promote proactive forest health practices.	**Objective C – Water Based Recreation.** Support programs and projects that protect, maintain and promote water recreational areas that provide resources for the diverse water-based recreation activities in the watershed.

Water Resources	Forest Resources	Recreational Resources
Strategy 2 – Restore and improve impaired resources…		
Goal 2 – Improve Impaired Water Resources	**Goal 2 – Increase and Restore Forest Land Cover**	**Goal 2 – Encourage Forest-Oriented Private Land Recreation**
Objective A – Native Vegetation in Impaired Riparian Corridors. Implement projects that restore and improve native vegetation in riparian corridors.	**Objective A – Forest Restoration Projects.** Support the implementation of forest restoration projects on priority sites in each sub-watershed.	**Objective A – Wildlife Habitat**. Support programs and projects that improve, restore and maintain wildlife habitat on private lands (WHP, EQIP, etc) while providing access for recreational users.
Objective B – Shoreland Restoration Projects. Work with partners to support the implementation of shoreland restoration projects on lakes in the watershed. Support erosion control projects that utilize native vegetation.	**Objective B – Insects, Disease, and Invasive Species**. Support efforts by local and state agencies, conservation groups, landowners and other stakeholders to control/manage invasive species**.**	**Objective B – Technical and Financial Support**. Support programs and projects that provide technical and financial assistance to private landowners to increase outdoor recreation on their properties (trails, amenities, etc.).
Objective C – Restoration BMPs. Advocate and support the implementation of Best Management Practices (BMPs) that guide the restoration of forested riparian corridors and shoreland areas.	**Objective C – Biomass/Forest Restoration Projects.** Design and implement forest and other land-based restoration projects to maximize utilization of removed undesirable woody plant material.	**Objective C – Trail Networks.** Support the development of neighborhood trail networks.

Water Resources	Forest Resources	Recreational Resources
Strategy 3 – Increase coordination by building and sharing knowledge…		
Goal 3 – Advance Water Resources Knowledge	**Goal 3 – Advance Forest Resources Knowledge**	**Goal 3 – Enhance the Awareness of the Natural Resource Base on Which Outdoor Recreation Depends**
Objective A – County Water Plans. Support and coordinate with counties in the development and implementation of the county water plans. Advocate the integration of this plan with the county water plans.	**Objective A – Watershed/Forest Land Cover Connection**. Actively educate stakeholders in the watershed about the watershed/forest land cover connection and its role in producing clean water.	**Objective A – Increase Public Awareness**. Work with local outdoor recreation groups to increase the awareness of the public about the value of forests and high quality natural resources to outdoor recreation.
Objective B – Lake Management Plans. Support and coordinate with counties in the development and implementation of lake management plans.	**Objective B – Local Conservation Groups**. Support the expansion and effectiveness of local conservation groups through their active involvement in PFM (Kettle River Woodland Owners Association, lake associations, etc.).	**Objective B – Collaborate with Partners and Stakeholders**. Work with partners and stakeholders to link citizens and businesses in the watershed to support organizations actively working to protect, restore and improve forest and water resources in the watershed.
Objective C – Monitor Water Quality. Support efforts by local and state agencies to monitor water quality in the watershed and distribute results to the public**.**	**Objective C – Land Use Planning**. Advocate sound land use planning and the recognition of forest resources in local planning and regulation processes.	**Objective C – Outreach and Education.** Proactively educate visitors to the Kettle River Major Watershed about the high quality natural resources in the watershed and their role in protecting them.

Part 3 – Section 6 – Coordination Framework

Successful implementation starts with a small group of committed people. Successful implementation requires timely and purposeful coordination. Coordination, before implementation, is one of the most overlooked and underestimated cost-saving management efforts in resource management. This section provides guidance on a range of coordinative and administrative topics that need close consideration by partners working in the watershed. Additional guidance can be found in the US Forest Service document, "Landscape Stewardship".

A. Organizing for Effective Implementation

One of the primary goals of landscape stewardship is to provide seamless service to a far greater number of private landowners while at the same time coordinating efforts with public land managers over large geographic areas to create more sustainable landscapes. In order to attain this goal, increased levels of coordination by multiple agencies and organizations working within a landscape are needed.

The narrative in this section provides guidance on four areas of coordination that resource managers and their landscape partners should address before diving into the implementation of a landscape stewardship plan:

- Partners and Partnerships
- Implementation Programs and Priorities
- Training and Funding
- Engaging Communities and Landowners

Moving from a paradigm of preparing and implementing single forest stewardship plans and projects for individual landowners to a landscape approach involving hundreds, perhaps thousands of landowners and their communities will require new ways of thinking and working together.

B. Partners and Partnerships

There is no one entity solely responsible for the management of forest and water resources in the Kettle River Major Watershed. Rather, there are numerous agencies and organizations with varying and sometimes overlapping roles and authorities. Identifying partners and clarifying roles is important to the successful implementation of this Plan especially since there is no one governing entity.

Partners in the Kettle River Major Watershed

Partner agencies listed below have been involved in the development of this Plan (see Appendix A for a list of participants). Agencies and organizations not involved in the planning process are welcomed and encouraged to get involved in implementing the Plan.

- St. Croix River Association (SCRA). Nonprofit organization of people and organizations advocating for conservation across the Basin.
- Soil and Water Conservation Districts (SWCD). Pine SWCD, Carlton SWCD, Aitkin SWCD and Kanabec SWCD. The SWCDs work in partnership with landowners, state and federal agencies and a range of conservation organization to conserve and manage land and water resources across their respective county.
- The Nature Conservancy (TNC). A non-governmental organization dedicated to the conserve Minnesota's most significant prairies, forests, lakes, rivers, streams and wetlands for nature and people since 1958.
- Minnesota Forestry Association (MFA). The statewide nonprofit organization that works on behalf of family forest owners, through education and advocacy, to promote stewardship of woodlands.
- Kettle River Woodland Owners Council. The local chapter of MFA serving landowners in the Kettle River watershed.
- Minnesota Department of Natural Resources (MNDNR), Division of Forestry -- PFM Program. MNDNR Forestry provides overall leadership and management of services to private woodland owners through its Private Forest Management (PFM) program.
- Minnesota State Agencies. MNDNR Divisions of Fish & Wildlife, and Ecological and Water Resources; MN Board of Water and Soil Resources (BWSR); MN Pollution Control Agency (MPCA).
- Federal Agencies. USDA Forest Service (USFS), National Park Service (NPS), Natural Resources Conservation Service (NRCS), and the U.S. Fish & Wildlife Service (USFWS).
- St. Croix Watershed Research Station. Station scientific staff conduct ongoing ecological research at the watershed scale.
- MFRC East Central Landscape Committee. The MFRC Landscape Program fulfills the MFRC's charge to "encourage cooperation and collaboration between public and private sectors in the management of the state's forest resources." Committee members represent forest industry, natural resource agencies, individual landowners, non-profit organizations, educational institutions, and concerned citizens.

All of the partners are encouraged to be active through the coordination, implementation and monitoring phases of this Plan. They should all work to complement each other's efforts to increase the successful implementation of this Plan. The goals and objectives outlined in Part 2 of this Plan are attainable, but will be accomplished only if the people and the organizations in the watershed can muster the collective will to do what is necessary to make the plan goals a reality. So how should this network of partners work together?

Coordination Strategy # 1 – Convene, Support and Sustain the Coordination / Implementation Committee

The primary coordination strategy for this Plan is to convene a core group of partners – resource professionals, service providers, landowners, and local officials – into a team or committee that can effectively manage the coordination and implementation of this Plan. Partners will need to commit to sharing resources and active involvement on an ongoing basis to reaching the goals in this Plan. And while partnering organizations should understand that this landscape stewardship project should be considered a minimum 5 – 10 year commitment, resources from the MN DNR and US Forest Service are already available to support the initial efforts of such a committee.

Coordination Strategy # 2 – Hire a Project Coordinator

To support the work of the Coordination / Implementation Committee and ensure that all partners are on the same page, it would be beneficial to have one person serve as the point of contact to manage the coordination process. This should be a paid position and could be administered by the St. Croix River Association or other entity. Some seed moneys to support this position are already in place.

Coordination Strategy # 3 – Form the Kettle River Watershed Partnership (KRWP)

A third coordination strategy recommended by the Planning Committee is that a broader partnership of stakeholder groups working in the Kettle River Watershed be formed. This partnership of agencies and organizations is purposefully intended to be quite informal in nature and take on a limited or focused outreach and networking role. It would do this principally by convening an annual landowner meeting each year to convey progress made in the sustainable management of forests, water, and recreation resources.

Coordination Strategy # 4 – Growing Coordination through Partnerships in the Watershed

A good landscape stewardship plan will not in itself establish the level of coordination needed to ensure seamless, effective and efficient service delivery, especially when the plan covers multiple jurisdictions and operational territories involving many actual and potential partners and stakeholders. The commitment by partners and stakeholders to share resources and actively participate on an ongoing basis is the core to developing and expanding partnership and stakeholder capacity to reach the shared goals and objectives of this landscape stewardship plan. Landscape stewardship also depends on increasing partnership capacity across all levels of government as well as within the private and nonprofit sectors.

Moving from a paradigm of serving one landowner at a time to a landscape approach that concurrently serves landowners and their communities will require Cooperative Forestry Managers and their State Foresters to encourage 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.

C. Implementation Programs and Priorities

The "PFM Implementation Tool Box": Foundation to Service Delivery to Private Woodland Owners

When outlining coordination and implementation strategies in resource management plans, it is beneficial to consider the entire range of tools available to resource managers. The "implementation tool box" for private woodland owners is often bigger than many people realize. The implementation toolbox (see Expanded Plan) illustrates many of the major implementation tools and options that can be used to encourage landowners and community leaders to develop flexible and effective forest stewardship or other resource plans based on the all lands approach. As the diagram suggests, services provided to landowners on the left tend to be less costly, but are also less permanent in nature and less explicitly connected with societal benefits. In contrast, techniques listed further to the right side of the spectrum, while more costly, generally tend to have a greater degree of permanence and produce more easily recognized benefits to society.

Redesigning the PFM Program: Providing Woodland Owners with Options through the Graduated Service Delivery Approach

There are over 200,000 private woodland owners in Minnesota. The landscapes that these parcels occur on vary greatly in ecological settings. The properties and the resources they contain and conditions they are in vary greatly as do the owners themselves. A "one-size fits all" approach to providing services leaves many people and lands from being better managed. MN DNR Forestry is in the process of redesigning the basic approach of service delivery to private woodland owners through its Private Forest Management (PFM) Program to more comprehensively serve their needs. What are their interests, motivations, concerns and challenges? We need to give them options. Furthermore, these options should be rolled out in a way that encourages greater involvement and commitment by landowners in exchange for more public benefit or service. The diagram in the Expanded Plan describes the four basic levels of service being developed by the MN DNR.

Implementation Strategies: A Framework for Building Systematic Implementation

There is no one tool or strategy that will solve the challenges of significantly increasing forest stewardship across a landscape or watershed and keeping forests as forest. One of the benefits of using a landscape approach to forest stewardship is that it encourages partners and stakeholders to consider multiple strategies at varying scales, to bring those strategies together in a cohesive plan, and then to take complimentary actions that are relevant to the local community with respect to its culture and traditions. Five general implementation strategies have been identified that can be used in most any resource management endeavor including forest stewardship: Outreach & Education; Incentive Programs; Public Investments; Policy Integration; and Regulation.

Coordination Strategy # 5 – Synchronizing Watershed Priorities with Federal / State / Regional / Local Priorities

Members of the Coordination / Implementation Committee should be aware of two recent priority setting efforts by the MFRC East Central Regional Landscape Committee:

- Minnesota State Forest Action Plan (FAP) http://www.forestactionplans.org/states/minnesota
- LSOHC 25-Year Forest Habitat Implementation Vision http://www.lsohc.leg.mn/materials/10_Mtg/Forest_Vision.pdf

D. Training and Funding

Coordination Strategy # 6 – Integrate Service Provider Training

While landscape approaches to forest stewardship provide significant benefits, successful implementation will likely require that agency staff and field foresters learn new skills in some or all of the following areas: media training, strategic communication, conservation marketing (also known as social marketing), working with local decisionmakers, and meeting facilitation. Other training courses may be developed, or adapted from other fields, to help foresters acquire the skills necessary to be successful. MN DNR Forestry along with its partners will need to determine who will receive what training, and to what depth of knowledge. For example, field foresters will need to have a working knowledge of conservation marketing, without necessarily becoming experts in the field.

Coordination Strategy # 7 – Collaborate on Funding Development Using this Plan as a Guide

How will the implementation of this landscape-scale forest stewardship initiative 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.

An often 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. There are also opportunities for financial support opening up as more and more businesses want to project a "green" image.

Landscape stewardship projects also 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 investements 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.

Coordination Strategy # 8 – Maintain an Inventory of Available Resources for Implementation

The following is a list of potential resources available to the Coordination / Implementation Committee to pursue in the project and funding development stage. The Coordination / Implementation Committee should maintain and grow this inventory of administrative, technical, financial, and political resources as tools to foster increased success in implementation of this Plan.

Administrative Resources

- East Central Landscape Committee.
- Landowners – thousands of property owners in the Kettle River Watershed.
- Township Officials – 4 sets of supervisors and clerks.
- SWCDs – 4 counties, four districts, 4 sets of supervisors and staff.
- County Boards – 4 counties, four districts, 4 sets of commissioners and staff.
- Planning and Zoning – 4 different approaches to comprehensive planning and implementation.
- MN DNR Forestry – 2 different area offices.
- BWSR – 1 board conservationist, 1 agency forester.
- MPCA – multiple programs.
- USDA Forest Service, Northeastern Area, State and Private Forestry.

Technical Resources

- Intern projects.
- GIS mapping – plan appendices, other sources.
- State agency personnel - DNR Division of Forestry, Division of Fish and Wildlife, etc.
- County staff – planning & zoning staff, county water planners, SWCD technicians, etc.
- Consulting foresters and Loggers.
- USDA Forest Service, Northeastern Area, State and Private Forestry.

Financial Resources

- MFRC seed money ($5,000 per year).
- Clean Water Land & Legacy Amendment funds.
- Costs Share programs.
- State agency programs - FSP, Stewardship Committee, etc.
- County Water Plans projects and programs.
- Foundations and organizations.
- Landowners - private investments.
- Federal and State agency budgets - staff assistance.

Political Resources

- Private landowners.
- Townships.
- Soil and Water Conservation Districts - supervisors and staff.
- County boards and staff and county water plan committees.
- MFRC.

E. Engaging Communities and Landowners

Outreach to 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.

Community Benefits of Forest Stewardship on a Landscape Scale

Contributes to Economic Prosperity
- Attract tourists.
- Attract businesses.
- Attract new residents (e.g. retirees).
- Enhance real estate value.
- Reduce taxes.
- Stimulate financial activity/sales.
- Reduce energy costs.

Helps to Alleviate Social Problems
- Promote cultural & historical preservation.
- Preserve/regenerate community character.
- Alleviate unemployment distress.
- Enhance quality of life.

Provides Environmental Services
- Provide clean water.
- Protect drinking water supplies.
- Improve flood control.
- Provide clean air.
- Preserve biological diversity.
- Mitigate climate change impacts

Coordination Strategy # 9 – Systematic and Comprehensive Landowner Outreach

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 Expanded Plan.

F. Conclusion

Successful implementation starts with a small group of committed people. It requires timely and purposeful coordination. Coordination, before implementation, is one of the most overlooked and underestimated cost-saving management efforts in resource management. In an age of complex environmental and socio-economic issues and declining budgets for public and private conservation agencies, sharing resources and leveraging successes has never been more important. Services to private landowners must meet the needs of both the

landowner and the needs of the community if we are going to address the forest and water quality issues at the watershed level with increasing effectiveness.

Coordinating and leveraging resources brings multiple benefits to partners including making grant funding more likely due to multi-agency approaches, removal of duplication of services, and delivering consistent services and information to the people who live, work, and recreate in the watershed. Targeted outreach to landowners and targeted conservation efforts result in messages that resonate with individuals and communities alike and in actions that get the most bang for the buck. Section 7 will expand on the sub-watershed analysis in terms of what can be done to focus implementation efforts in terms of clear messaging and targeted actions.

This type of coordinated effort is already happening in the Kettle River Watershed, but if shared projects do not continue to be leveraged and agencies do not step up their commitment to work together, the good things that are happening today may lose energy and wither away. We also cannot rely solely on the tools and skills of the past to carry us into an ever changing future. New tools and skills must become a part of a strategy of continuous improvement for all natural resources agencies both in internal and external operations. Emerging tools and skills will be covered in more detail in Section 7.

Part 3 – Section 7 – Implementation Framework

Implementation of landscape stewardship plans will be as successful as the imagination, creativity, and commitment that partners and stakeholders bring to the overall process. This section provides a more in-depth description on how the Coordination / Implementation Committee can implement the Plan over the next 10 – 20 years. The first part of this section describes seven overall implementation strategies and establishes a list of potential demonstration projects suggested by the Planning Committee. The second part provides an initial framework for guiding targeted and prioritized implementation activities at the sub-watershed level that can ultimately guide work down to a specific parcel of land.

A. Overview

The implementation of a landscape-scale 'all-lands' approach to forest stewardship is different from traditional approaches of the past in that it is much broader in scope. Landscape stewardship seeks to connect and implement multiple efforts at watershed, sub-watershed, community, and landowner levels, working toward shared goals and objectives that have been developed through a collaborative planning process as outlined in Section 5. The following are some suggested initial tasks to get this style of collaborative implementation started:

- Task 1: Celebrate: Congratulations! Enjoy the completion of the Kettle River Watershed Landscape Stewardship Plan! Take a breather and celebrate the completion of this Plan with your partners and stakeholders – it truly represents a major milestone.
- Task 2: Get Organized: Convene the Coordination / Implementation Committee. We've got money to spend, more money we can get...let's get rolling…
- Task 3: Take Action: Implement priority projects. Engage partners, stakeholders, and interested parties to get some things going on the ground and develop the relationships that will foster the long-term sustainable management of forest and water resources in the Kettle River Major Watershed and the sub-watersheds.
- Task 4: Celebrate Projects: Congratulations! Acknowledge and celebrate completed projects identified in the Kettle River Watershed. Highlight how they became successful collaborative efforts with partners, stakeholders and interested parties. Share these success stories with others to continue building support and momentum for future project implementation.
- Task 5: Evaluate and Repeat: Evaluate projects against the goals and objectives in the plan to make sure things are on track. Adjust priorities as needed and repeat Tasks 3 and 4.

B. Systematic Implementation Strategies

There is no one strategy that will solve the challenges of significantly increasing forest stewardship across the watershed while at the same time attaining other desired public outcomes such as increasing water quality protection. One of the benefits of using landscape approaches to forest stewardship concurrent with water resources as well as recreation management is that it encourages partners and stakeholders to consider multiple strategies at varying scales, bring those strategies together in a cohesive plan, and then take complimentary actions that are relevant to the local community with respect to its culture and traditions. The following list outlines a package of overall systematic implementation strategies that the Coordination / Implementation Committee should develop and actively use to more successfully implement this plan. The Coordination / Implementation Committee should focus on growing these strategies, especially in the first three to five years.

- Strategy # 1 – Integrated Outreach and Education Program
  - Integrated Outreach and Education for Landowners
  - Integrated Continuing Education for Natural Resources Managers and Service Providers
- Strategy # 2 – Coordinated Technical and Financial Assistance Program
- Strategy # 3 – Leveraged Incentives Program
- Strategy # 4 – Shared Data Management Program
- Strategy # 5 – Cooperative Community Building/Resource Protection Policy and Regulation Coordination
  - Presentations to Local Governments
  - Support and Participate in Local Planning Processes
- Strategy # 6 – Regulatory Coordination
- Strategy # 7 – Purposeful Demonstration Projects

C. 10-year Demonstration Project List

Demonstration projects developed in an orchestrated manner can provide valuable insights to resource professionals and landowners alike in cost effective ways. As a part of the planning process, Planning Committee members were asked to brainstorm potential forest management projects that could improve or protect water quality in the watershed. To help members more quickly identify potential projects, primer materials including maps and data (land cover, ownership, stewardship plans, forest health threats, etc.) were provided at the meetings. Members were then asked to rank sub-watershed project priority.

As a result, members identified twenty potential projects spread throughout the Kettle River Major Watershed. The map included in the Expanded Plan illustrates the project locations. The table below for the 10-Year Demonstration Project List summarizes the list of potential projects, partners, initial priorities and suggested timelines. It should be noted that while this list will need more development by the Coordination/Implementation Committee, there are a lot of opportunities to build from given the amount of conservation work already in progress in the watershed. This list serves as one starting point for the Coordination/Implementation Committee to consider as a way to grow sustained momentum in supporting the robust implementation of this plan over the next ten years. The Committee should periodically review and refine the 10-year project list.

10-Year Demonstration Project List

Map No.	Project Name and Brief Description	Subwd / Project Priority	Lead Entity / Supporting Entities	Proposed Timeline
	Lower Kettle River Sub-watershed (SubWD # 1)	**4**		
1	Pelkey Creek: Designated trout stream, large block of contiguous forest stretching northwest from public lands including School Trust lands, misc. county land, Chengwatana State Forest, and St. Croix State Park.		MN DNR Parks	
2	City of Sandstone: Urban and community forestry, parkland, important areas for stormwater runoff; Kettle River runs through it.		City of Sandstone	
3	Kettle River Streambank Erosion - Banning State Park. Approx. 500 feet of streambank erosion located downstream of Hwy 23 bridge within Banning State Park. .		Pine County SWCD	
4	East Central High School Property. The East Central High School is built on an 80-acre parcel. There is a large wetland and forest on the back part of the property. I know they talked in the past about using the area for classes.		Pine County SWCD	
5	Cane Creek: Larger block of contiguous forest, edged by Banning State Park, County Misc. land, Rutledge WMA, and School Trust land. Appears to have highly varied land cover.		MN DNR Parks	
	Grindstone River Sub-watershed (SubWD # 2)	**1**		
6	Spring Creek: Designated trout stream that runs through several agriculture and grassland cover types but is surrounded by a good sized forested buffer.		MN DNR Fisheries	
7	City of Hinckley: Urban and community forestry, parkland, important areas for stormwater runoff; Grindstone River runs through it.		City of Hinckley	
8	Grindstone Lake: Audubon Center, potential interested landowner w/ 300 acres, designated trout stream. Water quality monitoring, particularly temperature/dissolved oxygen profiles monthly through open water season, compare with change in land use upstream (which has 20-60% disturbance).		Audubon Center, DNR Fisheries	
	Pine River Sub-watershed (SubWD # 3)	**2**		
9	Hinckley-Finlayson School Forest. The school has two 80-acre parcels connected diagonally, one of which has been used for many years for outdoor environmental education. Little Pine Creek bisects one of the parcels and connects Upper Pine Lake and Little Pine Lake. Prior to 2003, some trail improvements were made to the forest with help from the Pine County Ruffed Grouse Society and the Finlayson-Giese Sportsmen's Club. Needs include a Forestry Stewardship Plan, interpretive signs, invasive species identification, or seedlings. Pine County SWCD.		Hinckley-Finlayson School District	
10	Big Pine Lake: Success with landowners.		Big Pine Lake Assoc.	

	Willow River Sub-watershed (SubWD # 4)	**7**		
11	Larsons Creek: Designated trout stream, larger block of contiguous forest, surrounded by the Nemadji State Forest, DNR Forestry land, School Trust land, and Misc. County land. In the northeast corner of the junction of Kerrick Road and Larson Creek, a landowner has several tree plantings... possible private partner?		MN DNR Forestry	
	Moose River Sub-watershed (SubWD # 5)	**3**		
12	City of Sturgeon Lake: Urban and community forestry, parkland, important areas for stormwater runoff, Moose Horn River runs through, meets Kettle River on southwest corner.		City of Sturgeon Lake	
13	City of Moose Lake: Urban and community forestry, parkland, important areas for stormwater runoff, next to Moose Head Lake, which is a part of the Moose Horn River.		City of Moose Lake	
14	Hanging Horn Drainage: Part of the Clean Water Legacy Tullibee Lakeshed Stewardship Project, which gives possibility of multiple benefits for projects.		Carlton SWCD	
15	King Creek: Designated trout stream, meanders past several agricultural fields, possible areas for some buffer expansion.		Carlton SWCD	
16	Moose Horn River Headwaters: Designated trout stream, meanders past a few agricultural fields, possible areas for some buffer expansion, but judging from aerial imagery mostly flows through a mix of floodplain shrubs and forests.		MN DNR Fisheries	
	Upper Kettle River Sub-watershed (SubWD # 6)	**5**		
17	Birch Creek to Moose Horn River Reach: Funding applied for 3 small projects focused on riparian areas.		Carlton SWCD	
18	Northwest State/County Forest Block: Protect these blocks from fragmentation and parcelization.		MN DNR Forestry / Carlton Co Land Dep't	
	Headwaters Kettle River Sub-watershed (SubWD # 7)	**6**		
19	West Branch Kettle River: Protect riparian areas. Consists of mostly 40 acre parcels owned by a variety of private non-industrial landowners.		Carlton SWCD	
20	Fond Du Lac State Forest: Re-meandering of drainage ditches.		MN DNR Forestry	
	Additional Project Considerations for All Sub-watersheds			
21	Cost-share Forest Stewardship Plans. Provide cost-share for forest stewardship plans for private land owners. .		Pine County SWCD NRCS	
22	Culvert Replacements. Assist in culvert replacements where water quality and forested areas are threatened and where aquatic connectivity issues exist.		Pine County Highway Dept	
23	Township Road Culvert Inventories. Inventory township road culverts.		Pine County SWCD	
24	Beaver Control. Identify and control beaver damage in forested areas.		Pine County SWCD	
25	St. Croix TMDL projects. Review the MPCA study for potential projects.		MPCA	

D. Sub-watershed Management Strategy

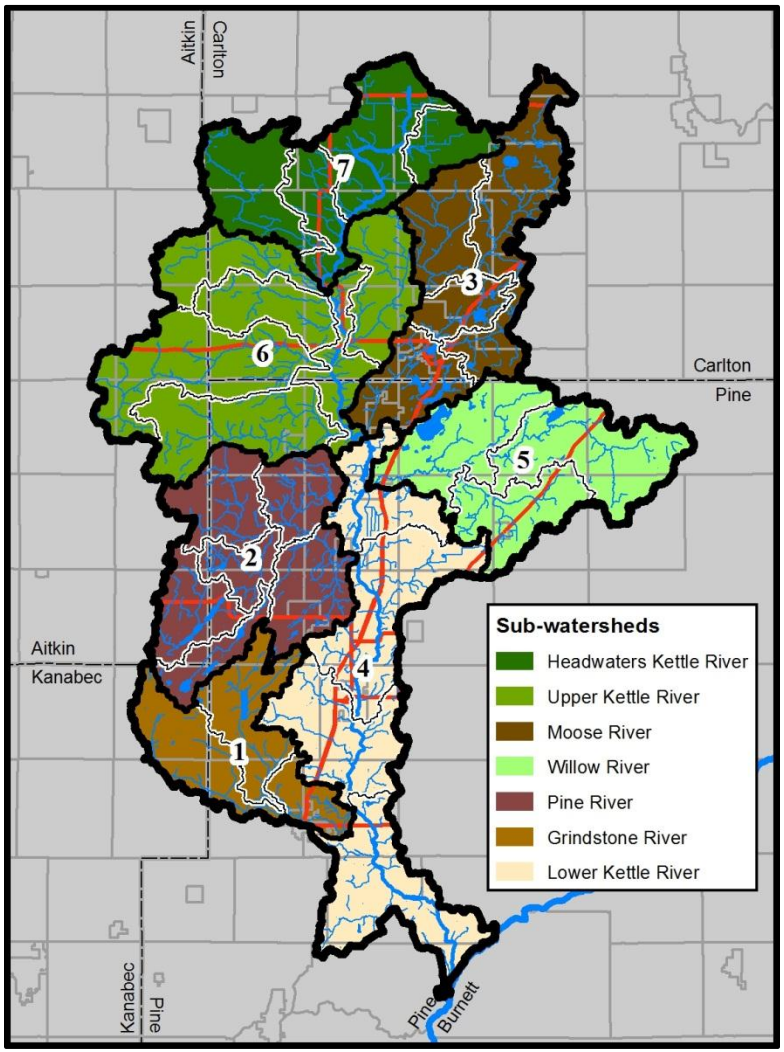
As described in Section 3 and supporting technical documents, the sub-watershed analyses provide a useful evaluation of the land cover/watershed relationships and initial risk assessment. The intent of the following narrative is to provide the Coordination/Implementation Committee with resource management strategies at the sub-watershed scale in order to more effectively address key forest and water resource issues.

Based on the analysis, the seven sub-watersheds are ranked below in order of priority from the most threatened to the least threatened. Individually, these sub-watersheds become the geographic basis for future forest planning areas.

1. Grindstone River sub-watershed
2. Pine River sub-watershed
3. Moose River sub-watershed
4. Lower Kettle River sub-watershed
5. Willow River sub-watershed
6. Upper Kettle River sub-watershed
7. Headwaters Kettle River sub-watershed

The following three steps are suggested as a basic guide to implementing the sub-watershed action plans:

- **Target** – identify specific key areas for forest management in each sub-watershed based on sub-watershed analyses in Section 3. The sub-watershed action plans provided later in this section provide an initial identification of target areas. Use the additional screening tools below to further prioritize sub-watersheds.
- **Implement** – Apply appropriate Systematic Implementation Strategies as described above and follow Site Level Implementation described below.
- **Monitor / Evaluate** – Measure activities and outcomes and determine if activities and outcomes are resulting in desired effects, modify implementation if not.



MN DNR Fisheries Watershed Assessment Criteria and Management Strategies

MN DNR Fisheries has assessed land cover on a watershed basis statewide and began to define general land management strategies to support the production of clean water that flows into streams, rivers and lakes. The following diagram summarizes these integrated concepts. This diagram provides the Coordination/Implementation Committee with additional quantifiable criteria for managing the sub-watersheds. Using the criteria for converted and protected land, all of the sub-watersheds fall under the "Protection" strategy. However, restoration strategies along lakes and streams of concern should also be considered in implementation of the Sub-watershed Action Plans.

Vigilance	Protection	Moderate Restoration	Intense Restoration
Sub-watershed having <25% of converted cover and > 75% protection in public land ownership and private conservancy. Low risk/least threatened. This approach involves careful identification and monitoring of problems or signs of danger; being watchful. No immediate action needed unless conditions significantly deteriorate.	Sub-watershed having <25% of converted cover and < 75% protection in public land ownership and private conservancy. Moderate risk/moderately threatened. This approach involves active protection of upland forest cover through purchase/fee title/conservation easements, etc.	Sub-watershed having between 25% and 60% of converted cover and with >75% protection in public land ownership and private conservancy. High risk/highly threatened. This approach involves active protection of upland forest cover through purchase/fee title/conservation easements, etc. and active restoration/management of upland forest cover.	Sub-watershed having > 60% of converted cover and with <75% protection in public land ownership and private conservancy. Extreme risk/extremely threatened. This approach involves immediate action to address the most threatened sub-watersheds by implementing restoration and management projects. Restore and increase forest land cover.

Prioritizing Service Delivery: Applying Additional Screening Tools

One of the first tasks for the Coordination/Implementation Committee in advancing the sub-watershed management strategy should be to develop a prioritized list of parcels in the target areas of each sub-watershed. The Coordination/Implementation Committee should consider using the following modeling tools when prioritizing clusters of parcels and refining work priorities for each sub-watershed action plan:

First level of screening
- Historic upland forest loss.
- Adjacency to riparian areas.
- Adjacency to public lands – SNAs, state parks, state forests, county forests, other.

Second level of screening
- Spatial Analysis Project (DNR Forestry)
- MBS High-Outstanding Biodiversity Significance (DNR Ecological Resources)

- Forest threats (DNR Forestry – State Forest Action Plan)
- St. Croix Basin Prioritization Protocol (TNC)
- Kettle River EBI
- Others?

Site-Level Implementation for Forest Management Activities

The following should generally be consulted when applicable for site level management activities:

- MFRC Site-Level Guidelines http://mn.gov/frc/documents/council/site-level/MFRC_Revised Forest Management Guidelines %282012%29.pdf
- NPC Field Guides http://www.dnr.state.mn.us/npc/classification.html
- ECS Silvicultural Prescriptions http://www.dnr.state.mn.us/forestry/ecs_silv/interpretations.html
- DNR Invasive Species Website http://www.dnr.state.mn.us/invasives/index.html
- Tomorrow's Habitat for the Wild & Rare http://www.dnr.state.mn.us/cwcs/index.html
- Climate Change Response Framework http://www.forestadaptation.org/

The Lake St. Croix TMDL Implementation Plan specifically calls for the following to be observed to help reduce phosphorus loading from forest management activities:

- Maintenance of riparian management zones (RMZs)
  - Limit entry/light harvesting in proximity to riparian areas
  - Maintenance of long lived riparian tree species
- Proper planning, construction and maintenance of road/skid trail waterway crossings
- Proper planning and management of prescribed burning activities
- Proper methods and application of chemicals
- Avoiding excessive addition of organic material and debris to surface waters
- Minimize surface erosion
  - Proper road location and planning
  - Winter harvesting in sensitive areas
  - Installation of erosion control practices
    - Crowned roads
    - Water bars
    - Sediment capture basins
    - Proper ditching and culvert placement
- Post-harvest vegetation of skid trails and roads

E. Sub-watershed Action Plans

Guide

The sub-watershed risk assessment, using knowledge gained from the technical support documents, begins the process of establishing geographic targets within the Kettle River Major Watershed for applying forest management strategies interrelated to water quality strategies. An "action plan" for each of the seven sub-watersheds in the Kettle River Major Watershed is provided below. Each Sub-watershed Action Plan identifies specific target areas and begins to identify forest management strategies. The contents of the Sub-watershed Action Plans include:

Water Resource Management Strategies: Strategies that address the forest and water quality relationship.

Context: Context of the forest and water quality relationship in the sub-watershed.

Priority Management Strategies: Suggested strategies to address issues relating to the forest and water quality relationship.

Forest Management Strategies: Strategies that address ecological conditions in the sub-watershed.

Context:

- *ECS Subsections and Land Type Associations*: Provided as part of the hierarchy for Native Plant Communities. Native plant communities for this sub-watershed are either Potential Native Plant Communities or Observed Native Plant Communities as described below. While the data used to create these lists were derived from different methodologies, together these NPC lists help to describe the native vegetation that has characterized this sub-watershed. The NPC lists can then be used to reference ECS Silviculture Prescriptions.
- *Potential Native Plant Communities*: The dataset used to generate the list of potential native plant communities was created by a GIS computer model built by the Natural Resources Research Institute to classify the entire Laurentian Mixed Forest province for the potential NPC coverage and used datasets on soil variables, landform, climate, presettlement composition, wetlands, and other map layers to predict what NPC would occur over the whole of the Laurentian Mixed Forest Province. Note that some areas were only classified to the System level and not the Class level. This dataset provides full coverage of the Kettle River Major Watershed with the purpose of predicting what the NPC would be if natural vegetation were to occur in all areas. Natural vegetation does not occur in all areas, therefore, NPC do not fully cover each sub-watershed and may actually not exist within some sub-watersheds.
- *Observed Native Plant Communities*: The *Field Guide to the Native Plant Communities of Minnesota – Laurentian Mixed Forest Province* is based on observances of NPC from survey plots classified during the Minnesota Biological Survey. While significant efforts were made during the MBS to collect as much information on existing NPC occurrences as possible, some NPC occurrences may have been missed.

General Forest Management Recommendations: Use ECS Silvicultural Prescriptions to determine General Forest Management Recommendations. http://www.dnr.state.mn.us/forestry/ecs_silv/interpretations.html

Lower Kettle River Sub-watershed Action Plan (SubWD # 1)

	Lower Kettle River (**risk level,** stats)
Area	124,403 acres
Natural Factors	
Position in watershed	**H** Main stem, low
Stream density	**H** 1.21 miles/sqmi
Sub-wd Slope	**M** 6.1%
Cultural Factors	
Upland forest loss	**M** 23.8%
Converted lands	**H** 9.5%
Public lands	**M** 22.8%
Protected upland forest	**M** 39%, 18,858 ac
Potential PFM	**M** 62%, 44,915 ac
Impaired streams (other than mercury)	**L** 0.1 miles
Impaired waters (other than mercury)	**L** 0 acres

Water Resource Management Strategies

Context

- Overall Sub-watershed Risk Assessment: Moderate
- Resource Management Challenges: Moderate amount of public landownership with much of it located along the main stem, moderate amount of upland forest loss, high potential PFM, highest amount of converted lands, moderate in terms of average watershed slope.
- Minor Watershed Priorities: None.
- Lakes and Tributaries of Concern: Pelkey Creek, Cane Creek.

Priority Management Strategies

1. Restore and protect riparian forests along tributaries of concern.
2. Extend protection around state park lands.
3. Urban forestry in the City of Sandstone.

Forest Management Strategies

Context

- *ECS Subsection*: Mille Lacs Uplands
- *ECS Landtype Associations*:
  - Brooke Park Till Plain
  - Bruno Moraine
  - Cloverdale Sand Plain
  - Duxbury Moraine
  - Finlayson Till Plain
  - Pine Lake Till Plain
  - St. Croix Terraces
  - Willow River Sand Plain
- *Native Plant Communities*: See the Expanded Plan

General Forest Management Recommendations: Use ECS Silvicultural Prescriptions to determine General Forest Management Recommendations. http://www.dnr.state.mn.us/forestry/ecs_silv/interpretations.html

Grindstone River Sub-watershed Action Plan (SubWD # 2)

	Grindstone River (risk level, stats)
Area	55,558 acres
Natural Factors	
Position in watershed	**M** Trib, low
Stream density	**L** 0.87 miles/sqmi
Sub-wd Slope	**M** 4.7%
Cultural Factors	
Upland forest loss	**H** 42.9%
Converted lands	**H** 8.7%
Public lands	**H** 5.0%
Protected upland forest	**H** 14%, 2,393 ac
Potential PFM	**H** 86%, 20,981 ac
Impaired streams (other than mercury)	**H** 33.1 miles
Impaired waters (other than mercury)	**L** 0 acres

Water Resource Management Strategies

Context

- Overall Sub-watershed Risk Assessment: Very high
- Resource Management Challenges: Greatest loss of upland forest, high amount of converted lands, least amount of public landownership, lowest percent of upland forest protected, highest potential PFM, not enough upland forest protected to maintain stable spring snow melts, greatest length of impaired streams (not including mercury impairments).
- Minor Watershed Priorities: Grindstone, South Branch, North Branch (all minors).
- Lakes and Tributaries of Concern: Grindstone Lake, tributaries to Grindstone Lake, South Branch of the Grindstone River – west of Hinckley to Kroschel Township.

Priority Management Strategies

1. Protect and restore riparian buffers along lakes and tributaries of concern.
2. Protect an additional 1,860 acres of upland forest (to maintain stable spring snow melts); start with areas near state forest lands in the headwaters area located in Kroschel Township.
3. Urban forestry in the City of Hinckley.

Forest Management Strategies

Context

- *ECS Subsection*: Mille Lacs Upland
- *ECS Landtype Associations*:
  - Ann Lake Drumlin Plain
  - Brooke Park Till Plain
  - Bruno Moraine
  - Cloverdale Sand Plain
  - Duxbury Moraine
  - Finlayson Till Plain
- *Native Plant Communities*: See the Expanded Plan

General Forest Management Recommendations: Use ECS Silvicultural Prescriptions to determine General Forest Management Recommendations. http://www.dnr.state.mn.us/forestry/ecs_silv/interpretations.html

Pine River Sub-watershed Action Plan (SubWD # 3)

	Pine River (**risk level,** stats)
Area	92,197 acres
Natural Factors	
Position in watershed	**L** Trib, mid
Stream density	**H** 1.17 miles/sqmi
Sub-wd Slope	**H** 7.1%
Cultural Factors	
Upland forest loss	**H** 35.4%
Converted lands	**M** 6.0%
Public lands	**H** 15.5%
Protected upland forest	**H** 27%, 9,057 ac
Potential PFM	**H** 72%, 41,308 ac
Impaired streams (other than mercury)	**L** 0.0 miles
Impaired waters (other than mercury)	**L** 0 ac

Water Resource Management Strategies

Context

- Overall Sub-watershed Risk Assessment: High
- Resource Management Challenges: High upland forest loss (largest decrease in total upland forest loss, despite being the 3rd largest of the sub-watersheds), moderate amount of converted lands, low amount of public lands, low percent of upland forest protected, high potential PFM.
- Minor Watershed Priorities: Big Pine Lake, Rhine Lake – Pine River, Medicine Creek – Pine River.
- Lakes and Tributaries of Concern: Pine Lake and Big Pine Lake, Pine River downstream of Big Pine Lake, Bass Lake.

Priority Management Strategies

1. Protect and restore riparian buffers along Pine River downstream from Big Pine Lake and around Bass Lake.
2. Restore upland forests in the Big Pine Lake and Medicine Creek – Pine River minor watersheds.
3. Extend protected areas south of Solana State Forest in the Big Pine Lake minor watershed.

Forest Management Strategies

Context

- *ECS Subsection*: Mille Lacs Upland
- *ECS Landtype Associations*:
  - Cloverdale Sand Plain
  - Finlayson Till Plain
  - Kettle River Drumlin Plain
  - Pine Lake Till Plain
  - Solana Till Plain
  - Three Rivers Peatlands
- *Native Plant Communities*: See the Expanded Plan

General Forest Management Recommendations: Use ECS Silvicultural Prescriptions to determine General Forest Management Recommendations. http://www.dnr.state.mn.us/forestry/ecs_silv/interpretations.html

Willow River Sub-watershed Action Plan (SubWD # 4)

	Willow River (**risk level,** stats)
Area	85,750 acres
Natural Factors	
Position in watershed	**L** Trib, mid
Stream density	**L** 0.83 miles/sqmi
Sub-wd Slope	**M** 6.2%
Cultural Factors	
Upland forest loss	**L** 9.4 %
Converted lands	**M** 5.2 %
Public lands	**M** 24.1%
Protected upland forest	**M** 39%, 12,189 ac
Potential PFM	**M** 59%, 32,557 ac
Impaired streams (other than mercury)	**L** 0.0 miles
Impaired waters (other than mercury)	**L** 0 acres

Water Resource Management Strategies

Context

- Overall Sub-watershed Risk Assessment: Moderate
- Resource Management Challenges: Moderate amount of converted lands, moderate amount of public ownership, moderate percent of upland forest protected, moderate amount of potential PFM.
- Minor Watershed Priorities: Sturgeon Lake – Willow River.
- Lakes and Tributaries of Concern: Sturgeon Lake.

Priority Management Strategies

1. Riparian buffers around Sturgeon Lake and along streams upstream from Big Slough Lake.
2. Restore upland forests east of Sturgeon Lake.
3. Extend protected forest lands to the east of General C.C. Andrews State Forest.

Forest Management Strategies

Context

- *ECS Subsection*: Mille Lacs Upland
- *ECS Landtype Associations*:
  - Bruno Moraine
  - Duxbury Moraine
  - Finlayson Till Plain
  - Nickerson Moraine
  - Three Rivers Peatlands
  - Willow River Sand Plain
- *Native Plant Communities*: See the Expanded Plan

General Forest Management Recommendations: Use ECS Silvicultural Prescriptions to determine General Forest Management Recommendations. http://www.dnr.state.mn.us/forestry/ecs_silv/interpretations.html

Moose River Sub-watershed Action Plan (SubWD # 5)

	Moose River (**risk level,** stats)
Area	90,326 acres
Natural Factors	
Position in watershed	**L** Trib, hi
Stream density	**H** 1.16 miles/sqmi
Sub-wd Slope	**H** 8.0%
Cultural Factors	
Upland forest loss	**H** 33.0%
Converted lands	**H** 7.8%
Public lands	**H** 12.8%
Protected upland forest	**H** 21%, 5,856 acres
Potential PFM	**H** 76%, 43,147 ac
Impaired streams (other than mercury)	**L** 0.0 miles
Impaired waters (other than mercury)	**L** 0 acres

Water Resource Management Strategies

Context

- Overall Sub-watershed Risk Assessment: High
- Resource Management Challenges: High amount of upland forest loss, high amount of converted lands (mostly developed lands, 6.1% of watershed), low amount of public lands, low amount of protected upland forest, high amount of potential PFM.
- Minor Watershed Priorities: Moose River.
- Lakes and Tributaries of Concern: Moosehead Lake, Sand Lake, Island Lake, Hanging Horn Lake, Little Hanging Horn Lake.

Priority Management Strategies

1. Shoreland restoration with lakeshore owners around lakes of concern in Moose River HUC 12.
2. Urban forestry in the city of Moose Lake.
3. Protect riparian areas along designated trout streams.
4. Protect forests upstream from Hanging Horn and Little Hanging Horn Lakes (high quality Tullibee (Cisco) Lakes).

Forest Management Strategies

Context

- *ECS Subsection*: Mille Lacs Upland
- *ECS Landtype Associations*:
  - Brimson Sand Plain
  - Brookston Moraine
  - Kettle River Drumlin Plain
  - Nemadji Lake Plain
  - Nickerson Moraine
  - Willow River Sand Plain
- *Native Plant Communities*: See the Expanded Plan

General Forest Management Recommendations: Use ECS Silvicultural Prescriptions to determine General Forest Management Recommendations. http://www.dnr.state.mn.us/forestry/ecs_silv/interpretations.html

Upper Kettle River Sub-watershed Action Plan (SubWD # 6)

	Upper Kettle River (**risk level,** stats)
Area	143,810 acres
Natural Factors	
Position in watershed	**L** Main stem, hi
Stream density	**H** 1.11 miles/sqmi
Sub-wd Slope	**L** 4.7%
Cultural Factors	
Upland forest loss	**L** 16.0%
Converted lands	**L** 3.9%
Public lands	**M** 30.3%
Protected upland forest	**M** 42%, 22,499 ac
Potential PFM	**L** 54%, 53,224 ac
Impaired streams (other than mercury)	**L** 0.0 miles
Impaired waters (other than mercury)	**L** 0 acres

Water Resource Management Strategies

Context

- Overall Sub-watershed Risk Assessment: Low
- Resource Management Challenges: Moderate amount of public lands, moderate percent of upland forest protected.
- Minor Watershed Priorities: Birch Creek and Split Rock River.
- Lakes and Tributaries of Concern: None.

Priority Management Strategies

1. Riparian buffer strips along drainage ditches in Birch Creek and Split Rock River minor watersheds.
2. Protect forests that extend outward from Solana State Forest and the State Owned / County Administered lands.
3. TBD.

Forest Management Strategies

Context

- *ECS Subsection*: Mille Lacs Upland
- *ECS Landtype Associations*:
  - Automba Drumlin Plain
  - Kettle River Drumlin Plain
  - Pine Lake Till Plain
  - Rice Lake Moraine
  - Solana Till Plain
  - Three Rivers Peatlands
  - Willow River Sand Plain
- *Native Plant Communities*: See the Expanded Plan

General Forest Management Recommendations: Use ECS Silvicultural Prescriptions to determine General Forest Management Recommendations. http://www.dnr.state.mn.us/forestry/ecs_silv/interpretations.html

Headwaters Kettle River Sub-watershed Action Plan (SubWD # 7)

	Headwaters Kettle River (**risk level,** stats)
Area	80,882 acres
Natural Factors	
Position in watershed	**L** Main stem, hi
Stream density	**M** 1.06 miles/sqmi
Sub-wd Slope	**L** 4.3%
Cultural Factors	
Upland forest loss	**M** 18.5%
Converted lands	**L** 3.0%
Public lands	**L** 45.8%
Protected upland forest	**L** 53%, 11,606 ac
Potential PFM	**L** 41%, 24,576 ac
Impaired streams (other than mercury)	**L** 0.0 miles
Impaired waters (other than mercury)	**L** 0 acres

Water Resource Management Strategies

Context

- Overall Sub-watershed Risk Assessment: Low
- Resource Management Challenges: Moderate amount of upland forest loss.
- Minor Watershed Priorities: West Branch River.
- Lakes and Tributaries of Concern: West Branch River.

Priority Management Strategies

1. Protect areas along West Branch River between State Owned / County Administered lands and around Fond Du Lac State Forest.
2. TBD

Forest Management Strategies

Context

- *ECS Subsection*: Mille Lacs Upland
- *Land Type Associations*:
  - Automba Drumlin Plain
  - Brimson Sand Plain
  - Brooke Park Till Plain
  - Brookston Moraine
  - Kettle River Drumlin Plain
  - Moose Willow-Peatlands
  - Rice Lake Moraine
  - Wright Till Plain
- *Native Plant Communities*: See the Expanded Plan

General Forest Management Recommendations: Use ECS Silvicultural Prescriptions to determine General Forest Management Recommendations. http://www.dnr.state.mn.us/forestry/ecs_silv/interpretations.html

Part 3 – Section 8 – Monitoring and Evaluation

The purpose of this section is to provide an initial outline for monitoring and evaluating the implementation of this Plan over the next ten to twenty years. The Coordination / Implementation Committee will be responsible for developing this monitoring program. This Committee will periodically review progress made towards the implementation of this plan based on information provided by partners in the Watershed and report their findings to the DNR Division of Forestry and the Minnesota Forest Resources Council.

A. Overview

All landscape stewardship plans should include efforts to monitor what has been accomplished as well as evaluate the effectiveness of the project's approach to forest stewardship over time including biophysical and socio-economic factors. This involves an iterative process of assessing/identifying problems and recommending a series of solutions. Sustainable forest management and clean water projects, programs, and policies happen because of a series of decisions about how to allocate time and money, which expertise to tap, who to involve, and what practices and activities to implement. The quality of the decisions depends on the quality of understanding of the watershed system, definition of the problem, identification of causes of the problem, and effective solutions.

The goals and objectives included in Section 5 reflect the needs and interests of local as well as State and regional stakeholders and partners, and ultimately serve as the basis for evaluating and adjusting this Plan. Those goals and objectives lay the foundation for short-term monitoring of accomplishments as well as evaluating the long-term outcomes (the program impacts). Monitoring focuses on tracking what is accomplished, while evaluation seeks to measure program effectiveness.

Monitoring the project's accomplishments related to program activities is generally short term in nature. Evaluating outcomes or results, such as an increase in engaged landowners or increased acres of forest on privately owned lands, takes a longer-term perspective. Monitoring takes place on an ongoing basis or annually, whereas evaluation occurs less often.

A clear framework, agreed upon by the key stakeholders and partners at the end of the planning stage, is essential in order to carry out monitoring and evaluation systematically. This framework serves as a plan for monitoring and evaluation, and should clarify:

- What is to be monitored and evaluated
- The activities needed to monitor and evaluate
- Who is responsible for monitoring and evaluation activities
- When monitoring and evaluation activities are planned (timing)
- How monitoring and evaluation are carried out (methods)
- What resources are required and where they are committed

Developing a monitoring component to track and evaluate the effectiveness of your implementation efforts is very important. Measurable progress is critical to ensuring continued support of forest management and watershed projects, and progress is best demonstrated with the

use of monitoring data that accurately reflect the biophysical and socio-economic changes relevant to the identified problems. Monitoring is used to fill in the identified data gaps as part of the iterative process.

Evaluation is a critical but often neglected step in forest and water resources management. Evaluation not only demonstrates whether project deliverables and goals were met, but also informs strategic planning and future projects, and helps build partnerships by demonstrating the impacts of activities. Evaluation is important to determine whether efforts have been successful in changing people's attitudes and behaviors (e.g. landowner's behavior towards sustainable forest management practices), implementing sustainable forest management practices in the Kettle River Major Watershed, and achieving the desired change (protection, improvements, restoration) in water quality.

It is recommended that the Coordination/Implementation Committee further develop the monitoring framework using this plan as a guide and prepare a report yearly to daylight goals and objectives that have been met in the Kettle River Watershed.

Data Sharing

Obtaining data from partners working in the watershed that is both useful and scalable to the watershed and sub-watershed levels is essential to the development of a monitoring program for the Kettle River Watershed.

For a watershed level monitoring program to be successful, land managers in the watershed need to be able to effectively share data regarding their activities in ways that can be used to evaluate if progress towards this plan's goals and objectives have been made or not.

It is important that partners and the public be aware that the landscape management process, including monitoring and evaluation, is voluntary, and that the primary purpose of landscape level monitoring is to support and enhance better forest resource planning and coordination.

B. Short-Term: Monitor Performance and Evaluate Process

There are several short term indicators that can be monitored (see the table below). Goals and a time frame to meet those goals should be set by the Coordination/Implementation Committee.

	Lower Kettle River (SubWD # 1)	**Grindstone River (SubWD # 2)**	**Pine River (SubWD # 3)**	**Willow River (SubWD # 4)**	**Moose River (SubWD # 5)**	**Upper Kettle River (SubWD # 6)**	**Headwaters Kettle River (SubWD # 7)**
Area	124,403 acres	55,558 acres	92,197 acres	85,750 acres	90,326 acres	143,810 acres	80,882 acres
Area of Private Ownership	94,858 acres	52,225 acres	77,910 acres	65,058 acres	78,181 acres	100,167 acres	43,813 acres
Outreach & Education							
Mailings							
Phone calls							
Site visits							
Workshop participants							
Technical Assistance							
Brief FSP - Level 2							
Traditional FSP - Level 3							
Forest Mgmt Projects							
Riparian buffer plantings							
Upland forest restoration							
Forest stand improvement							
Timber harvests							
Biomass harvests							
Incentive Programs							
Cost share assistance							
SFIA							
2c							
Conservation Land Prot							
Conservation Easements							
Public Land Acquisitions							
Public Land Sales							
Land Trades / Exchanges							

C. Long-Term: Assess Results and Evaluate Effectiveness

There should be regular or periodic assessments of whether or not progress is being made towards the project's objectives for at least the intended life of the landscape stewardship plan. The long-term evaluation of this overall project should include each goal statement in the landscape stewardship plan and its corresponding measures or indicators used to assess whether or not progress is being made towards achieving that outcome (see the table below). Monitoring Questions and Potential Data Sources should be further developed by the Coordination/Implementation Committee. As the plan is implemented, the Coordination/Implementation Committee should periodically review if these objectives are being met by answering the Monitoring Questions.

Kettle River Plan Objective	Monitoring Question	Potential Data Source
Water Resources Goal 1. Protect Healthy Water Systems and Features		
Objective A: Protect Forested Riparian Corridors.	– How has the protection and maintenance of existing forested riparian corridors been supported?	– County Assessor's Office – DNR Area Fisheries Offices – Score Your Shore tool – Landowner Outreach Database
Objective B: Protect Undeveloped Shorelands.	– How has the protection and maintenance of undeveloped and native shorelands on lakes been supported?	– DNR Area Fisheries Offices (Fishing Lakes) – DNR Area Wildlife Offices (Shallow Lakes) – Score Your Shore tool – Landowner Outreach Database
Objective C: Protection BMPs.	– How has the implementation of Best Management Practices (BMPs) that guide the protection and maintenance of existing forested riparian corridors and shoreland areas been advocated and supported?	– eLINK Reporting – MFRC/DNR Site-Level Monitoring – TMDL Reporting
Water Resources Goal 2. Improve Impaired Water Resources		
Objective A: Native Vegetation in Impaired Riparian Corridors.	– How many projects have been implemented that restore and improve native vegetation in riparian corridors?	– eLINK Reporting – DNR Area Fisheries Offices – Score Your Shore tool – Landowner Outreach Database

Kettle River Plan Objective	Monitoring Question	Potential Data Source
Objective B: Shoreland Restoration Projects.	– How has the implementation of shoreland projects, especially erosion control projects that utilize native vegetation been supported?	– DNR Area Fisheries Offices (Fishing Lakes) – DNR Area Wildlife Offices (Shallow Lakes) – Score Your Shore tool – Landowner Outreach Database
Objective C: Restoration BMPs.	– How has the implementation of Best Management Practices that guide the restoration of forested riparian corridors and shoreland areas been advocated and supported?	– eLINK Reporting – TMDL Reporting
Water Resources Goal 3. Advance Water Resources Knowledge		
Objective A. County Water Plans.	– What has been done to work with counties and other partners and stakeholders in the development and implementation of county water plans to include forest management practices?	– County Water Plan planning committee meeting minutes – County Water Plans
Objective B. Lake Management Plans.	– What has been done to work with partners and stakeholders in the development and implementation of lake management plans to include forest management practices?	– DNR Area Fisheries Offices (Fishing Lakes) – DNR Area Wildlife Offices (Shallow Lakes) – Lake Associations – SWCDs
Objective C. Monitor Water Quality.	– What has been done to support efforts by local and state agencies and other partners and stakeholders to monitor water quality changes in the watershed and distribute results to the public?	– MPCA water quality monitoring
Forest Resources Goal 1. Protect Healthy Forest Ecosystems		
Objective A. Public Forestlands.	– What has been done to support the protection and maintenance of public forestlands?	– DNR FIM data – County forest management databases

Kettle River Plan Objective	Monitoring Question	Potential Data Source
Objective B. Private Forestlands.	– What has been done to implement projects that protect and maintain private forestlands using priorities established in the sub-watershed analyses and sub-watershed action plans?	– MN DNR Private Forest Management database – MN Department of Revenue Property Record Information System of Minnesota – Landowner Outreach Database
Objective C. Forest Health.	– What has been done to support and participate in programs and projects that promote proactive forest health practices as a form of prevention?	– EDD Maps database – MN DNR Terrestrial Invasive Species database
Forest Resources Goal 2. Increase and Restore Native Forest Land Cover		
Objective A. Forest Restoration Projects.	– How has the implementation of forest restoration projects on priority sites in each sub-watershed been supported?	– MN DNR Private Forest Management database
Objective B. Insects, Diseases, and Invasive Species.	– How have efforts by local and state agencies, conservation groups, landowners and other partners and stakeholders to prevent and manage invasive species been supported?	– EDD Maps database – MN DNR Terrestrial Invasive Species database
Objective C. Biomass/Forest Restoration Projects.	– What has been done to design and implement forest and other land-based restoration projects to maximize utilization of removed undesirable woody plant material?	– ?
Forest Resources Goal 3. Advance Forest Resources Knowledge		
Objective A. Watershed/Forest Land Cover Connections.	– How have partners and stakeholders in the watershed been actively educated about the watershed/forest land cover connection and its role in promoting water quality and quantity?	– Workshop attendance from workshop facilitators
Objective B. Local Conservation Groups.	– How have the expansion and effectiveness of local conservation groups through their active involvement in private forest management been supported?	– To be tracked by the Coordination / Implementation Committee

Kettle River Plan Objective	Monitoring Question	Potential Data Source
Objective C. Land Use Planning.	– How have the use of sound land-use planning and the recognition of forest resources in local planning and regulation processes been advocated?	– Land-use plans
Recreational Resources Goal 1. Protect Forest-Related Public Recreation and Tourism		
Objective A. Public Recreational Lands.	– How have programs and projects been supported that protect, maintain, and promote state-owned land (state forests, state parks, SNAs, etc.) and other public recreational resources?	– ?
Objective B. Scenic Roadways.	– How have programs and projects been supported that protect and maintain scenic roadways and view corridors in the watershed?	– ?
Objective C. Water-based Recreation.	– How have programs and projects been supported that protect, maintain, and promote water recreational areas?	– ?
Recreational Resources Goal 2. Encourage Forest-Related Private Land Recreation		
Objective A. Wildlife Habitat.	– How have programs and projects been supported that restore and improve wildlife habitat on private lands while providing access for recreational users?	– ?
Objective B. Technical and Financial Support.	– How have programs and projects been supported that provide technical and financial assistance to private landowners to increase outdoor recreation on their properties?	– ?
Objective C. Trail Networks.	– How has the development of new and the improvement of existing neighborhood trail networks been supported?	– ?
Recreational Resources Goal 3. Enhance the Awareness of the Natural Resource Base on Which Outdoor Recreation Depends		
Objective A. Increase Public Awareness.	– How has awareness been promoted about the value of forests and high quality natural resources to outdoor recreation?	– ?

Kettle River Plan Objective	Monitoring Question	Potential Data Source
Objective B. Collaborate with Partners and Stakeholders.	– How have partners and stakeholders including citizens and businesses in the watershed been included in efforts to support organizations actively working to protect, restore, and improve forest and water resources in the watershed?	– ?
Objective C. Outreach and Education.	– How have visitors to the Kettle River Major Watershed been educated about the high quality natural resources in the watershed and their role in protecting them?	– ?

Part 3 – Section 9 – Agency and Organization Recommendations

A. Recommendations to Local Officials

1. Reference Document. Local officials are strongly encouraged to use this Plan as a reference document when developing their resource management plans including county water plans, local land use plans, and state resource plans. 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.

B. Recommendations to Conservation and Non-governmental Organizations

1. Collaboration. Encourage the partnering of conservation and non-governmental organizations to address major resource management issues. Successful examples include the Wildlife Habitat Corridors Partnership and the Environmental Initiative.
2. Connections. Support the connecting of citizens with elected officials on sustainable forest management topics.
3. Reference Document. Conservation groups and NGOs are encouraged to use this Plan as a reference document when developing their plans and strategies. They also encouraged to share their plans and projects with the Coordination / Implementation Committee to increase coordination across the watershed.

D. Recommendations to Resource Agencies

MN DNR Forestry

1. Working Landscape Teams. Create a Working Landscape Teams Program for the forested regions of the state similar to the program operated by the MN DNR and BWSR for the prairie region. These working landscape teams would be integrated into to the MFRC regional landscape committees and support the implementation of sustainable forestry projects at a local level. These teams would be represented by members of the regional committees and report to them on a regular basis.
2. 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
3. Base PFM Program Funding. Increase and sustain funding for the private forest management program.

4. PFM CWL Investments. Support the continued investment of Clean Water Funds through the DNR Forestry Private Forest Management Program for the next 21 years to support the development and implementation of water quality/ forestry projects through the partnerships supported by the MFRC regional landscape committees. Increase the funding to $1 million per year starting in FY 2015.
5. Enter into a new memorandum of understanding (MOU) between the MFRC , MN DNR and other agencies to promote and implement landscape stewardship (i.e. NRCS, USFS, MN DNR, MFRC, BWSR, MASWCD, MACF, UMN Extension, MFA)
6. Support increasing the RC&D capacity to serve as grant writers, grant administrators, and fiscal agents on forestry projects being developed by the regional committees.
7. Encourage the expanded involvement of the US DA NRCS in landscape management:
   a. Engage NRCS regional staff in the MFRC regional landscape committees.
   b. Engage the district conservationists and technical field staff in regional committee work groups on committee projects.
   c. Design future NRCS programs beyond EQIP to integrate and support landscape management projects.
   d. Use the regional committees as the forestry local work groups (LWGs) for forestry practices where appropriate.
8. Encourage the expanded involvement of the MN BWSR in landscape management:
   a. Engage BWSR regional staff in the MFRC regional landscape committees.
   b. Design challenge grant programs to support and implement landscape management projects.
   c. Encourage county water plan programs to engage with regional committees and integrate their planning, coordination and implementation efforts with the regional committees
9. Primary and Secondary Forest Products Industries. Find ways to more effectively support and foster economic development opportunities for the primary and secondary forest products industries in the region.

Other DNR Divisions

1. Improve Coordinated Service to Private Landowners. Strategically coordinate the delivery of technical and financial assistance to private landowners based on landscape stewardship principles and practices. Let DNR Forestry lead the service delivery program design and implementation.
2. ECS. Continue to promote the Ecological Classification System (ECS) as a guide to developing land management strategies when working with landowners and local officials.
3. Important and Critical Areas. Continue to identify and protect important or critical ecological areas such as the joint effort by the Audubon Society and the DNR to identify and protect important bird areas.
4. Data Gathering. Support the collection, organization and evaluation of data collected relating to forestry at the local level on private lands. Encourage the coordination and sharing of data with other resource agencies and local officials.
5. MCWCS. Support the development and implementation of the Minnesota Comprehensive Wildlife Conservation Strategy (MCWCS).
6. Use this Plan as a resource for addressing the forest and water quality connection when developing management plans such as Lake Management Plans (DNR Fisheries) and Shallow Lake management plans (DNR Wildlife).

E. Recommendations to Education Groups

1. Use Existing Education Providers. All partners working in the watershed and the basin are encouraged to use existing education providers such as the U of MN Extension, Sustainable Forest Education Cooperative (SFEC), Minnesota Logger Education Program (MLEP), Minnesota Forest Association (MFA), the BWSR Academy, NRCS programs and others.
2. Collegial Connections. Colleges and universities throughout the state are encouraged to connect their students and faculty with DNR Forestry programs.

F. Recommendations to Private Landowners and Citizens

1. Become Informed. The KRWP and its partner agencies and organizations have numerous programs and resources to help landowners become more informed about sustainable forestry and the benefits of forests to our communities. All landowners are encouraged to become more knowledgeable about forest resources. Learning about best management practices (BMPs) is one easy way to get started. Recognize that forestry is a long-term endeavor and that changes on the land will generally take several years to become realized.
2. Seek Technical Assistance. While there are numerous sources of information available, landowners are encouraged to seek technical assistance to help manage their forestlands. Often a landowner may need assistance from many technical service providers. Developers can benefit from working with the forest resources on their lands and designing their developments
3. Get Involved. The Planning Committee members contributed hundreds of hours of time to develop this Plan. While they were not always in agreement, voicing their concerns and sharing their ideas has helped generate many new opportunities to improve forests and the quality of life in the Kettle River Major Watershed and the St. Croix Basin. They have taken a big first step to get involved. All citizens and landowners are encouraged to get involved in their communities and help promote sustainable forestry.

G. Recommendations to the MFRC

1. Landscape Project Staffing Support. Work with the Governor and the Legislature to secure funding for project staffing support necessary to implement the plan.
2. Forest Fragmentation / Parcelization Study. Proactively support the implementation of recommendations in the Forest Fragmentation / Parcelization Study with the governor, state legislature, and other appropriate entities
3. Private Forestland Management Study. Proactively support the implementation of recommendations in the Private Forestland Management Study with the governor, state legislature, and other appropriate entities.
4. Prioritize the Kettle River Watershed for Site-Level Monitoring.
5. Sharing and Communications. Support the increased sharing of ideas and experiences between the landscape committees as well as new and successful sustainable forest management activities taking place within the regions. Support the re-establishing of the MFRC newsletter and/or other communications tools to increase awareness about successful sustainable forest management activities throughout the state and in other states.