



North Dakota

Forest Action Plan



Larry A. Kotchman, State Forester
NDSU-North Dakota Forest Service
307 First Street East
Bottineau ND 58310

May 5th, 2010

Table of Contents

Foreword

Introduction	1
---------------------------	---

Statewide Assessment of Forest Resources

Section 1. Forest Conditions	4
Section 2. Forest Trends	7
Section 3. Forest Benefits and Threats	15
Section 4. Priority Areas	24
Section 5. Incorporation of Existing State Resource Plans	27

Forest Resource Strategy

Section 1. Overview	28
Section 2. Priority Areas of Forest Resources	29
Section 3. Priority Issues for Forest Resources	31
Section 4. Strategies to Address Forest Resource Issues	33
Section 5. Investing Resources	35
Section 6. Translating Strategies to Annual Actions	43
Section 7. Monitoring and Reporting	45

Appendices

Literature Cited	46
Maps 1-20	47
Appendix A: Strategy Matrix	67
Appendix B: Existing Plans Consulted	79
Appendix C: Stakeholders Involved	80

Cover photo credit: Garry Redmann, Bismarck, ND – A riparian forest in an agricultural setting on the prairie in North Dakota.

The United States Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410, or call (800) 795-3272 (voice) or (202) 720-6382 (TDD).

USDA is an equal employment opportunity provider and employer.
NDSU is an equal opportunity institution.

This publication is available in alternative formats upon request by calling (701) 228-5422.

Foreword

The North Dakota Forest Service engaged its partners in the development of a statewide assessment of forest resources and forest resource strategy to address critical forestry needs. The assessment and strategy were required by an amendment to the Cooperative Forestry Assistance Act enacted in the 2008 Farm Bill. The final document will be submitted to the Secretary of Agriculture by June 18, 2010. Local, state, federal and tribal partners will work collaboratively to help shape and influence forest land use on a scale and in a way that optimizes public benefits from trees and forests for present and future generations. The statewide forest resources assessment will provide a comprehensive analysis of the forest-related conditions, trends, threats and opportunities within the state.

The forest resource strategy will provide a long-term, comprehensive, coordinated strategy for investing state, federal and leveraged resources to address the management and landscape priorities identified in the assessment. The forest resource strategy will incorporate existing statewide forest and resource management plans and provide the basis for future program, agency and partner coordination. The strategy will help sustain the health, diversity and productivity of the nation's forests following three national themes: Conserve Working Forested Landscapes, Protect Forests from Harm, and Enhance Benefits from Trees and Forests. State Foresters provide technical and financial assistance to communities, tribes, landowners and resource managers for managing non-federal forests and urban forests.

A forest resources assessment session was held at the State Capitol on July 30, 2009, to solicit partners' perspectives of important forestry issues in North Dakota. Stakeholders developed a list of public benefits trees and forests provide, such as clean air and water, fish and wildlife habitat, recreation, energy sources and enhanced community environments. Stakeholders prioritized key threats and forestry issues. Threats to forest resources in North Dakota include invasive (insects and pathogens) tree pests; over-maturity and limited natural regeneration of forest resources; lack of tree species diversity and vulnerability to damaging agents; lack of education outreach; conversion from historic vegetation types; wildfire; limited wood utilization opportunities; and climate change.

Information from the preliminary meeting was used to facilitate a draft assessment distributed for external review on January 4, 2010. Partners recently attended a follow-up meeting on February 3, 2010, where they developed strategies to address threats and identified potential areas of collaboration. The draft assessment and strategy will be available on the North Dakota Forest Service website at www.ndsu.edu/ndfs.

--State Forester Larry A. Kotchman

Introduction

State assessments and resource strategies are integral to the State and Private Forestry (S&PF) Redesign and required as an amendment to the Cooperative Forestry Assistance Act (CFAA) as enacted in the 2008 Farm Bill.

There are three components to the assessment and planning required by the S&PF Redesign approach to identify priority forest landscape areas, and highlight work needed to address national, regional, and state forest management priorities:

- (1) **Statewide Assessment of Forest Resources** — provides an analysis of forest conditions and trends in the state and delineates priority rural and urban forest landscape areas.
- (2) **Forest Resource Strategy** — provides long-term strategies for investing state, federal and other resources to manage priority landscapes identified in the assessment, focusing where federal investment can most effectively stimulate or leverage desired action and engage multiple partners.
- (3) **Annual Report on Use of Funds** — describes how S&PF funds were used to address the assessment and strategy, including the leveraging of funding and resources through partnerships, for any given fiscal year.

Each state is required to complete a State Assessment and Resource Strategy within two years after enactment of the 2008 Farm Bill (June 18, 2008) to receive funds under CFAA.

Statewide Assessment of Forest Resources

To ensure that federal and state resources are being focused on important landscape areas with the greatest opportunity to address shared management priorities and achieve measurable outcomes, each state and territory will work collaboratively with key partners and stakeholders to develop a State Forest Resource Assessment. The State Forest Resource Assessment should provide a comprehensive analysis of the forest-related conditions, trends, threats, and opportunities within the state.



At a minimum, State Forest Resource Assessments will:

- (1) provide an analysis of present and future forest conditions, trends and threats on all ownerships in the state using publicly available information;
- (2) identify forest related threats, benefits and services consistent with the S&PF Redesign national themes;

- (3) delineate priority rural and urban forest landscape areas to be addressed by the state resource strategy. States can also identify linkages between terrestrial and aquatic habitat, as appropriate;
- (4) work with neighboring states and governments to identify any multi-state areas that are a regional priority; and
- (5) incorporate existing statewide plans, including Wildlife Action Plans, Community Wildfire Protection Plans, and address existing S&PF program planning requirements. States can also utilize relevant national and regional assessments as appropriate.

A combination of qualitative, quantitative and geospatial data can be used in the statewide assessment to provide information relevant to key state issues and national themes. In addition, non-geospatial information can be used in combination with geospatial data to identify priorities. States may identify separate priority areas for different programs and issues.

Forest Resource Strategy

A state's forest resource strategy will provide a long-term, comprehensive, coordinated strategy for investing state, federal and leveraged partner resources to address the management and landscape priorities identified in its assessment. The resource strategy should incorporate existing statewide forest and resource management plans and provide the basis for future program, agency and partner coordination. At a minimum, state resource strategies should:

- (1) outline long-term strategies for addressing priority landscapes identified in the State Forest Resource Assessment and the following national themes and associated management objectives:
 - **Conserve Working Forest Lands:** conserving and managing working forest landscapes for multiple values and uses.
 - identify and conserve high priority forest ecosystems and landscapes.
 - actively and sustainably manage forests.
 - **Protect Forests from Harm:** protect forests from threats, including catastrophic storms, flooding, insect or disease outbreak, and invasive species.
 - restore fire-adapted lands and reduce risk of wildfire impacts.
 - identify, manage and reduce threats to forest and ecosystem health.
 - **Enhance Public Benefits from Trees and Forests:** including air and water quality, soil conservation, biological diversity, carbon storage, forest products, forestry-related jobs, production of renewable energy and wildlife.
 - protect and enhance water quality and quantity.
 - improve air quality and conserve energy.
 - assist communities in planning for and reducing wildfire risks.
 - maintain and enhance the economic benefits and values of trees and forests.
 - protect, conserve, and enhance wildlife and fish habitat.
 - connect people to trees and forests, and engage them in environmental stewardship activities.
 - manage and restore trees and forests to mitigate and adapt to global climate change.

- (2) describe how the state proposes to invest federal funding, along with other resources, to address state, regional and national forest management priorities;
- (3) include a long-term timeline for project and program implementation;
- (4) identify partner and stakeholder involvement;
- (5) identify strategies for monitoring outcomes within priority forest landscape areas and how action will be revised when needed;
- (6) describe how the state's proposed activities will accomplish national State and Private Forestry program objectives, and respond to specified performance measures and indicators;
- (7) describe how State and Private Forestry programs will be used to address priority landscape and management objectives; and
- (8) incorporate existing statewide plans, including Wildlife Action Plans, community wildfire protection plans, and address existing S&PF program planning requirements.

To ensure that federal and state resources are being focused on important landscape areas with the greatest opportunity to address shared management priorities and achieve measurable outcomes, the North Dakota Forest Service has worked collaboratively with key partners and stakeholders to develop this Statewide Forest Resource Assessment. The State Forest Resource Assessment provides a comprehensive analysis of the forest-related conditions, trends, threats and opportunities within North Dakota.

Statewide Assessment of Forest Resources

Section 1. Forest Conditions



North Dakota is often characterized as a prairie state due to the topography, soils and climate that promotes perennial grasses and forbs, and limits the natural distribution of forestland. Despite this characterization, some diverse and unique forest resources are found in the state. North Dakota's forest resources can be separated into four categories: upland forests, riparian forests, rural plantings, and community forests. Upland forests (including deciduous and coniferous forests and wooded shrublands), riparian forests, and rural tree plantings encompass

1,958,000 acres (4.4% total land area - North Dakota Spatial Analysis Project 2007). Eastern deciduous forest types and western coniferous forest types are both found in North Dakota. Deciduous forest types comprise approximately 98% of the state's forestland. Community forests include boulevard trees, trees planted within city parks, and trees that naturally occur within city limits or public right-of-ways. Community forests are important infrastructure of the state's 387 communities, and represent 629 square miles (400,640 acres - US Census 2000). These forest resources provide numerous ecological, social, and economic benefits to North Dakota residents.

1A. Upland Forests

Topography and species composition are the most influential factors in determining an upland hardwood forest type. These stands can be found in upland areas across the state, but are more prevalent in the eastern and northern areas. Common deciduous upland forest types in North Dakota include: aspen/birch (*Populus tremuloides/Betula papyrifera*), and bur oak (*Quercus macrocarpa*). Forest types are categorized by the dominance of one or a few tree species, although numerous species may comprise each forest type. Bur oak and aspen/birch forests are common in the Turtle Mountains, the Devils Lake Hills, and the Pembina Gorge.

Only 2% of the state's forestland is classified as western conifer forests. Isolated stands comprised of ponderosa pine (*Pinus ponderosa*) and limber pine (*Pinus flexilis*) are located in the southwest counties of the state. In addition, there are approximately 600,000 acres of Rocky Mountain juniper (*Juniperus scopulorum*) shrublands in the Badlands of western North Dakota.

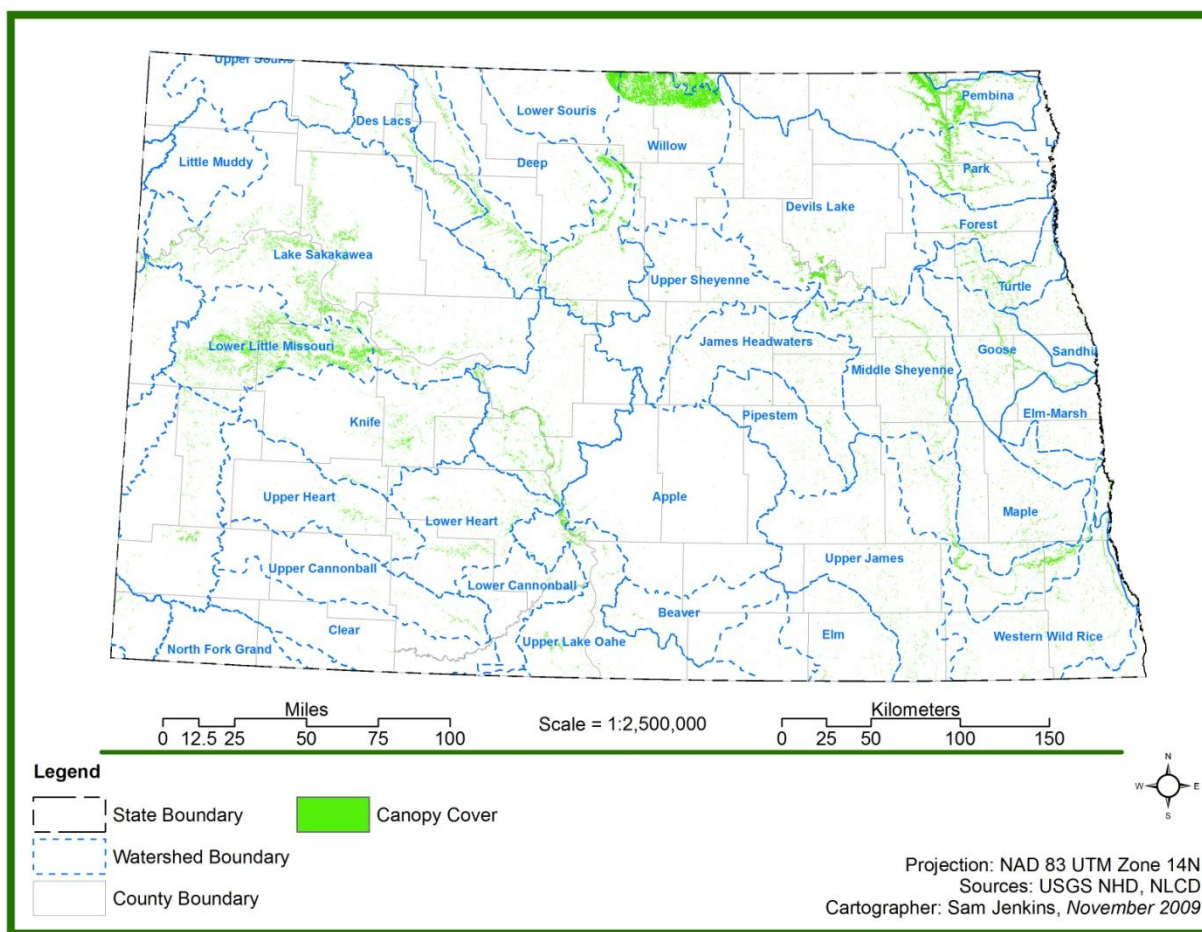


1B. Riparian Forests

A riparian zone is the area between a body of water and the adjacent upland, identified by soil characteristics and distinctive vegetation that requires an excess of water. Generally, it is comprised of trees and shrubs, as well as understory vegetation that includes a variety of grasses and forbs. The elm/ash/cottonwood forest type is the most abundant of all forest types in North Dakota and occurs along rivers, lakes and streams.

In eastern North Dakota, riparian forests are often associated with sites that have deep alluvial soils, which are present at the base of slopes and are often present in coulees that were formed by glaciation and water erosion. Thick layers of organic matter are common in the deep soils of these areas. Species such as green ash (*Fraxinus pennsylvanica*), boxelder (*Acer negundo*) and basswood (*Tilia americana*) may dominate along the eastern rivers, while cottonwood (*Populus deltoides*), ash and boxelder may be more common to the west. Other associated species include American elm (*Ulmus americana*), hackberry (*Celtis occidentalis*), bur oak and willow (*Salix* spp.). Some of the shrub species include chokecherry (*Prunus virginiana*), gooseberry (*Ribes* spp.), and snowberry (*Symphoricarpos* spp.).

Figure 1. Total Forest Canopy, North Dakota.



1C. Rural Tree Plantings

Rural tree plantings generally refer to farmstead plantings, shelterbelts, living snow fences, wildlife plantings, riparian buffer strips, and others that are designed to achieve conservation, economic and societal goals.

North Dakota is largely a rural state with an economy that is deeply rooted in agriculture. North Dakota has a long history of tree planting efforts dating back to the Timber Culture Act of 1873. Early settlers planted trees to provide wind protection, fuel and food. The Dust Bowl of the 1930s had far-reaching social, economic, and environmental consequences which accelerated tree planting programs. The most notable program was the Prairie States Forestry Project which resulted in the planting of 217 million trees in the Great Plains. Tree planting efforts have continued throughout the state into present times.



1D. Community Forests

Community forests include boulevard trees, trees planted within city parks, and trees that naturally occur within city limits or public right-of-ways. The management of such tree resources may fall under the responsibility of city foresters, public works departments, and/or community tree boards. The community forest also includes trees that are planted on private or commercial properties. Common tree species present in residential communities include cultivars of elm (*Ulmus* spp.), linden (*Tilia* spp.), ash (*Fraxinus* spp.), oak (*Quercus* spp.), hackberry (*Celtis occidentalis*), and silver maple (*Acer saccharinum*).

Section 2. Forest Trends

2A. Upland Forests

2A.1. Aspen Forests

Nearly 27% of North Dakota's timberland (a subset of 'forestland' based on growth potential) is classified as the aspen/birch forest type (Haugen et al. 1999). The majority of this forest type is located in the Turtle Mountains and represents the state's largest concentration of forestland. Aspen forests can also be found in the Pembina Gorge, the Mouse River sandhills, the Badlands of western North Dakota, the Killdeer Mountains, and the Sheyenne River valley. Quaking aspen is the dominant species in these stands, however, paper birch, bur oak and green ash are also common on these sites.

A significant portion of this aspen resource can be characterized by low productivity, high incidence of stem decay, and tree mortality associated with stand over-maturity. In the absence of stand-replacing disturbances to encourage vigorous aspen regeneration, aspen stands age and deteriorate over time as the result of numerous inciting, predisposing and contributing factors. These may include frost injury, drought, hail damage, windstorms and several forest pests.



Defoliating insects, wood rotting fungi and canker diseases contribute to the deterioration of these aspen stands. Aspen forests are prone to periodic defoliation episodes caused by the forest tent caterpillar (*Malacosoma disstria*). Defoliation reduces growth, predisposes trees to other damaging agents, and exacerbates the senescence of aging aspen stands. Internal decay of live aspen trees is common within mature aspen stands, particularly those over 50-years of age. Stem decay caused by the fungus *Phellinus tremulae* reduces the amount of useable wood within a stand, in addition to increasing the probability of stem breakage. The wood volume loss due to this stem decay has been increasing as the aspen resource continues to age. Similarly, mortality of large diameter trees due to hypoxylon canker (*Hypoxylon mammatum*) contributes to the deterioration of older stands (Kangas 2007).

The damage caused by these pests should not be perceived as 'unnatural,' but rather reflects a shift of the disturbance regime. Without disturbance, whether by fire, harvesting, bulldozing, or other means, to encourage vigorous aspen regeneration, pests and environmental factors deteriorate the aging aspen and give way to other species. Throughout its western and eastern range, aspen is a pioneer species that is often succeeded (replaced) by shade-tolerant conifer species in the absence of disturbance. However, many aspen forests of the northern prairie regions of North America convert to shrubland where shade-tolerant conifers do not naturally occur (Perala 1990, Harniss 1981). This successional scenario is apparent within some areas of the Turtle Mountains where hazel (*Corylus* spp.) dominates the under-story of deteriorating aspen stands and prevents the establishment of other tree species. Over a 25-year period, the

aspen forest type in the stand age category of 0- to 20-years has decreased by over 35,000 acres, while 60% of aspen stands in the state in 2005 are 40-years of age or older (Haugen et al. 2009). The Forest Legacy¹ Area Nomination process identified areas threatened by conversion to non-forest. Among the nominated areas, several forested lands dominated by aspen were identified, in the Turtle Mountains, Pembina Gorge and Killdeer Mountains.

Conversion of aspen to non-forest has been most prominent in the Turtle Mountains. This conversion may be driven in part by reduced productivity and vigor of the stands, coupled with a lack of harvesting opportunities for private landowners. As a result, some private landowners are inclined to clear low-production forests and use the land for agricultural purposes that generate marginal economic benefits. In 1980, there was an estimated 154,000 acres in the aspen forest type; by 2005 the area of aspen had dropped to 116,000 acres, a decrease of approximately 25% (Haugen et al. 2009).

2A.2. Western Conifer Forests

Pine forests occupy 6,000 acres in the southwestern region of North Dakota. Ponderosa pine is the most common species, however, a small stand of limber pine is located in Slope County. Rocky Mountain juniper, a large shrub, dominates much of the rest of the Badlands, occupying about 600,000 acres.

There are several animals, insect pests and pathogens that are found in the native ponderosa pine stands of southwestern North Dakota. Of these, animal damage caused by deer and porcupines is most apparent. Shoot death and branch dieback caused by Western gall rust (*Endocronartium harknessii*), diplodia shoot blight and canker (*Diplodia pinea*), and pine pitch nodule maker (*Retinia metallica*) are commonly encountered. Such pests may incite tree mortality if conditions favor repeated infections/infestations over several years. Often pines weakened by these pests and other factors succumb to mortality following colonization by pine engraver beetles (*Ips pini*) or turpentine beetles (*Dendroctonus valens*). Despite the presence of pests, these isolated pine stands are quite resilient and the level of tree mortality has remained low. Perhaps the greatest concern in these areas has been wildfire. Such wildfire concerns were realized as a prairie fire (designated as the Deep Creek Fire) spread into portions of the native ponderosa pine stands of Slope County in September of 2004. Years of past fire suppression, coupled with high stand densities, create conditions that may intensify fire behavior.

¹ The Forest Legacy Program is a US Forest Service program. States that implement this program protect environmentally sensitive forest lands through conservation easements; legally binding agreements; and transferring a negotiated set of property rights from one party to another without removing the property from private ownership.

2B. Riparian Forests

2B.1. Elm/Ash Forests

The elm/ash forest type is the most abundant of all native forestland and is found along rivers throughout the state. These forests have experienced significant alterations over the past decades due to Dutch elm disease (*Ophiostoma ulmi* and *O. novo-ulmi*), overgrazing, altered water flows, and conversion to non-forest. Since the first detection of Dutch elm disease in 1969, the disease has spread throughout North Dakota. The American elm was a major component of the state's riparian forests and occupied a wide range of sites. Dutch elm disease spread aggressively and decimated the elm population that once comprised a large portion of the riparian forests along the Red, James, Sheyenne and Pembina Rivers. In addition, the disease continues to kill elms that occur in the wooded draws of western North Dakota. Although the American elm has not been eliminated entirely from these forests, the species primarily persists as a small understory tree, occupies a small proportion of the total stand basal area, and often succumbs to mortality prior to reaching maturity. The loss of American elm dominance in these systems has shifted the species composition toward green ash, boxelder and other species. The dominance of ash in riparian forests is a major concern to resource managers as the emerald ash borer (*Agrilus planipennis*) continues to spread throughout the Midwest.

In addition to the impacts of invasive tree pests, many riparian forests have been converted to non-forest through agricultural and residential development, particularly along the rivers of eastern North Dakota. The Forest Legacy Area Nomination process identified the lower Sheyenne River from Highway 46 to the confluence of the Red River as one of the riparian forest areas most threatened by conversion to non-forest. Riparian forests are further impaired by damaging factors such as overgrazing and water flow alterations that have gradually reduced the vigor of existing trees and destroy understory woody vegetation. Such forest changes and conversions adjacent to watercourses have important implications for water quality, flood control, wildlife habitat and recreation opportunities.

2B.2. Cottonwood Forests

The cottonwood forests that occur within the Missouri River floodplain are in poor condition that has resulted from progressive mortality of mature trees and the absence of natural regeneration to replace those that have died. Prior to flood mitigation, the Missouri floodplain experienced periodic inundation as high spring water flows deposited sand in low-lying areas. These moist sandbars serve as seedbeds for cottonwood and are critical for natural regeneration of the species (Burns et al. 1990). This historical disturbance regime of periodic flooding drove the succession, distribution and age class structure of cottonwood forests along the floodplain (Ball 1997).



In the absence of flooding and subsequent sandbar formation, the current cottonwood forests are in a state of temporary existence as there are no young cottonwoods to replace the overmature trees that succumb to old age and senescence. As a result, the floodplain that once persisted as a fluctuating mosaic of backwater wetlands, sandbars and cottonwood forests now exists as a xeric, fire-prone floodplain bisected by a channelized river. The cottonwood component of the Missouri floodplain may eventually die out and give way to other tree species (both native and non-native) with the exception of a few isolated sites adjacent to the ever-deepening river channel.

In 1980, there was an estimated 66,000 acres in the cottonwood forest type, by 2005 that had dropped to 55,000 acres, a decrease of around 20% (Haugen et al, 2009). Over a 25-year period, the cottonwood forest type in the stand age category of 0- to 20-years has dropped to 0 acres. Across all forest types in the state, the number of cottonwood saplings in the 1.0- to 2.9-inch diameter range is 0 and there are only 445,000 saplings in the 3.0- to 4.9-diameter range from 1994 to 2005 (Haugen et al. 2009). These estimates illustrate the lack of cottonwood regeneration within the state. If these trends persist across the state, the area and the number of cottonwood trees growing in the state will continue to decrease.

Cottonwood riparian forests are also threatened by conversion to non-forest. The Forest Legacy Nomination Process identified the Missouri River corridor as a high priority area threatened by conversion to non-forest.

2C. Rural Tree Plantings

North Dakota is largely a rural state with an economy that is deeply rooted in agriculture. Rural tree plantings are an important component of many agricultural systems and can improve rural life in the northern plains. For example, field windbreaks reduce soil erosion during years of drought, reduce water evaporation from adjacent cropland, and increase crop yields. Similarly, some plantings are designed to stabilize streambanks, filter water runoff from adjacent agricultural lands, provide wildlife habitat, protect stretches of highway prone to severe snow accumulation, provide wind protection for livestock, or protect farmsteads and rural homes from snow and wind. Although many rural tree plantings occur in areas where the historical vegetation type was prairie, these resources are critical for the present needs of rural residents that live in the current agricultural landscape. An estimated 55,000 linear miles of windbreaks have been planted in North Dakota since the 1930's (Haugen et al. 1999). According to results from the North Dakota Forest Stewardship Spatial Analysis Project (2007), North Dakota has an estimated 34,000 acres of rural tree plantings.



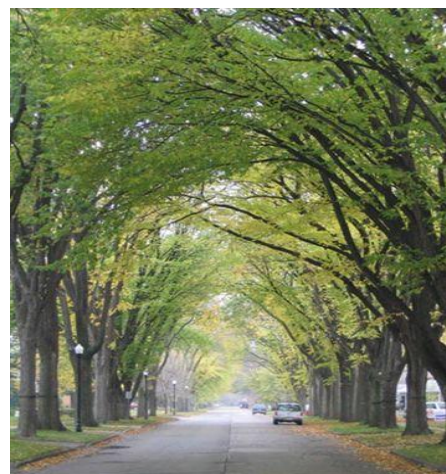
Tree plantings of the northern plains are exposed to numerous pests and environmental conditions that hinder planting success, reduce their effectiveness, and limit long-term survival. Deterioration of tree plantings is often incited by drought, flooding, frosts, inadequate spacing, weed competition, herbicide exposure, defoliating insects and foliar diseases. As trees become weakened, canker diseases and wood-boring insects may cause further damage to these plantings.

Lack of species diversity is an underlying factor in the decline of many rural plantings. Plantings composed of one or few species often experience episodes of abrupt decline, simply because all trees are vulnerable to the same damaging factors. Similarly, these plantings are more susceptible to pest outbreaks in comparison to those that consist of several different (or non-host) species. Some examples include: decline of single-row Siberian elm (*Ulmus pumila*) field windbreaks due to herbicide exposure, marginal cold hardiness, and canker diseases; decline of Colorado blue spruce (*Picea pungens*) plantings due to yellowheaded spruce sawfly (*Pikonema alaskensis*), rhizosphaera needlecast (*Rhizosphaera kalkhoffii*), and cytospora canker (*Leucostoma kunzei*). The impacts of these damaging factors could have been greatly reduced had additional species been incorporated into these plantings.

The damage to rural plantings caused by these interacting factors are more effectively prevented rather than treated. Incorporating various weed control techniques, manipulating planting density and arrangement, or selecting species most suitable for the site have been effective approaches to prevent the decline of tree plantings. In recent years, state, federal and university forestry/tree care professionals have promoted species diversification in an attempt to avoid past experiences in tree planting decline. In practice, these techniques greatly enhanced the effectiveness of rural plantings. Despite this, research focusing on the identification of species and seed sources that perform well in the northern plains is still a critical need for conservation tree planting. The number of suitable native species for the northern plains is relatively limited in comparison to more forested regions. Therefore, the loss of a single species due to the introduction of invasive pests or other factors is magnified, and further limits tree planting options and diversification efforts.

2D. Community Forests

Community forests include boulevard trees, trees planted within city parks, and trees that naturally occur within city limits or public right-of-ways. The management of such tree resources may fall under the responsibility of city foresters, public works departments, and/or community tree boards. The community forest also includes trees that are planted on private or commercial properties. As a whole, these tree resources comprise the community forest and provide many benefits to the community's residents, including: reduced winter heating and summer cooling costs, wind and snow protection, beautification, recreational opportunities and enhanced quality of life.



Trees that are planted within residential areas are exposed to insects, diseases and environmental stresses throughout the course of their lives. Commonly observed forest pests in residential areas include various defoliating insects, piercing insects, wood-boring insects, foliar diseases and canker diseases. In addition, abiotic stressors, such as compacted soils, turf herbicides, lack of (or too much) watering, nutrient deficiency, and mechanical injuries, often exacerbate the damage caused by insects and disease.

Despite the copious environmental stresses and pests, Dutch elm disease continues to be the most damaging factor of community tree resources. This disease has eliminated many of the stately elms that once graced North Dakota communities. Several of the larger cities have developed management programs to combat Dutch elm disease with notable success. However, smaller communities that lack the tax base to support a forestry staff have been severely impacted by this disease.

Ash and cultivated varieties of the species were the most common replacements for dying elm trees following Dutch elm disease. As a result, many community forests that were once dominated by elm are now dominated by ash. Although ash performs well on a variety of sites and conditions, the overabundance of this species has raised concerns since the recent discovery of the emerald ash borer within nearby states. Many North Dakota communities have realized that their community tree resources may be susceptible to another episode of tree mortality if eradication efforts fail and the emerald ash borer spreads westward into the Plains States. As a result, many communities are beginning to embrace the concept of species diversification within community forests. There is a distinct and urgent need for inventories to be updated to provide underserved communities with a useful, current management tool.



Emerald ash borer

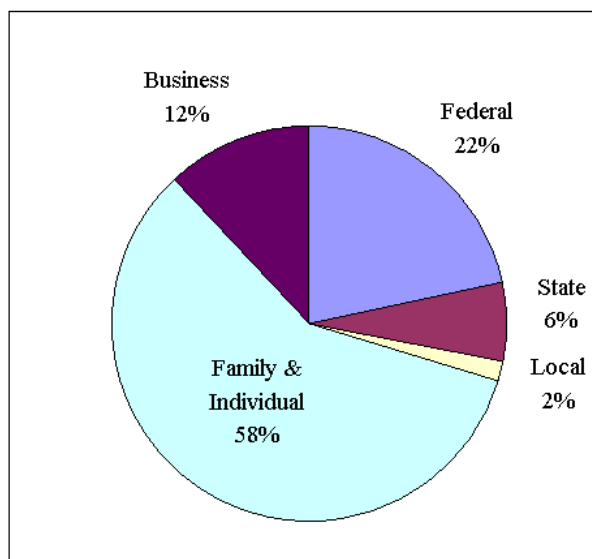
2E. Forest Ownership

2E.1. Private Forest Ownership

The majority of the forest land in North Dakota, 424,000 acres or 58%, is owned by families and individuals (figure 2). An additional 86,000 acres are owned by other private groups (e.g., corporations, tribes, etc.); collectively, private owners possess 70% of the state's forests (Haugen et al. 2009).

Among the estimated 30,000 families and individuals who own forest land, 76% of family forest owners have fewer than 10-acres of forest land. Although, most family forest owners in North Dakota plan minimal activity on their forest land, approximately one in every three acres is owned by someone who plans to either transfer their land to an heir or otherwise sell it within the next five years. Land transfer is related, in part, to the age of the owners; 28% percent of the family forest land is owned by people 75 years of age or older, and an additional 38% of the family forest land is owned by people between 65 and 75 years of age. This large-scale intergenerational shift will change the characteristics of the family forest owners; influence how owners view, interact and relate to their land; and, as a result, alter future forest characteristics (Haugen et al. 2009).

Figure 2. Forest Ownership in North Dakota (Haugen et al. 2009).



2E.2. Public Forest Ownership

Public forests are an important part of North Dakota's natural resource heritage. Forests provide access to outdoor education and recreational opportunities, managed wildlife habitat, and play an important role in protecting watersheds.

Roughly, 30% (214, 400 acres) of forest land in North Dakota are publicly owned (figure 2). The federal government, primarily the US Forest Service, is responsible for the management of 72,000 acres or 34%, while the State of North Dakota manages just over 46,000-acres or 22% of the forest land. Over 39% of the public lands are managed by other federal agencies, which includes the US Fish and Wildlife Service, National Park Service and the Bureau of Land Management (Haugen et al. 2009).

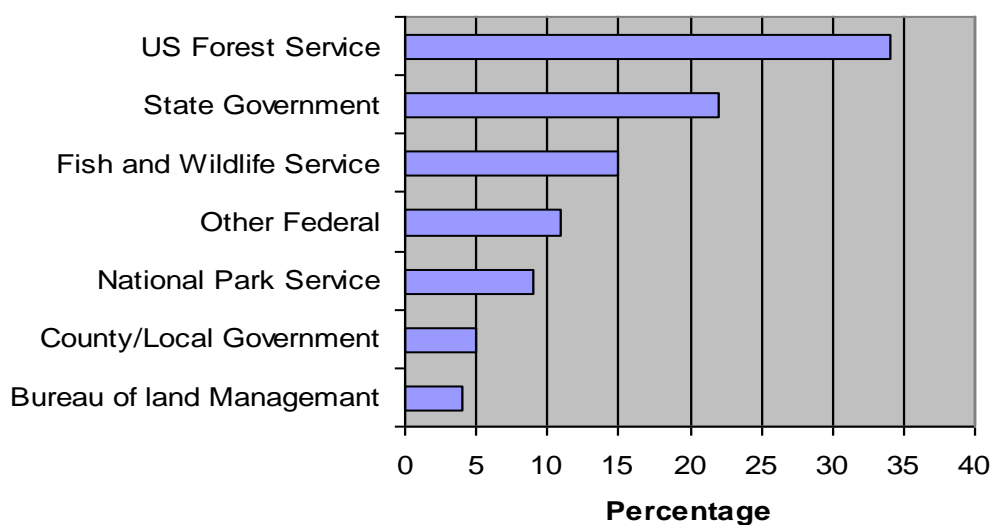
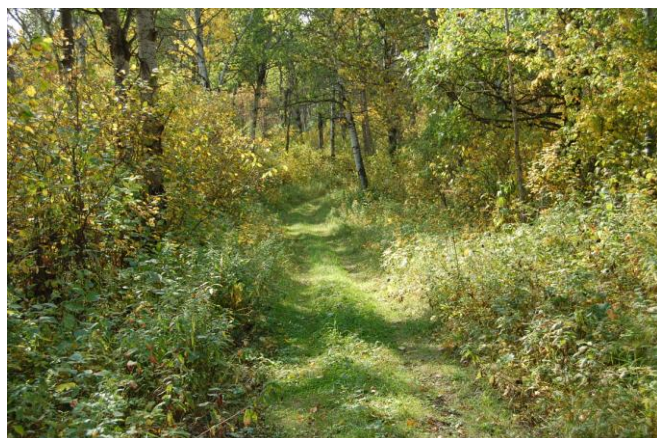


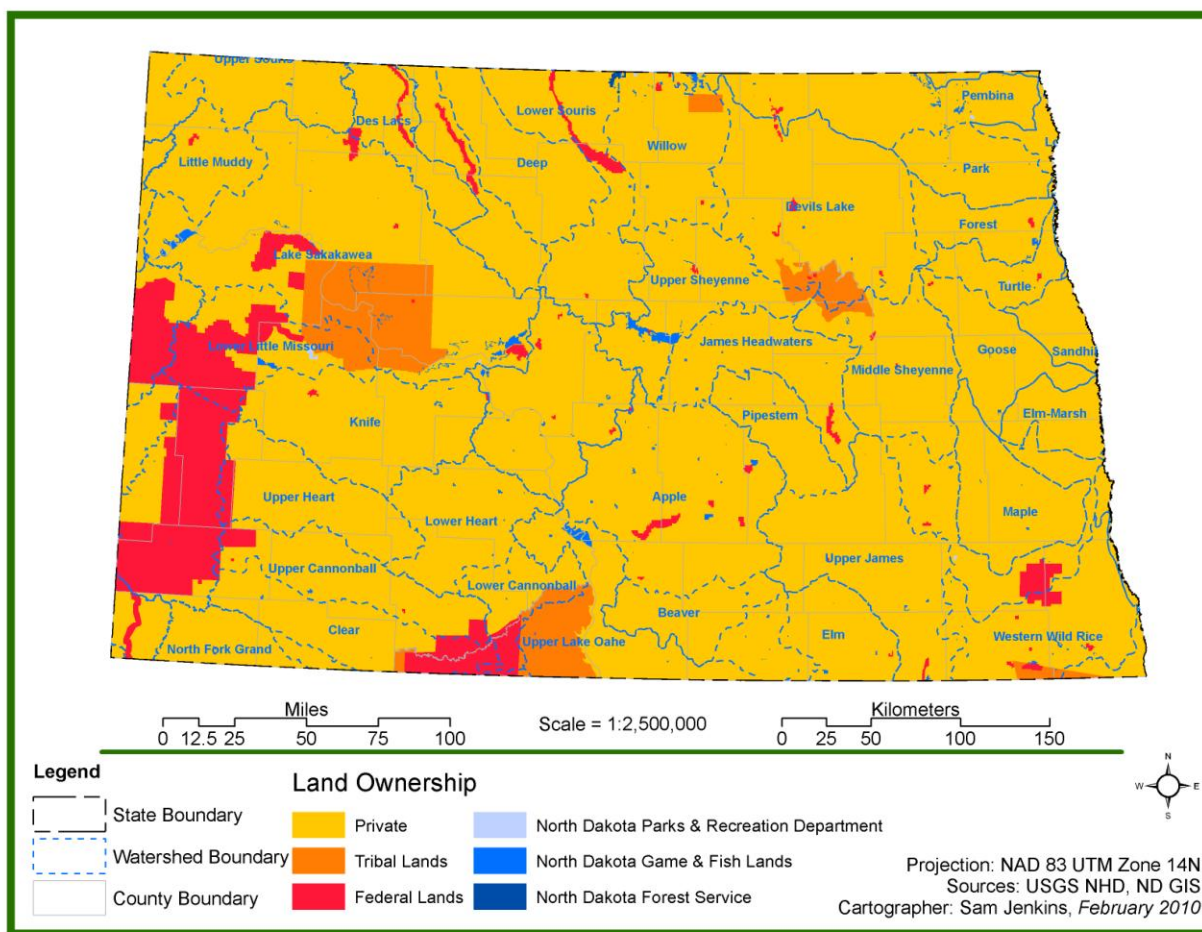
Figure 3. Distribution of Public Ownership by Percent, North Dakota (Haugen et al. 2009).



Much of the land available for public outdoor recreation, such as hunting, fishing, hiking, camping, or bird watching, is managed by state and federal agencies. The North Dakota Parks and Recreation Department administers 19 state parks and recreation areas and the North Dakota Game and Fish Department manages numerous properties across the state. The North Dakota Forest Service manages 5 state forests for multiple benefits, including recreation and forest products. Federal

agencies, like US Forest Service, Park Service, Fish and Wildlife Service, manage areas available for recreation, many of which are forested (Haugen et al. 2009).

Figure 4. Surface Management by Agency in North Dakota.



Section 3. Forest Benefits and Threats

The following narratives describe benefits and threats to four major resource issues identified by NDFS forestry personnel, natural resource professionals, and stakeholders. These resource issues are intended to complement the State and Private Forestry National Objectives. They include: Native Forest Conservation, Community Forest Conservation, Sustainability of Riparian Forests and Conservation of Rural Plantings.

3A. Forest Resource Benefits

3A.1. Upland Forest Conservation Benefits

Despite their limited acreage, native forests are important resources in North Dakota. These forests provide wildlife habitat, recreational opportunities, stabilize river banks, filter water runoff from adjacent agricultural lands, provide wood products, serve as seed sources for conservation tree production, and increase the botanical diversity of the state. Woodlands and forests serve as important habitat for many species of animals, including: birds, mammals, reptiles, and amphibians (Hagen et al. 2005).

Upland forests provide numerous recreational opportunities, including: hiking, camping, fishing, hunting, bird watching, cross country skiing and snowmobiling. These are popular activities in the Turtle Mountains, Pembina Gorge, Devils Lake Hills and Sheyenne River Valley. These ‘outdoor laboratories’ are critical for teaching future generations about nature and conservation.

3A.2. Community Forest Benefits



Community forests include boulevard trees, trees planted within city parks, and trees that naturally occur within city limits or public right-of-ways. This resource provides many benefits. Green infrastructure can reduce energy expenses by reducing summer cooling costs and winter heating costs. Trees increase the aesthetic appeal to residential environments. Trees can also improve air quality, reduce storm water runoff, and can add to property values of homes. The green infrastructure is a source of employment as arborists and foresters are employed to maintain this resource.

Based on a 2002 Bismarck inventory, every \$1 spent on tree care results in a \$3.09 benefit return in terms of energy savings, air quality improvement, storm water run-off reductions and increased property values. The ability of Bismarck’s municipal trees to intercept rain, thereby reducing storm water runoff, provides the largest environmental benefit to the community. Overall, large-stature trees produce greater benefits than smaller trees. Continued investment in management is critical to ensuring the community maintains or increases its return on investment into the future (Peper 2004).

3A.3. Riparian Forests Benefits

Riparian forests provide many environmental and social benefits. Trees and woody plants along watercourses help to control soil erosion and filter agricultural chemicals from reaching rivers. In addition, riparian forests provide recreational opportunities and provide habitat for numerous wildlife species.

3A.4. Rural Tree Plantings Benefits

Rural tree plantings generally refer to farmstead plantings, shelterbelts, living snow fences, wildlife plantings, and others that are designed to achieve conservation, economic and societal goals. For example, field windbreaks reduce soil erosion especially during years of drought, reduce water evaporation from adjacent cropland, and increase crop yields. Similarly, some plantings are designed to stabilize stream banks, filter water runoff from adjacent agricultural lands, provide wildlife habitat, protect stretches of highways prone to severe snow accumulation, provide wind protection for livestock, or protect farmsteads and rural homes from snow and wind. Although many rural tree plantings occur in areas where the historical vegetation type was prairie, these resources are critical for the present needs of rural residents that live in the current agricultural landscape.

3B. Threats to Forest Resources

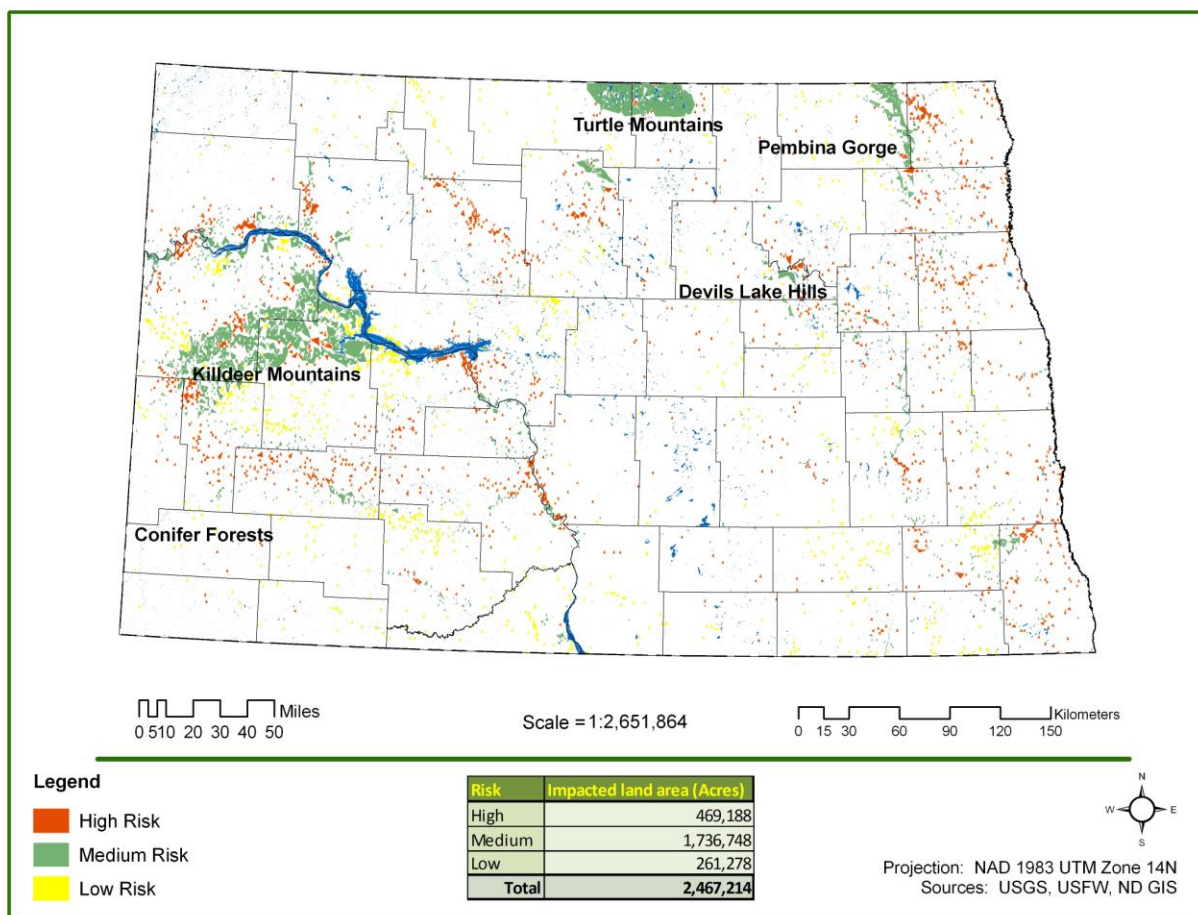
3B.1. Invasive Tree Pests

Invasive tree pests (exotic or non-native tree insects and pathogens) are perhaps the greatest threat to forests, shade trees, and woody ornamentals in the United States. Non-native insects and pathogens, such as the Gypsy moth, Dutch elm disease fungus, and chestnut blight have impacted ecological, cultural and economic resources throughout the United States. More recently, invasive pest detections such as the emerald ash borer, Asian longhorn beetle, and the Sudden Oak Death pathogen within the United States, have raised great concerns among foresters, scientists, arborists and nursery personnel.



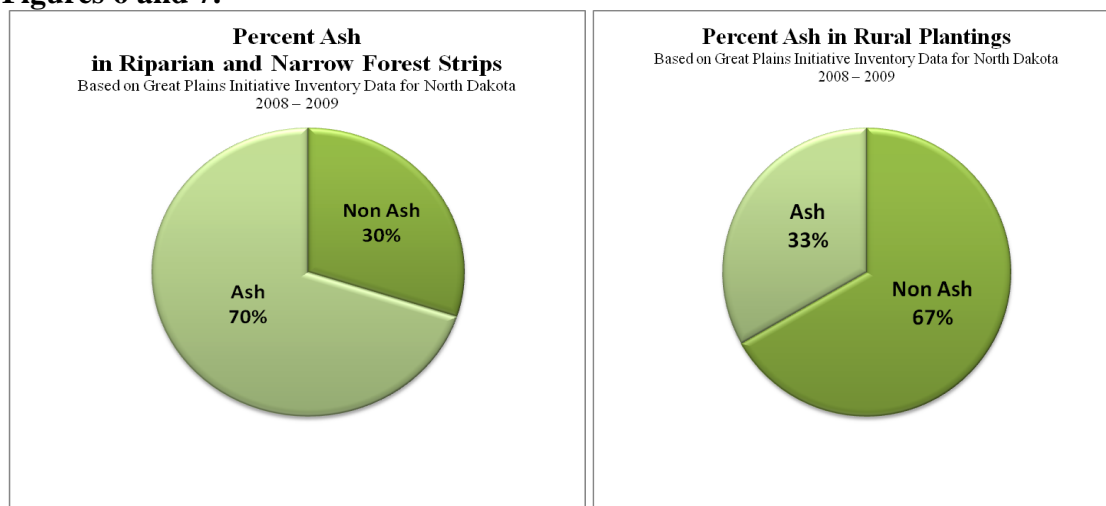
Gypsy moth

Figure 5. Ash ‘At-Risk’ to Emerald Ash Borer in North Dakota.



North Dakota has felt the impact of invasive tree pests. Since 1969, Dutch elm disease has spread throughout the native forests, rural plantings, and community tree resources of the state. This invasive pathogen has altered riparian forests, decimated field windbreaks, and eliminated many boulevard trees in communities.

Detections of the emerald ash borer, Asian longhorn beetle, and the expansion of the Gypsy moth within the Lake States Region have raised great concern among natural resource professionals in North Dakota. Most notably, the emerald ash borer has raised great concerns in North Dakota. According to US Forest Service Forest Inventory and Analysis data, North Dakota has an estimated 78million ash trees within its woodlands, upland forests and riparian forests. A risk modeling exercise conducted by the North Dakota Forest Service and the North Dakota State University Department of Geosciences estimates 469,188 acres of forestland, woodlands, and non-forestland with trees at high risk to emerald ash borer introduction (figure 5). According to data collected as part of the Great Plains Forest and Tree Invasive Initiative, 70% on North Dakota riparian Forest and narrow wooded strips are comprised of ash (figure 6). Additionally, 33% of North Dakota 55 thousand miles of windbreaks are ash (figure 7). Ash is the most common tree planted in North Dakota communities representing approximately xx% of the state’s community tree resource.

Figures 6 and 7.

3B.2. Overmaturity and Limited Natural Regeneration

Overmaturity and limited natural regeneration threatens the future sustainability of North Dakota's forests. Natural regeneration is hindered by the lack of processes that promote regeneration (flooding, prescribed fire, harvesting) or processes that limit regeneration (herbivory). This issue is most prominent in the state's aspen forests, riparian forests dominated by cottonwood, and riparian forests with an overabundance of ash.

North Dakota's forests can be categorized into six broad age classes: 0 to 20 years old, 21 to 40 years old, 41 to 60 years old, 61 to 80 years old, 81 to 100 years old and 100 plus years. Stand age by forest types varies. In 2005, stands dominated by Rocky Mountain juniper, bur oak and cottonwood contained a greater proportion of area in the oldest age class, whereas stands dominated by aspen generally are younger.

Over three quarters of the forest stands in North Dakota are 40 years or older; lack of regeneration is an issue of concern for many forest types within the state. This is due in part to lack of disturbances that are required to create suitable seedbeds and/or promote root suckering (Haugen et al. 2009).

3B.3. Lack of Species Diversity and Vulnerability to Damaging Agents

Limited species diversity is an underlying threat to the long-term sustainability of the state's forest resources. The climate and soils of the Northern Plains limits the number of tree species that can survive. Forests composed of one or few species often experience episodes of abrupt decline simply because all trees are vulnerable to the same damaging factors. Similarly, these stands are more susceptible to pest outbreaks in comparison to those that consist of several different (or non-host) species.

3B.4. Strengthening Educational Outreach

The public's perception of the role trees and forests play in society is constantly changing. An understanding of people's dependence on the land and its natural resources for survival is no longer inherent. A disconnect from nature is developing in children as they spend more time indoors watching television, playing video games and using the Internet. In the coming decades, the public will more frequently be called upon to understand complex forestry issues, assess risk, evaluate proposed environmental plans, and understand the local, and global, impacts individual decisions affect. Creating a scientifically informed citizenry is critical to the long-term sustainability of forest resources.

Utilizing new technologies, social networks, and distance learning opportunities will be key in the future to providing access to lifelong learning opportunities for younger, more technology oriented generations. Utilizing electronic opportunities must be accompanied by opportunities to connect youth to nature. Research shows that people who grow up to care about the environment, enjoyed meaningful experiences in the outdoors as a child. The North Dakota Forest Service's *Project Learning Tree* program is committed to creating those meaningful experiences for today's K-12 youth. Map 20, in the Appendix displays recent *Project Learning Tree* educational outreach in North Dakota communities.



3B.5. Conversion from Historic Vegetation Type

Conversion to non-forest is a threat to upland forests, riparian forests and rural tree plantings. There are various forms of this threat, including: residential development, clearing for agricultural uses, and fragmentation of land ownership in smaller, less manageable parcels. Although North Dakota is generally regarded as a rural state, there are urbanized areas. Recently, residential development has encroached into historically wooded riparian areas as communities, such as Fargo, Bismarck, Grand Fork, West Fargo and Minot, have expanded. This trend may continue as larger communities have shown the greatest population growth in North Dakota.



Economic pressures may result in the conversion of non-productive forest land to agricultural uses. This conversion may be driven in part by reduced productivity and vigor of the stands coupled with a lack of harvesting opportunities for private landowners. As a result, some private landowners are inclined to clear low-production forests and use the land for agricultural purposes that generate marginal economic benefits.

Over the past 50 years, a majority of the riparian areas in eastern North Dakota watersheds have been mismanaged and degraded by activities such as overgrazing, intensive agriculture and indiscriminate logging (Rush 2005). It is estimated that over 50% of the original forest cover in many watersheds in eastern North Dakota has been cleared for agricultural use. In addition, unmanaged grazing has damaged a significant portion of the remaining riparian forests.

Overgrazing, in combination with periodic drought, has left many riparian areas in a weakened condition and susceptible to insects and diseases.

Potential land transfer may increase fragmentation and further limit management opportunities. Private individuals own 58% of North Dakota's forestland. Among these forest owners, 59% are 65 years of age or older; suggesting the potential for a larger intergenerational shift in ownership either by sale or transfer to an heir (Haugen et al. 2005).

Many rural tree plantings were established following the Dust Bowl of the 1930s to help curb soil erosion. Farming practices have changed substantially since that time and many producers opt for 'no till' farming instead of establishing windbreaks. In addition, many windbreaks have been removed as they limit the use of larger farm machinery. The role of windbreaks needs to be considered in future farm systems.

Encroachment of trees into historically prairie ecosystems has emerged as an issue in the recent decade. In the absence of fire (whether prescribed or naturally occurring) to promote grasses, trees frequently become established via windblown seeds or carried by animals into these areas. The presence of trees can create management issues for grassland and wetland management areas. Consequently, over mature or dilapidated windbreaks within grasslands should be considered for removal and the planting of new windbreaks within or adjacent to intact grasslands should be discouraged.

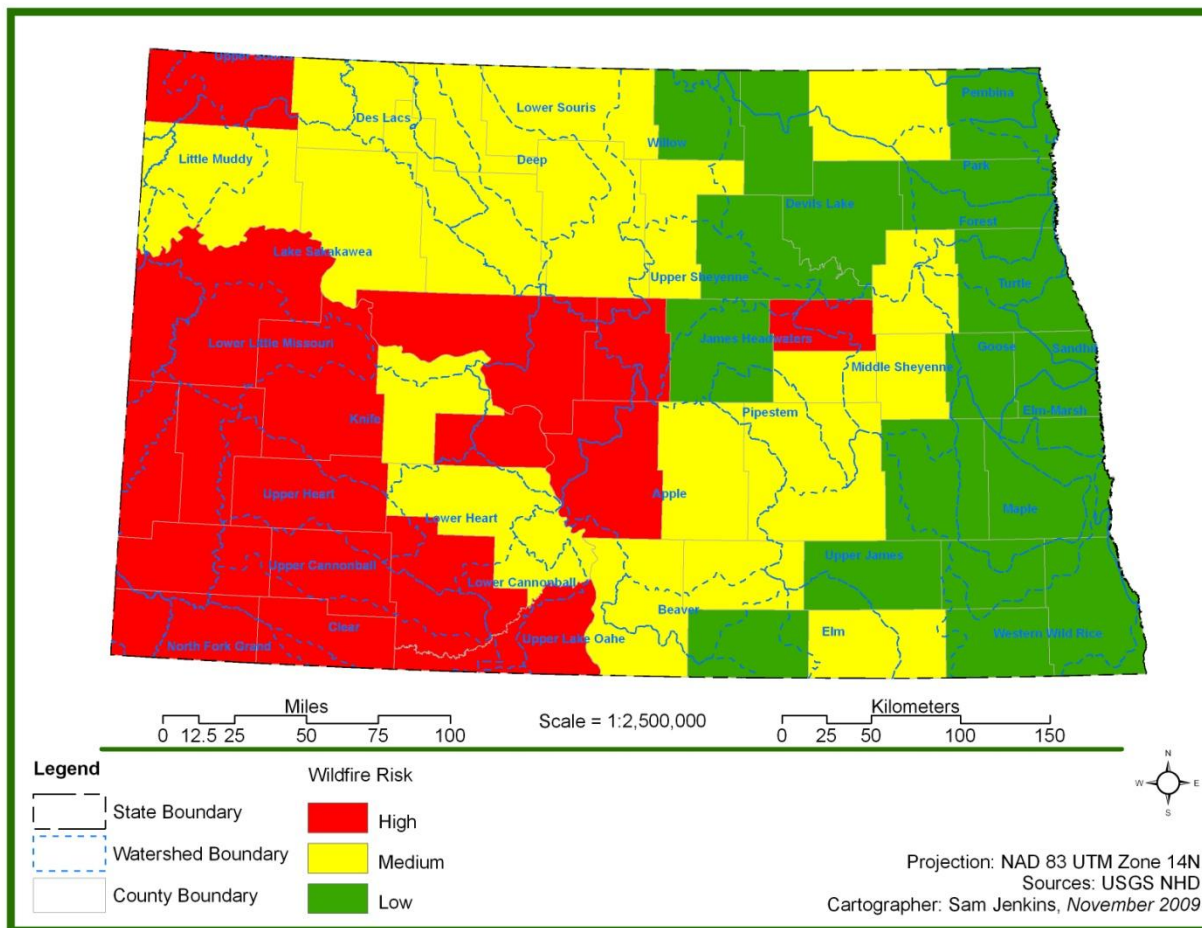
3B.6. Wildfire

Wildfire has always been common and widespread in North Dakota. Travelers, settlers and explorers, including Lewis and Clark, documented huge fires on the horizon, the constant smell and pall of smoke in the air, and miles of blackened prairie. Studies indicate that wildfires occurred in the same locales every three to four years, with larger conflagrations taking place on a 10 to 30 year sequence (North Dakota Forest Service 2009). Today's wildfires follow similar cycles, with larger fires frequently coinciding with drought years.

Prior to European settlement, the majority of fires were started by Native Americans to drive game; provide horses and wildlife with succulent and nutritious new vegetation; conduct warfare against enemies; and protect themselves from attack. Lightning also started many fires. As settlers arrived during the late 1800s, plowing, planting and grazing gradually broke up the vast grasslands. The occurrence of fire most likely increased, but the size of the wildfires decreased as the landscape became fragmented (North Dakota Forest Service 2009).

Despite the conversion of much of the indigenous prairie to non-native grasses and crops, the majority of the state's fuels are still highly combustible, light fuels that burn readily and rapidly given the right environmental conditions. The western part of the state still contains large unbroken acreage of native mixed grasses. The highly successful Conservation Reserve Program (CRP) has enabled North Dakotans to conserve nearly three million acres of land in highly flammable native vegetation. Uncontrolled wildfire still remains a threat to North Dakota's people, property and natural resources (figure 8).

Figure 8. Wildfire Risk by County in North Dakota.



The occurrence of wildfire in forests is rare in North Dakota due to the limited acreage of forestland. Wildfire can be beneficial and detrimental to upland forests depending upon management objectives and stand conditions. Over mature aspen forests may benefit from wildfire as overstory mortality may facilitate vigorous regeneration. Despite this, many homes and other properties are located within these areas and must be protected should a wildfire start.

Years of fire suppression within ponderosa pine forests has led to high fuel accumulations that could result in intense, stand-replacing fires that may have several negative environmental impacts. Thinning coupled with prescribed understory fires may help restore these pine forests to a more natural state. Prescribed burning is also an important tool for maintaining and restoring prairie ecosystems. In the absence of fire, trees often encroach into grasslands, creating an undesirable mosaic of sod and pockets of trees.

The wildland-urban interface is the zone where human development intermingles with undeveloped land. Specifically, the wildland-urban interface (WUI) is the territory between sparsely populated agricultural, forest, and rangeland, and more-populated cities and suburbs.

3B.7. Limited Wood Utilization Opportunities

North Dakota's wood products manufacturing industries employ over 2,000 workers with an output of approximately 355 million dollars (US Commerce 2005). Most of the wood product manufacturers in the state are secondary manufacturers, such as cabinet and mill works. Sawmills are the primary wood-using industry in the state (Haugen et al. 2009).

A mill survey was conducted of all known primary wood-using mills in North Dakota in 2003 (Haugen et al. 2009). The study included the size of the industry, the amount of roundwood harvested, and its uses. Information on the generation and distribution of wood residues was also included. The top three hardwood species harvested in the state was cottonwood, aspen and bur oak, while spruce was the top softwood species harvested.

By product, sawlogs accounted for 60% of all the roundwood produced, with pulpwood making up the remaining 40%. Wood material harvested for industrial roundwood on North Dakota's forests was over 404,000 cubic feet in 2003; 73% was used for products, 17% was logging slash and 10% was logging residues.

In 2003, 73% of the state's sawlog production was exported to mills in Minnesota. The remaining 27% went to mills in North Dakota. Totals from sawlog mill receipts from the 2003 survey illustrate that 100% of the wood coming into North Dakota mills is grown in-state.



A comparison of the 1998 and 2003 timber products inventories shows a decrease in industrial roundwood production of 29%; this may be due in part to the closing of one mill in the state. Even though the total active mills in the state dropped slightly, production capacity was changed considerably with the loss of this one mill.

Cottonwood is still the most commonly harvested species in the state. This is partly due to the fact that the elm/ash/cottonwood forest type covers an estimated 165,000 acres of forest land, and cottonwoods are some of the state's largest trees. There is periodic interest from Minnesota's timber industry in this resource (Haugen et al. 2009).

As previously illustrated, North Dakota's wood product manufacturing industry is very small. The absence of viable forest product markets limits the economic incentive of landowners to sustainably manage forest resources.

3B.8. Climate Change

Forests, woodlands and grasslands have an important role in mitigating climate change while adapting to climate change. Mitigation addresses ways that ecosystems can sequester carbon; ways to increase carbon stored in wood products; and ways that forests and woodlands can provide renewable energy from woody biomass to replace fossil fuel consumption. Mitigation also includes ways state and federal agencies can reduce their environmental footprint and lead by example in greening our practices.

According to the Hadley model, the northern plains will experience warmer temperature and increased precipitation over the next century (US Global Change Research Program, 2001). Climate change may affect disturbance regimes, insect and disease outbreaks, recreational values, and productivity. Forests should be managed sustainably to help forests adapt to anticipated changes. Practices such as afforestation and agroforestry, reforestation, lengthening of forest rotation, preservation of forestland from conversion, and community and urban forestry offer opportunities for carbon offsets.

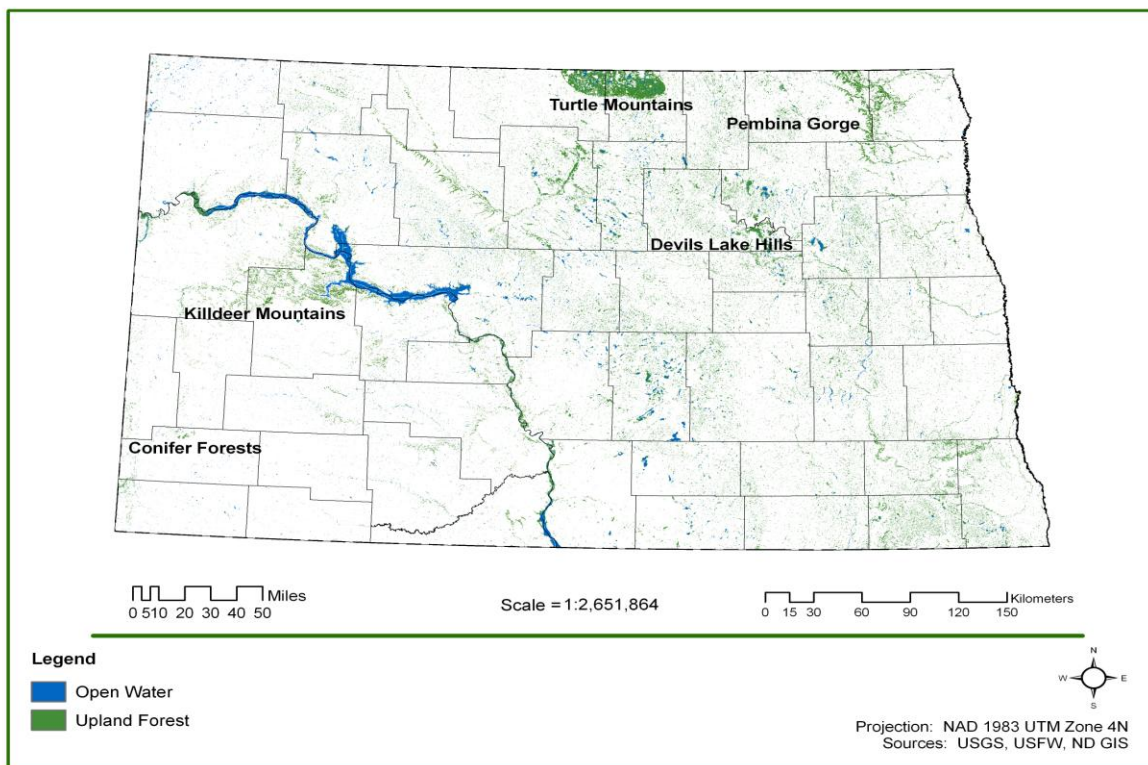
Section 4. Priority Areas

This section provides a brief description of priority areas identified by stakeholders. Such landscape areas may represent unique forest resources, issues and or social/economic needs.

4A. Upland Forests

Priority areas of upland forests are delineated primarily on the basis of the concentration of forested lands in the state. Priority areas may include: Turtle Mountains, Devils Lake Hills, Pembina Gorge, Killdeer Mountains, and the conifer forests of southwestern North Dakota (figure 9). The following provides a brief description of priority areas.

Figure 9. Upland Forest Priority Areas.



Pembina Gorge

Area: 168,000 acres

Description and Condition: Nominated as a Forest Legacy Area, the Pembina Gorge is a steep, dissected escarpment on the edge of the Drift Prairie and bordering the Red River Valley and Canada. The steep slopes maintain the natural woodland community, comprised of bur oak, quaking aspen, green ash, cottonwood and American elm. Other areas have been cleared for cropland of small grains, sunflowers and flax. A few areas are used for cattle grazing. Primary ownership groups include: non-industrial private forest owners, ND Forest Service, ND Game and Fish and ND Parks and Recreation.

Turtle Mountains

Area: 262,000 acres

Description and Condition: Nominated as a Forest Legacy Area, the Turtle Mountains rise 800 feet above the surrounding northern Drift Prairie. The elevational change results in an extra 10 inches of precipitation per year that support deciduous forest cover of bur oak, aspen, green ash, paper birch, boxelder, Juneberry and snowberry. Hundreds of large, deep ponds and lakes are present throughout this geologic feature. Many areas have been cleared for crops and pastureland despite the soil being rather erodible and poorly suited for farming.

Devils Lake Hills

Area: 3,500 acres

Description and Condition: The deciduous forest surrounding Devils Lake bears many similarities to the Pembina Gorge. Fluctuating water levels have inundated many of the forests along the lake.

Killdeer Mountains

Area: 15,000 acres

Description and Condition: Nominated as a Forest Legacy Area, the Killdeer Mountains rise 700 to 1,000 feet above the surrounding prairie/badlands landscape. These forests are comprised of bur oak, quaking aspen, green ash, paper birch, black birch (*Betula fontinalis*) and American elm. Grazing is common on private land.



Conifer Forests

Area: 6,000-acres

Description and Condition: Native stands of ponderosa pine and limber pine can be found in the southwestern counties of North Dakota. These stands encompass approximately 6,000 acres. In addition, Rocky Mountain juniper covers vast areas of the North Dakota Badlands. These shrublands are not considered by most as ‘forests’ and their widespread occurrence is largely a reflection of fire suppression throughout the region. The encroachment of Rocky Mountain juniper into draws and the adjacent prairie landscape has emerged as a significant management issue as the species is prone to stand replacing crown fires that threaten property, infrastructure, and wildlife habitat.

4B. Riparian Forests

Nearly one fifth of North Dakota’s forests occur within 200 feet of water. Major rivers in North Dakota include: Red River, Sheyenne River, James River, Mouse River, and Missouri River. Each of these major river systems are composed of numerous tributaries and sub-watersheds. Maps 1 through 6, in the Appendix illustrate riparian forests for the five areas of North Dakota soil conservation districts.

4C. Rural Plantings

The North Dakota Spatial Analysis Project (2007) provided the state with a consistent methodology to spatially display: (1) important forest lands (rich in natural resources, vulnerable to threat, or both), and (2) areas of opportunity to focus future forest stewardship efforts based on potential. The Spatial Analysis Project delineated areas to target interested landowners and prioritized areas that would be of immediate concern.

Prioritization criteria were established with high priority areas as those characterized as forested and Native American lands; medium priority as those identified as Wildland Urban Interface and Highly Erodible Lands; and low priority as those lands of Grasslands/Herbaceous cover. High priority total land acreage was 4,482,656 acres; medium priority lands total acreage was 15,603,441 acres; and 7,897,121 acres for low priority. Maps 7 through 10, in the Appendix represent the North Dakota Spatial Analysis priority areas. Additional maps pertaining to rural tree plantings include: Map 11 total acres of windbreak by county; Map 12 all existing windbreaks in the state; Maps 13-17 existing windbreaks by soil conservation district.

4D. Community Forests

Community forests include boulevard trees, trees planted within city parks, and trees that naturally occur within city limits or public right-of-ways. The management of such tree resources may fall under the responsibility of city foresters, public works departments, and/or community tree boards. The level of forest management within communities can be categorized as: managing, developing, and underserved. ‘Managing’ refers to a program with all four community forestry program elements (performance indicators) in place including an ordinance, an advocacy organization (i.e. tree board), a management plan, and a professional staff. A ‘developing’ program refers to a program with one, two, or three of the listed elements in place. Underserved refers to a community with none of the four elements. Maps 18 and 19 in the Appendix display the forest management occurring within North Dakota communities.

4E. Multi-State Priority Areas

There are several areas of potential multi-state collaboration opportunities in relation to the forest resource issues outlined in this document. The Great Plains states bear many similarities in terms of forest resource types and forest resource issues. Specifically, the abundance of ash in the northern Great Plains, which will be impacted by the emerald ash borer, creates a logical need for collaborative efforts between North Dakota, South Dakota, Nebraska and Kansas. Additionally, the Great Plains states recognize the over maturity issues facing cottonwood forests along the Missouri River.

Section 5. Incorporation of Existing State Resource Plans

State Wildlife Action Plan



The Farm Bill requires states to consider existing State Wildlife Action Plans and Community Wildfire Protection Plans as state assessments are being developed. The intent is to build upon and complement such resource plans, identify opportunities for coordination, and avoid contradictions or omission of key items.

The North Dakota Comprehensive Wildlife Conservation Strategy, developed by the North Dakota Game and Fish Department, represents a strategy rather than a detailed plan to guide the process of preserving the state's fish and wildlife resources for the foreseeable future. The plan is habitat based, rather than species based. North Dakota was divided into nine primary landscape components, which are essentially the state's major habitat types. They include tall-grass prairie (Red River Valley); eastern mixed-grass prairie (Drift Prairie); mixed-grass prairie (Missouri Coteau); western mixed-grass/short-grass prairie (Missouri Slope); planted or tame grassland; wetlands and lakes; rivers, streams, and riparian; Badlands; and upland deciduous forest.

The North Dakota Forest Service will coordinate with the North Dakota Game and Fish Department to identify areas of mutual interest to address resource needs.

Community Wildfire Protection Plans

The North Dakota Forest Service will address Community Wildfire Protection Plans (CWPP) in the implementation of the state assessment. CWPPs are developed to address issues, such as wildfire response, hazard mitigation, community preparedness, structure protection in communities and other issues. The local scale of these plans may limit their incorporation into the state assessment. However, the North Dakota Forest Service will analyze the CWPPs that have been developed, and provide a summary of those communities.

Since the passage of the Healthy Forests Restoration Act (HFRA) in 2003, communities have been charged with becoming active partners in their own protection from wildfire. Drafting Community Wildfire Protection Plans (CWPP) in collaboration with state and local officials, communities identify prominent sources of fire risk, summarize structural ignitability concerns, and prioritize areas for fuels reduction treatment. The main purpose of CWPPs is for localities to improve their wildfire mitigation capacity and to work with government agencies to coordinate efforts to identify high fire risk areas and prioritize areas for mitigation, suppression and emergency preparedness management. State governments have a key role to play in the formulation of CWPPs, as communities may look for long-term guidance from outside experts.



Forest Resource Strategy

Section 1. Overview

North Dakota's forest resource strategy provides a long-term, comprehensive, coordinated strategy for investing state, federal, and leveraged partner resources to address the management and landscape priorities identified in the assessment. The forest resource strategy incorporates existing statewide forest and resource management plans (such as Community Wildfire Protection Plans and the State Wildlife Action Plan) and provides the basis for future program, agency, and partner coordination. Appendix B contains a description of integration with existing Community Wildfire Protection Plans and the State Wildlife Action Plan.

The overall goal of the North Dakota Forest Resource Strategy is to identify a long-term, coordinated strategy for investing state, federal, and leveraged partner resources to address forestry issues of interest. Partner and stakeholder input were integrated to identify resource issues, priority areas, and strategies to address resource needs.

To ensure that federal and state resources are being focused on important landscape areas with the greatest opportunity to address shared management priorities and achieve measurable outcomes, the North Dakota Forest Service has worked collaboratively with key partners and stakeholders to develop the Statewide Forest Resource Assessment. The Statewide Forest Resource Assessment provides a comprehensive analysis of the forest-related conditions, trends, threats, and opportunities within North Dakota.

Time Line of Events - Statewide Forest Resources Assessment and Resource Strategy

July 2008	Enactment of 2008 Farm Bill
October 2008	Formation of NDFS State Assessment and Strategy Team
November 2008	Coordination with NDSU Geosciences Department
July 2009	Preliminary stakeholder meeting
August 2009	Development of draft assessment
January 2010	Stakeholder comment period
February 2010	Second stakeholder meeting
February 2010	Formation of state resource strategy
April 2010	Public comment period
May 2010	Submission of final assessment and strategy to regional office
June 2010	Final submission of assessment and strategy to Secretary of Agriculture for approval
July 2010	Development of state five-year and annual action plans

Priority Landscape Areas and Issues

The North Dakota Forest Service has engaged with the North Dakota Game and Fish Department, the State Technical Committee, and the State Stewardship Committee in the development of the North Dakota Statewide Forest Resource Assessment and the North Dakota Forest Resources Strategy. Various state, federal, and local agencies were also brought into the process. A ‘partner’s session’ meeting was held at the state capitol in Bismarck, ND, on July 30, 2009. The purpose of the meeting was to provide an overview of the S&PF Redesign, the state assessment and resource strategy requirements in the 2008 farm bill, and identify partner priorities that may align with the national objectives outlined in the Redesign. In addition, numerous non-governmental agencies and other potential stakeholders were consulted. A complete list of partners and stakeholders can be found in Appendix C. Information from the preliminary meeting was used to facilitate the draft assessment. This draft assessment was distributed to partners for external review in January of 2010. On February 3, 2010, a second ‘partner’s session’ was held at the state capitol. The goals of this meeting were to:

- (1) solicit feedback on the draft assessment,
- (2) develop strategies to address threats, and
- (3) identify priority areas of potential collaboration.

Section 2: Priority Areas of Forest Resources

The following section provides a brief description of priority areas identified by stakeholders. Such landscape areas may represent unique forest resources, issues, and or social/economic needs. Priority areas consist of state, federal, tribal, and private ownerships. Priority areas are classified as: upland forests, riparian forests, rural tree plantings, and community forests.

2A. Upland Forests

Upland forests provide wildlife habitat, provide recreational opportunities, stabilize river banks, filter water runoff from adjacent agricultural lands, provide wood products, serve as seed sources for conservation tree production, and increase the botanical diversity of the state. Priority landscape areas of upland forests are delineated primarily on the basis of the concentration of forested lands in the state. Priority areas include: Turtle Mountains, Devils Lake Hills, Pembina Gorge, Killdeer Mountains, and pine forests of southwestern North Dakota.



2B. Riparian Forests

Nearly one-fifth of North Dakota's forests occur within 200 meters of water. Riparian forests provide many environmental and social benefits. Trees and woody plants along watercourses help to control soil erosion and filter agricultural chemicals from reaching rivers. In addition, riparian forests provide recreational opportunities and provide habitat for numerous wildlife species.

Priority riparian landscape areas are delineated primarily by watersheds of major rivers in North Dakota. These include: Red River, Sheyenne River, James River, Mouse River, and Missouri River. Each of these major river systems are composed of several tributaries and sub-watersheds.

2C. Rural Tree Plantings

Rural tree plantings generally refer to farmstead plantings, shelterbelts, living snow fences, wildlife plantings, and others that are designed to achieve conservation, economic, and societal goals. The North Dakota Spatial Analysis Project provided a consistent methodology to spatially display: (1) Important forest lands (rich in natural resources, vulnerable to threat, or both) and (2) areas of opportunity to focus future forest stewardship efforts based on potential. The Spatial Analysis Project delineated areas to target interested landowners and prioritized areas that would be of immediate concern.

Prioritization criteria was established with high priority areas as those characterized as forested and Native American lands, medium priority as those identified as Wildland Urban Interface and Highly Erodible Lands, and low priority as those lands of grasslands/herbaceous cover. High priority total land acreage was 4,482,656; medium priority lands total acreage was 15,603,441 and 7,897,121 acres for low priority.

2D. Community Forests

Community forests include boulevard trees, trees planted within city parks, and trees that naturally occur within city limits or public right of ways. The management of such tree resources may fall under the responsibility of city foresters, public works departments, and/or community tree boards. Priority community forest areas are not delineated on a geographical basis, but rather on the level of community forest management occurring within municipalities. These levels can be categorized as: managing, developing, and underserved. Managing refers to a program with all four community forestry program elements (performance indicators) in place, including an ordinance, an advocacy organization (i.e. tree board), a management plan, and a professional staff. A developing program refers to a program with one, two, or three of the listed elements in place. Underserved refers to a community with none of the four elements.



Section 3. Priority Issues for Forest Resources

The following section provides a brief description of priority issues identified by stakeholders. The Matrix in Appendix A provides greater detail for the linkage of issues to specific priority landscape areas.

3A. Invasive Tree Pests, Tree Pathogens, and Invasive Weeds

Invasive tree pests (exotic or non-native tree insects and pathogens) are perhaps the greatest threat to forests, shade trees, and woody ornamentals in the United States. North Dakota has felt the impact of invasive tree pests. Since 1969, Dutch elm disease has spread throughout the native forests, rural plantings, and community tree resources of the state. This invasive pathogen has altered riparian forests, decimated field windbreaks, and eliminated many boulevard trees in communities.

Detections of the emerald ash borer, Asian longhorn beetle, and the expansion of the Gypsy moth within the Lake States region have raised great concern among natural resource professionals in North Dakota. Most notably, the emerald ash borer has raised great concerns in North Dakota. According to USFS Forest Inventory and Analysis data, North Dakota has an estimated 47-million ash trees within its woodlands, upland forests, and riparian forests. Ash is the most common tree planted in North Dakota communities and is a major component of the state's estimated 55,000 miles of windbreaks.



Noxious Weeds and plants that are invasive create additional management issues for land managers. The North Dakota Department of Agriculture lists 12 species of noxious weeds. Among those that can be potentially problematic in forested settings include: Absinth wormwood, Canada thistle, Diffuse knapweed, Field bindweed, Leafy spurge, Musk thistle, Spotted knapweed, Yellow starthistle, and Saltcedar.

3B. Over Maturity and Limited Natural Regeneration

Over maturity and limited natural regeneration threatens the future sustainability of North Dakota's forests. Natural regeneration is hindered by the lack of processes that promote regeneration (flooding, prescribed fire, harvesting) or processes that limit regeneration (herbivory). This issue is most prominent in the state's aspen forests, riparian forests dominated by cottonwood, and riparian forests with an overabundance of ash.

3C. Lack of Species Diversity and Vulnerability to Damaging Agents

Limited species diversity is an underlying threat to the long-term sustainability of the state's forest resources. The climate and soils of the northern plains limits the number of tree species

that can survive. Forests composed of one or few species often experience episodes of abrupt decline simply because all trees are vulnerable to the same damaging factors. Similarly, these stands are more susceptible to pest outbreaks in comparison to those that consist of several different (or non-host) species.

3D. Strengthen Educational Outreach

Educational outreach is critical to the long-term sustainability of forest resources. The public's perception of the role trees and forests play in society is constantly changing. An understanding of people's dependence on the land and its natural resources for survival is no longer inherent in many of today's youth. Incorporating forestry education into youth and adult education efforts is a challenge. Lifelong learning opportunities that give youth and adults the knowledge and skills they need to conserve, protect, and improve our forest resources for future generations to enjoy are needed.



3E. Conversion from Historic Vegetation Types

Conversion to non-forest is a threat to upland forests, riparian forests, and rural tree plantings. There are various forms of this threat, including: residential development, clearing for agricultural uses, encroachment of trees into prairies, and fragmentation of land ownership in smaller less manageable parcels.

3F. Wildfire

Wildfire is a common occurrence in North Dakota. Historical studies indicate that wildfires occurred in the same locales every three to four years, with larger conflagrations taking place on a 10- to 30-year sequence. Today's wildfires follow similar cycles, with larger fires frequently coinciding with drought years. Despite the conversion of much of the indigenous prairie to non-native grasses and crops, the majority of the state's fuels are still highly combustible, light fuels that burn readily and rapidly given the right environmental conditions.

The western part of the state still contains large unbroken acreage of native mixed grasses. The highly successful Conservation Reserve Program (CRP) has enabled North Dakotans to enroll nearly three million acres of land in highly flammable native vegetation. Uncontrolled wildfire still remains a threat to North Dakota's people, property, and natural resources. Conversely, prescribed burning is an important tool for maintaining and restoring prairie ecosystems. In the absence of fire, trees often encroach into grasslands, creating an undesirable mosaic of sod-bound pockets of trees.



3G. Limited Wood Utilization Opportunities

North Dakota's wood product manufacturing industry is very small. The absence of viable forest product markets limits the economic incentive of landowners to sustainably manage forest resources. There is a growing need to identify wood utilization opportunities within communities as they prepare for and respond to invasive tree pests, such as the emerald ash borer.



3H. Climate Change

Forests, woodlands, and grasslands have an important role in mitigating climate change while adapting to climate change. Mitigation addresses ways that ecosystems can sequester carbon, ways to increase carbon stored in wood products, and ways that forests and woodlands can provide renewable energy from woody biomass to replace fossil fuel consumption. Mitigation also includes ways the agency can reduce its environmental footprint and lead by example in greening our practices.

Section 4. Strategies to Address Forest Resource Issues

Formulating Strategies

The North Dakota Forest Service consulted various partners to identify priority issues, priority landscape areas, strategies to address said issues, resources required to carry out strategies, and identify potential stakeholders. In addition, the NDFS consulted the State Urban and Community Forestry Committee, the North Dakota Game and Fish Department, the State Stewardship Committee, and the State Technical Committee. A complete list of agencies and stakeholders that were invited to the partner sessions can be found in Appendix C.

Matrix of Strategies

The strategy matrix provides a concise manner in which to summarize various aspects of strategies to address forest resource issues affecting landscape priority areas. The complete strategy matrix can be found in appendix A. There are seven components for each issue identified. These include: (1) Strategy, (2) Priority Area, (3) Programs that Contribute, (4) Potential Stakeholders, (5) Resources Required, (6) Measures of Success, and (7) Supports National Objectives. Below is a brief description of each component and how they incorporate requirements of the 2008 Farm Bill.

Strategy – Strategies were developed as a means to provide a generalized long-term plan to address the issue. These strategies are not intended to be prescriptive but rather serve to provide a framework in which to envision an approach to the issue. The strategies outlined in the matrix are specific to the corresponding priority area.



Priority Areas – Many issues and threats are not exclusive to a particular forest resource type or geographical area. In order to focus resources in a more targeted and efficient manner, forestry personnel and stakeholders deemed it necessary to identify specific priority areas for a particular issue. As such, issues may have several identified priority areas. Priority areas that extend beyond state borders are identified.

Programs that Contribute – Identifying ongoing programs and projects are critical to determining potential future collaboration and avoid duplication of efforts. Although some of the programs that contribute may not address an issue specifically, they are listed in the matrix because the scope or a component of the program/project may complement a potential strategy. The programs listed in the matrix represent various federal, state, and local programs/projects.

In addition, many existing S&PF programs have a logical role in the strategies listed. Such S&PF programs are listed within the matrix under this section.

Potential Stakeholders - A complete list of stakeholders can be found in Appendix C. Stakeholders represent not only the State Urban and Community Forestry Committee, North Dakota Game and Fish Department, State Stewardship Committee, and State Technical Committee, but also numerous other local, state, federal, tribal, and private partners. Potential partners from neighboring states were also invited to address issues of regional significance.



Resources Required – Resources required entails what resources are needed and what resources are currently available in order to reach goals for specific issues. S&PF programs that may contribute to such efforts are listed.

Measures of Success – The North Dakota Forest Service has identified which S&PF performance measures will be used to measure accomplishments for each strategy. Additionally, the NDFS has incorporated the agency's 'accountability measures' as proposed measures of success.

Supports National Objectives – The S&PF national themes and objectives supported are listed for each strategy as a means to describe how the proposed activities will accomplish national S&PF program objectives. For brevity's sake, the number of the corresponding theme is listed for each strategy in the matrix.

National Themes and Objectives

1. Conserve Working Forest Landscapes

- 1.1 Identify and conserve high priority forest ecosystems and landscapes.
- 1.2 Actively and sustainably manage forests.

2. Protect Forests from Harm

- 2.1 Restore fire-adapted lands and reduce risk of wildfire impacts.
- 2.2 Identify, manage, and reduce threats to forest and ecosystem health.

3. Enhance Public Benefits from Trees and Forests

- 3.1 Protect and enhance water quality and quantity.
- 3.2 Improve air quality and conserve energy.
- 3.3 Assist communities in planning for and reducing wildfire risks.
- 3.4 Maintain and enhance the economic benefits and values of trees and forests.
- 3.5 Protect, conserve, and enhance wildlife and fish habitat.
- 3.6 Connect people to trees and forests, and engage them in environmental stewardship activities.
- 3.7 Manage and restore trees and forests to mitigate and adapt to global climate change.

Section 5: Investing Resources

The North Dakota Forest Service has considered the resources needed and/or available to effectively implement strategies to address issues. Specific budgetary information (dollar amounts) is not included in the Forest Resource Strategy, but will be described in the annual grant proposals/narrative. The Strategy Matrix (Appendix A) outlines various local, state, federal, tribal and private resources that are available to address strategies. Many S&PF programs tier logically with the strategies outlined. In keeping with the intent of the Farm Bill, and the spirit of the S&PF Redesign, the North Dakota Forest Resource Strategy will integrate different S&PF program areas to address identified priority landscape areas and issues through a collaborative approach.

The Strategy Matrix provides an overview of how existing S&PF programs complement issues and priorities areas identified in the assessment and strategy. The following narratives provide a general overview of S&PF funding needs for North Dakota.

5A. Forest Stewardship

The objective of the Forest Resource Management Program is to provide technical forestry assistance to private landowners throughout North Dakota. Activities stressed by this program include:

- Providing natural resource planning to increase active management within native forestlands and windbreaks.
- Restoring riparian areas and improving management within category one watersheds.
- Promoting wildfire protection through the installation of vegetative firebreaks, defensible space and Firewise practices.
- Promoting tree planting to increase the number of acres planted annually.
- Assisting landowners with timber harvesting and marketing.
- Providing forestry incentives such as the ND Forest Stewardship Tax Law.
- Engaging in the Dakota Forest Preservation and Restoration Project to reduce fuel loads and protect a unique forest type.

This effort includes administration of the Forest Stewardship Program. The State Stewardship Coordinating Committee will provide on-going program direction. The State Forester will chair bi-annual meetings.

Field services will be provided statewide. These efforts are a result of inter-agency cooperation between the ND Forest Service, ND Game and Fish Department, ND Soil Conservation Districts, USDA Natural Resources Conservation Service, and other significant partners. Training sessions are scheduled throughout the state to introduce cooperating agency personnel to Forest Stewardship Program procedures and available financial incentives programs.

5B. Urban and Community Forestry

The Urban and Community Forestry Assistance Program provides information, technical assistance and challenge grants to communities and other units of local government on planting, protecting, maintaining trees in urban environments, developing management plans, developing inventories, conducting resource assessments, and developing ordinances or policies.

The Forestry and Fire Management Assistance Team Leader, two (2) Community Forestry Specialists, a support staff position (.5 FTE, this position is shared with the Fire Management Program) located in Bismarck, and a Community Forestry Assistant, located in Lisbon, will accomplish urban forestry assistance program activities.



Specific Urban & Community (U&CF) Forestry Assistance Program activities are as follows:

- Promoting the priorities of the North Dakota Community Forestry Council, which includes: plant health care, species diversity, right tree right place, sustainable forestry and promoting professionalism.
- Coordinate statewide Tree City USA programs (activities in 49 cities).
- Assist communities in applying for and receiving CTE Community Challenge Grants and Storm Tree Replacement Grants.
- Prepare and monitor project contracts.
- Collaborating with North Dakota Department of Agriculture (NDDA) and USDA-APHIS on statewide Gypsy moth and emerald ash borer (EAB) trapping.
- Inventorying community forests as part of the multi-state Great Plains Initiative Forest Resource Survey.
- Continue to promote and conduct ISA Certified Arborist exams and provide training for the ISA Certified Arborist exam in cooperation with the ND Urban and Community Forestry Association
- The Community Forestry Program is continuing to build relationships within Native American communities. The program has worked closely with the four reservations in the state.
- The Community Forestry Program will work closely with the Forest Health Specialist to monitor the health of community forests.
- Partnership tours that highlight community forestry activities will continue. Partners include congressional staff, ND Department of Transportation and USDA Forest Service. These efforts will be coordinated with local community leaders.

5C. Forest Health Management

The Forest Health Specialist is responsible for providing educational outreach, delivering training, technical assistance, and insect and disease survey efforts. This position collaborates with state, university, and federal personnel to deliver program services including forest health surveys, insect and disease diagnosis, and management recommendations on a statewide basis.

The primary emphasis for the Forest Health Management program is the statewide monitoring of forest insects and disease conditions. Also,

publications of pest condition reports, such as ‘North Dakota Forest Health Highlights’ and ‘Forest Pest Conditions of North Dakota’ are to be released annually and every two years, respectively. Other program activities include Gypsy moth detection trapping; diagnosis and assessment of forest pests on private and public lands; and training in identification of insect and disease pests. In addition, the North Dakota Forest Health Management program collaborates with the USDA Forest Service to implement the Forest Inventory and Analysis program (FIA) and includes Ozone Bioindicator Plot Surveys.

Expected program accomplishments:



- Conduct Gypsy Moth Detection Surveys of North Dakota. North Dakota Forest Service surveys approximately 300,000 acres of forestland where the risk of introduction is greatest.
- Conduct statewide EAB trapping in coordination with NDDA and USDA APHIS.
- Facilitate activities of the North Dakota Cooperative Agriculture Pest Survey (CAPS) committee as it pertains to forest pests.
- Conduct annual NCFIA Ozone Bioindicator Plot Survey.
- Expand educational outreach for local natural resource professionals and landowners through workshops, seminars and fact sheets.
- Continue off-plot monitoring for forest insects and diseases through site visits, communication with natural resource professionals, detection surveys and collaborative efforts with peripheral agencies.
- Continue to provide assistance to the NDSU Plant Diagnostic Lab.
- Coordinate and share information in regards to emerging forest health issues with federal and out-of-state entities by attending workshops, conferences and/or training sessions.
- Prioritize issues for state and multi-state forest health reports as described in the reporting plan for forest health monitoring.
- Provide digital survey data of insects, diseases, and other disturbing events and narrative text for North Dakota Forest Health Highlights Reports.
- Partner with North Dakota Department of Agriculture, NDSU Extension Service, USDA APHIS, North Dakota Association of Soil Conservation Districts, city foresters, and USFS to accomplish forest health management goals.

5D. Natural Resource Conservation Education

Part of the North Dakota Forest Service's mission is to serve the educational community in the state, ultimately improving the learning of students in our schools regarding the wise use and conservation of our forests and related natural resources. Therefore, educational opportunities must be made available to educators that will achieve the desired goals of the Natural Resource Conservation Education (NRCE) Program. NRCE funds will be used for a variety of educational opportunities that will increase awareness and knowledge; promote critical thinking skills, and foster responsible stewardship. Some programs that are supported by NRCE funds include:

- **Envirothon** – The Envirothon, a year-long study program about natural resources for high schools that culminates with a state competition, is rapidly growing in North Dakota! Teams of five students from a school, club or organization are tested on their knowledge of forestry, water, wildlife, soils and a special environmental issue each year. North Dakota started the program in 2000 with four teams and in 2010 will be working with approximately ninety teams! Grant funds help provide forestry resources each fall to participating teams and help cover costs associated with running the three-day state competition in the spring. The Envirothon is an effective educational tool that nurtures environmentally aware high school students into action-oriented adults.



- **Arbor Day and Smokey Bear Poster Contests** - Some funds will be used to support the statewide poster contests. The funds will be used, in part, for the development, printing, postage and distribution of promotional flyers, prizes and an awards ceremony.
- **Teacher Center Network** – Some funds are targeted to support the Teacher Learning Centers across the state that promote forestry education efforts, such as the Arbor Day and Smokey Bear Poster Contests, Envirothon, plus set up and promotion of *Project Learning Tree* workshops and other special Forest Service events.
- **Coalition for Conservation and Environmental Education (C2E2)** - A portion of the grant funds assist with initiatives identified in the "ND Environmental Education Strategic State Plan," which was developed by C2E2 members and guides the operation. C2E2 is a non-profit made up of over forty natural resource agencies, organizations and individuals. The North Dakota Forest Service has served as one of the lead agencies in the Coalition.
- **Project Learning Tree** - The remainder of the NRCE funds will be retained by the North Dakota Forest Service and used to provide *Project Learning Tree* (PLT) professional development opportunities for K-12 educators; classroom visits, conservation and Eco-ed camps; and offset direct costs of books, communications, office and travel expenses incurred by the Information and Education coordinator. Special emphasis will be placed on tying PLT to the new North Dakota Studies curriculum recently developed for grades 4, 8 and 10.



5E. State Fire Assistance

State Fire Assistance (SFA) Program grant funds are an integral component in the implementation of planned strategies. They will be used to build the overall wildland fire prevention and suppression capacity of the various firefighting organizations by promoting and developing interagency cooperation; upgrading state suppression capabilities; and improving cooperative wildfire prevention, training and mitigation activities.

SFA monies will be used primarily to support operational aspects of wildland fire suppression in North Dakota, but will also include prevention efforts. In addition to our continued support of the North Dakota Fire Council and North Dakota Dispatch Center, activities planned include:

- **Multimedia Utilization** - Utilize all audio/visual (A/V) resources to produce training and prevention resources to educators, communities and fire departments. The A/V resources will include video, high definition video, web, computer, pro audio, computer audio, and live multimedia events.
- **Rangeland Fire Danger Index Signs Program** - Initiated in 2003, the NDFS obtained a guaranteed price from Roughrider Industries for the fabrication of Rural Fire Danger Index (RFDI) signs for distribution to rural fire departments. Rural fire departments match the cost of the signs with in-kind services associated with erecting the signs. We ask the departments to use the sign from April 1 through October 31 of each year, and base the index on the RFDI issued daily by the National Weather Service.

- **Community & Private Land Fire Planning and Hazard Mitigation** - Continue Community Firewise Landscaping and Wildfire Hazard Mitigation efforts initiated under the National Fire Plan. Cooperate with federal partners in identifying and implementing fuels reduction and mitigation projects across multiple land ownerships, such as the ponderosa pine breaks.
- **Hazard Mitigation on State Forests** - Evaluate potential hazard mitigation and fuels reduction opportunities to include prescribe burning regimes on our state forests that enhance the protection of private homeowners and their property from wildfire. Promote wildland fire awareness and prevention to state forest visitors.
- **Firewise Communities USA/Firewise ND** - Increase the promotion and visibility of these two programs. We will promote and distribute "FireWise ND" materials and Fire Risk assessments to fire departments, rural education programs, and communities across the state throughout the year. We are striving to create a fire prevention/information campaign created with video, audio, web and print based media.
- **State Fuels Committee** - Encourage the development of an interagency "State Fuels Committee" that provides a venue for cooperation, formal collaboration and raised awareness of fuels reduction/hazard mitigation partner projects, fulfilling the directives in the 10-Year Comprehensive Strategy and Interagency Fuels Memorandum of Understanding.
- **Communities at Risk Assessment** - Maintain the Communities at Risk Assessment in North Dakota, and work with the State Fuels Committee to improve and update the list.
- **Wildfire Awareness & Prevention** - Continue our general wildfire prevention message statewide and expand a more direct campaign focusing on the rural residents and expand the visibility of Smokey Bear. We will continue to provide resources to the state's K-12 educators focusing on agriculture classrooms and sponsorship to the state's second graders regarding the Smokey Bear poster contest. We will be working to develop rural fire department focus groups consisting of chiefs and local officials dealing with fire.
- **Federal Excess Personal Property (FEPP)** - Continue our efficient administration of the FEPP Program to augment the equipment and resources available to rural fire districts. We conduct a 100% physical inventory of FEPP equipment on a two-year rotation. Ensure a smooth integration of the Department of Defense Surplus Property Program into our existing framework and transition to the web-based FEPMIS Inventory System.
- **Rural Fire Department Training and Coordination** - Continually expand and enhance the comprehensive training and mentoring that has been established for fire departments. We are in the stages of developing a Wildland Fire Academy or Fire Sciences Curriculum in cooperation with several colleges. Approximately 12 classes are anticipated in 2010 that will target over 200 fire department personnel from multiple districts. In addition, we are working to produce a series of wildland training videos that focus on North Dakota's unique fuels and terrain. Training efforts consist of NWCG-sanctioned classes, qualifications currency and custodianship, and mobilization requirements.



- **IMT3 Development** - In the past few years, North Dakota has experienced an increasing number of wildfires that have reached the Type 3 management level. This level of complexity requires a minimum amount of management that is often unavailable at the local unit. The organization of a ND Zone Interagency IMT3 that will be capable of managing Type 3 complex fires that exceed local capabilities has been identified within the Zone and we are working towards the goal of being able to staff an IMT3 with ND Zone personnel along with a fire cache.
- **Fire Department Cooperative Fire Agreements (CFA)** - Finalize the revision and update of our agency's agreements with the state's 376 fire departments, and circulate for signatures. The CFA identifies guidelines for participation in NDFS Cooperative Fire and Prevention Programs, mutual aid, and mobilization through the national dispatch system.
- **Fire Suppression Task Force** - Provide technical guidance to the ND Division of Emergency Management in the continuation and enhancement of a State Fire Suppression Task Force designed to support rural fire districts during periods of extreme fire activity. Develop formation and usage protocols based upon the interagency Preparedness Plan.
- **Equipment Inspections** - The North Dakota Zone established an Equipment Committee to coordinate and conduct systematic inspections and sign-up procedures for fire departments and private equipment statewide for the purposes of emergency fire mobilization. Our agency has assumed a leadership role on this committee.
- **Firewise North Dakota** - This project encourages a behavioral and attitudinal change in the general public, civic leaders, government and tribal partners through Firewise assessments and management plans that outline specific wildfire safety recommendations. Landowners will receive a management plan that assesses fire risk within and adjacent to the property, and outlines prescriptions that address rural interface concerns. Financial assistance may be provided to protect homes, work areas, barns and other facilities. Landowners will use this funding to install Firewise practices and "vegetative fuelbreaks" around their properties on a cost-shared basis. A vegetative fuelbreak is designed to slow the spread of wildfire and gives rural firefighters an opportunity to defend isolated, scattered home sites. Firewise practices are also designed to enhance the survivability of property from wildfire.
- **NDFS Engine Strike Team** - The organization of an NDFS engine strike team was initiated in 2003 with the development of two Type 6 engines. The purpose of the strike team is to provide RFDs with support and fireline supervision capabilities during major incidents. We will continue the development of a seasonal engine crew in 2010. The engines will be available for mobilization through the national dispatch system.
- **GSA Access** - A systematic and manageable method for rural fire departments to purchase limited wildfire personal protective clothing and equipment from GSA through the State Forester's Office was established in 2002. We continue to review and revise the equipment availability schedule to increase the effectiveness and visibility of the program.



- **Interagency Annual Operating Plan (AOP) and Preparedness Plan** The North Dakota Forest Service continues to maintain an Annual Operating Plan with the USFS Dakota Prairie Grasslands and National Park Service – North Dakota Parks Group. The AOP addresses all aspects of fire business and management between the signing agencies. The Preparedness Plan is a fully interagency document in the North Dakota Zone that details planning levels and tasks and responsibilities of partner agencies at each threshold.
- **State Emergency Operations Plan (SEOP)** - Continual review and revision of the State Emergency Operations Wildfire Response Plan in order to harmonize it with the National Interagency Incident Mobilization System to ensure maximum firefighter and public safety. Critical positions need to be filled by the NDFS in order to meet our obligations identified in the SEOP, and training opportunities are targeted to meet those needs.

5F. Volunteer Fire Assistance

The funding provided through the Volunteer Fire Assistance (VFA) Program is used to provide financial and technical assistance to organize, train and equip North Dakota's 376 rural fire departments and districts.



For eight years (in 2010) the agency has combined delivery of VFA and USDOJ Rural Fire Assistance (RFA) funds (if the RFA funds are available) through the Cooperative Fire Protection Assistance (CFPA) Grants Program. This expanded partnership affords an opportunity to North Dakota's rural fire departments to enhance their firefighting capacity by maximizing assistance potential; minimizing duplication of efforts; and increasing the effectiveness and efficiency of program delivery.

The CFPA Grants Committee has been expanded to include representatives from the USDOJ Fish & Wildlife Service and Bureau of Land Management, in addition to individuals from the North Dakota Firefighter's Association, State Fire Marshal, USDA Forest Service and ND Forest Service. The committee establishes priorities based upon input from local cooperators, and determines funding allocations to fire departments and fire protection districts. Grants are awarded to rural fire departments using an application and reimbursement process based upon the year's established priorities.

A portion of funding provided through the Volunteer Fire Assistance Program will be used to enhance current wildland training opportunities for rural fire department personnel. Remaining funds will be used to supplement the Cooperative Fire Protection Assistance (CFPA) Grants Program. Requests from fire departments for wildland personal protective clothing, wildland communications, wildland equipment, prevention and wildland training will be used to provide financial assistance to those departments that qualified for 90% cost share (if 90% cost share is available), but due to funding limitations do not receive RFA grant funds.

Program funding priorities:

- Coordinate and host NWCG-sanctioned wildland fire management courses at various locations around North Dakota. This will include, but not limited to, the various training materials necessary for successful courses.
- Continued support and expansion of wildfire training courses offered to rural fire departments at state and regional fire schools, with the goal of training a minimum of 100 RFD personnel.
- Scholarships to fire department personnel pursuing advanced (200 level and above) NWCG wildland fire training.
- Assist rural fire districts in the purchase of wildland personal protective gear and equipment, primarily Nomex clothing and fire shelters, water-handling apparatus and appliances, and wildland firefighting tools.
- Provide cost-share funds to rural fire districts that have received Federal Excess Personal Property (FEPP) equipment and Firefighter Property Program (FFP), in order to assist them with renovation, repairs and reconditioning.
- Assist rural fire districts in the purchase of structural personal protective gear and equipment, including turnout gear, breathing apparatus, large diameter hose and trunk lines, venting saws and exhaust fans.
- Assist rural fire districts in the implementation of the National Fire Incident Reporting System (NFIRS). Cost-share will be provided for the purchase of computers, NFIRS software and/or NFIRS training opportunities.
- Provide financial assistance to rural fire districts to upgrade communications equipment in order to adhere to the State Radio Digital Migration Plan. P-25 compliant digital radios, analog radios that are upgradeable to P-25 digital compliance, and radios able to operated in mixed mode will be the highest priority.



Section 6. Translating Strategies to Annual Actions

The coordination with partners and potential stakeholders provided a framework to begin formulating actions to address issues. The state strategy will be used to develop a long range (5-year) and annual action plan that contain more detailed information and budgets. Coordination with stakeholders involved with the assessment and strategy process, coupled with the state action plans, will be utilized for grant proposal development and eventual narrative development for USFS funds.

The North Dakota Forest Service assembled a comprehensive statewide forest resource planning team to develop the Statewide Forest Resources Assessment and Forest Resource Strategy. The State Forester created a core team composed of the following representatives:

- NDFS – Forestry and Fire Management Assistance team members.
- NDSU Geo Sciences – Department Chair and staff
- Liaisons from the Western Forestry Leadership Coalition and the USDA Forest Service Regions 1/4 State Private Forestry Staff

The core team designated a team leader, established planning priorities, developed planning products, and solicited input from partner organizations during 2009 and 2010. The State Forester invited representation from the following agencies to consult with the core planning team including:

- ND Game and Fish Department
- ND Health Department
- ND Water Commission
- ND Parks and Recreation Department
- ND Department of Agriculture
- ND Department of Commerce
- NDSU Extension Service (including State Soil Conservation Committee)
- ND Division of Emergency Services
- ND Urban and Community Forestry Association
- ND Tribes
- USDA Forest Service Dakota Prairie Grasslands
- USDA Natural Resources Conservation Service including watershed coordinators
- The Nature Conservancy
- North Dakota Association of Soil Conservation Districts
- County Emergency Managers

The NDFS will continue to solicit advisory committee involvement in the development of competitive grants and delivery of non-competitive S&PF funds to implement projects that address issues outlined in the North Dakota Statewide Assessment of Forest Resources and Forest Resource Strategy. Such topics will be placed on the agendas for the ND Community Forestry Council, State Stewardship Coordinating Committee, and the NDSU Extension Forestry Advisory Committee meetings. Advisory council volunteers will be invited to consult with the core planning team.

Section 7. Monitoring and Reporting

The NDFS has identified which S&PF performance measures and other measures that will be used to measure accomplishments for each strategy and has incorporated the agency's 'accountability measures' as proposed measures of success. In addition, the NDFS in collaboration with North Dakota State University- Department of Geosciences proposes to develop an on-line forest resource threat mitigation response and spatial accomplishment reporting mechanism. This integrated real-time web-portal interface will be linked to the forestry decision support system located at <http://ndfsdss.ndsu.nodak.edu/>. This portal is designed to specifically: serve as a city, county, state and federal reporting mechanism for NDFS and affiliated partner forestry management accomplishments; a locale identifier; a tracking and monitoring geospatial interface; and a public resource to monitor or track threats or vulnerabilities including invasive species, catastrophic wildfire, climate change and forest conversion.

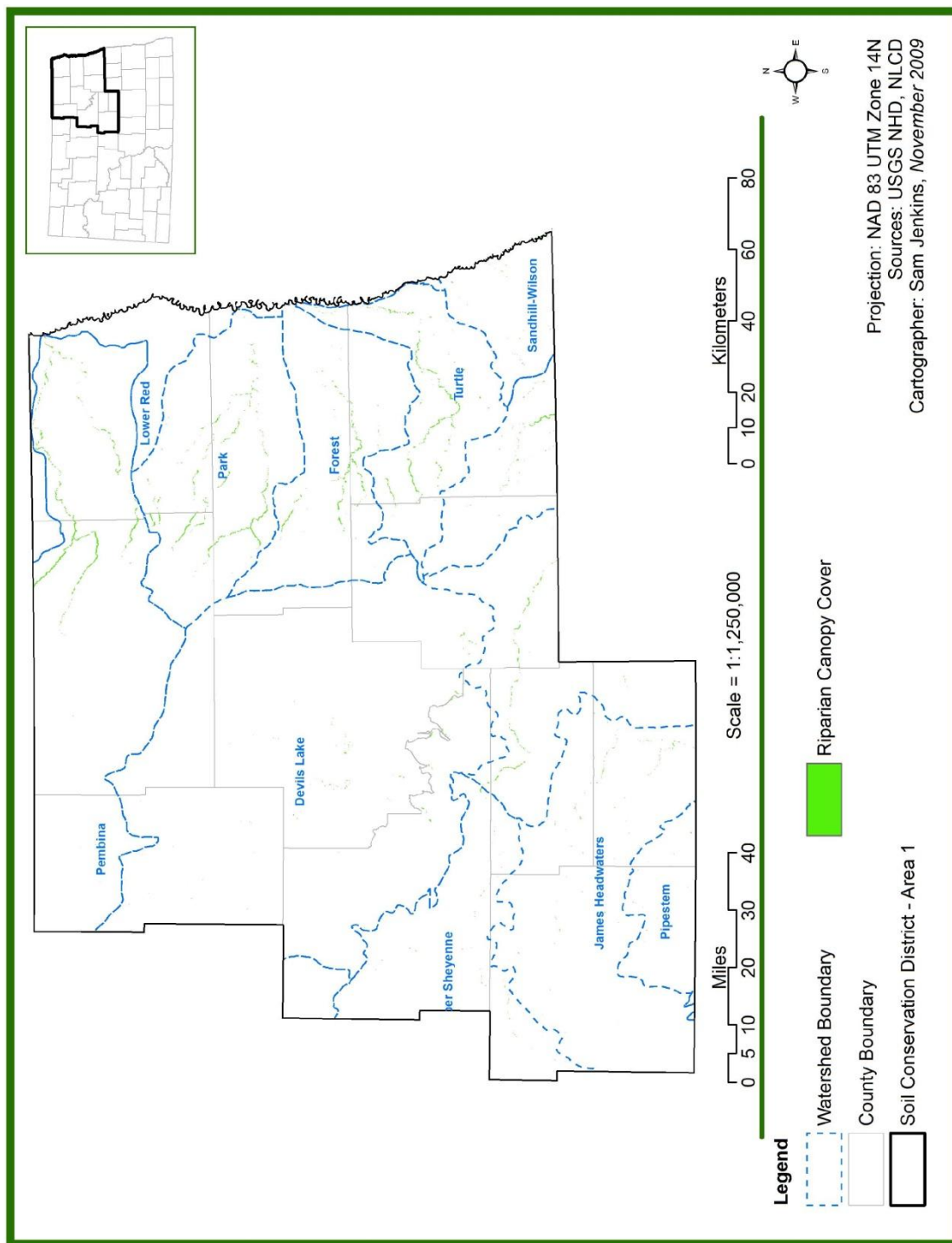


Literature Cited

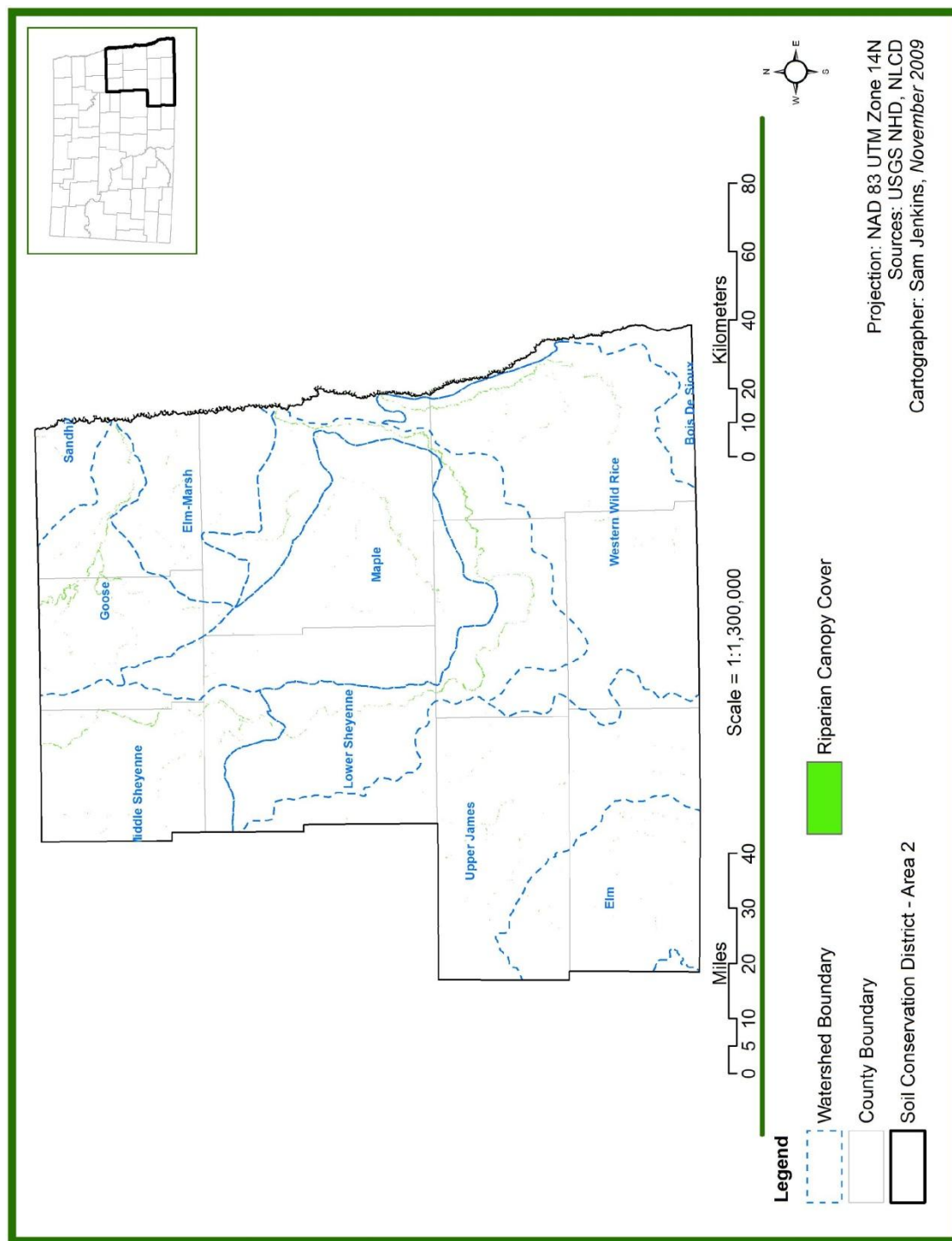
- Ball, J.J. 1997. *Restoration of Bottomland Forests: Challenges and Opportunities*. Proceedings of the North Dakota Academy of Science. Volume 51. supplement 1. pp 40-43.
- Burns, Russell M., and Barbara H. Honkala, technical coordinators. 1990. *Silvics of North America: 1. Conifers; 2. Hardwoods*. Agriculture Handbook 654. Washington, DC: U.S. Department of Agriculture, Forest Service. Volume 2, 877 p.
- Hagen, Sandra K., Patrick T. Isakson, and Steve R. Dyke. 2005. *North Dakota Comprehensive Wildlife Conservation Strategy*. North Dakota Game and Fish Department. Bismarck, ND. 454 pp.
- Harniss, R.O. 1981. *Ecological Succession in Aspen and its Consequences on Multiple Use Values*. In: DeByle, N.V., editor. Symposium proceedings, Situation management of two intermountain species: aspen and coyotes. Aspen. Logan, UT: Utah State University. Volume 1, pp 31-39.
- Haugen, David E., Michael Kangas, Susan J. Crocker, Charles H. Perry, Christopher W. Woodall,; Brett J. Butler, Barry Wilson, Dan J. Kaisershot. 2009. *North Dakota's Forests 2005*. Resource Bulletin NRS-31. Newtown Square, PA: U.S. Department of Agriculture, Forest Service, Northern Research Station. 82 p.
- Haugen, D.E., R. J. Piva, N. P. Kingsley, R.A. Harsel. 1999. *North Dakota's Forest Resources, 1994*. Research Paper NC-336. St. Paul, MN: US Department of Agriculture, Forest Service, North Central Research Station. 101 p.
- Kangas, M. 2007. *North Dakota Forest Health Report 2005 – 2006*. Bottineau, ND: North Dakota Forest Service. 16 p.
- North Dakota Forest Service. 2009. *North Dakota Forest Service Fire Management Program*.
http://www.ndsu.edu/ndfs/fire_management/
- Oduor, P; L.Kotchman. 2007. *North Dakota Spatial Analysis Project. 2007*. Bottineau, ND: North Dakota Forest Service. 127p.
- Peper, Paula J. et al., 2004. *City of Bismarck, North Dakota Street Tree Resource Analysis*. Center for Urban Forest Research. Davis, CA: University of California, U.S. Department of Agriculture, Forest Service, Pacific Southwest Research Station. 64 p.
- Perala D.A. 1990. Quaking aspen. In: Burns, Russell M., and Barbara H. Honkala, technical Coordinators. 1990. *Silvics of North America: 1. Conifers, 2. Hardwoods*. Agriculture Handbook 654. Washington, DC: U.S.
- Rush, David. 2003. *Red River Basin Riparian Project Phase II*. Section 319 Nonpoint Source Pollution Control Program. Red River Regional Council. US EPA Region VIII. 36pp.
- US Census Bureau. 2000. *Census of Population and Housing*. Washington DC: US Department of Commerce.
- US Department of Commerce, 2005. *2002 Census of Manufacturers*. Washington, DC: US Department of Commerce. Economics and Statistics Administration. Bureau of the Census.
- US Global Change Research Program, 2001. *Forests: The potential consequences of climate variability and change*. A report of the national forest assessment group. USDA Washington DC. 8 p.

Appendix

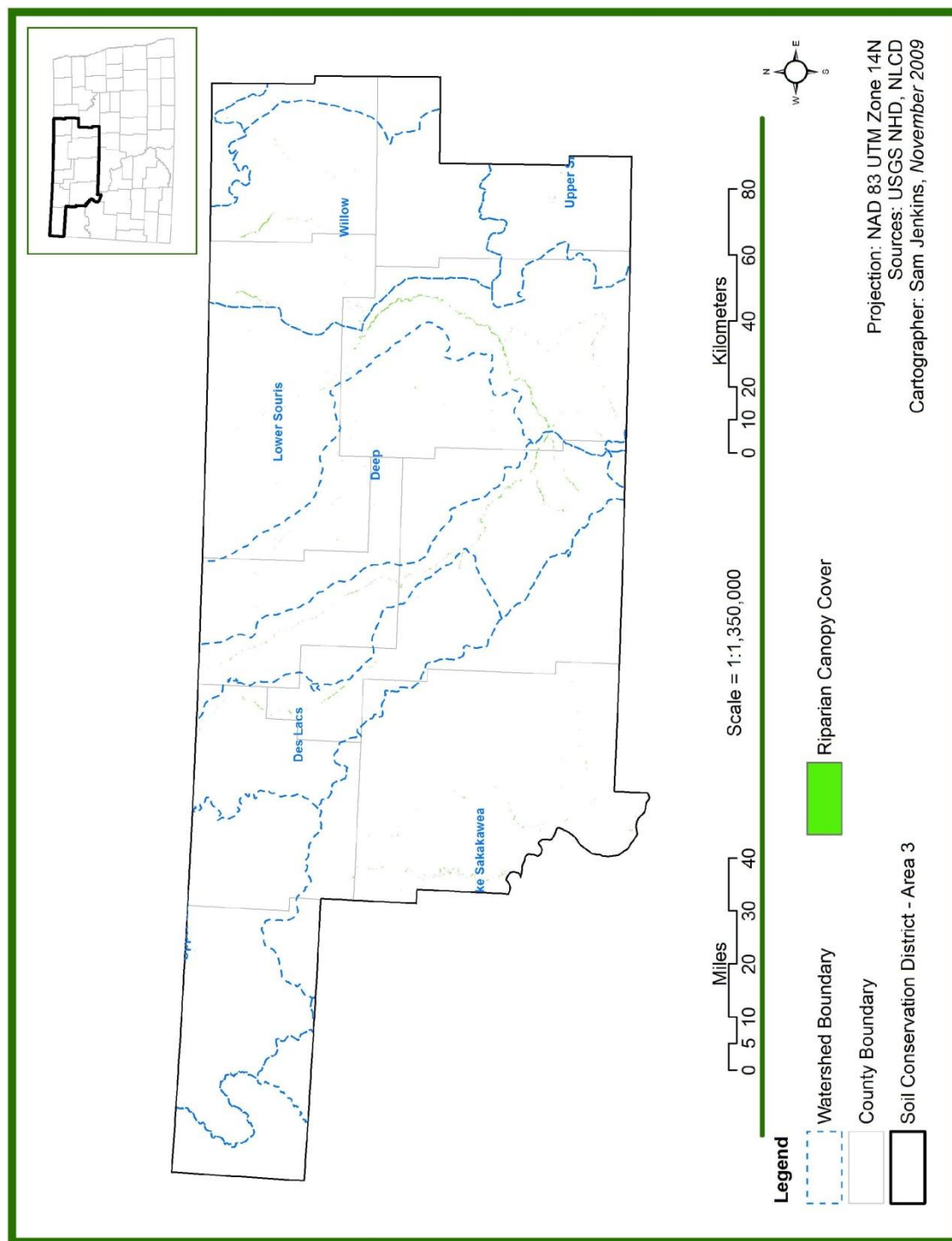
Map 1. SCD Area 1 Riparian Forests.



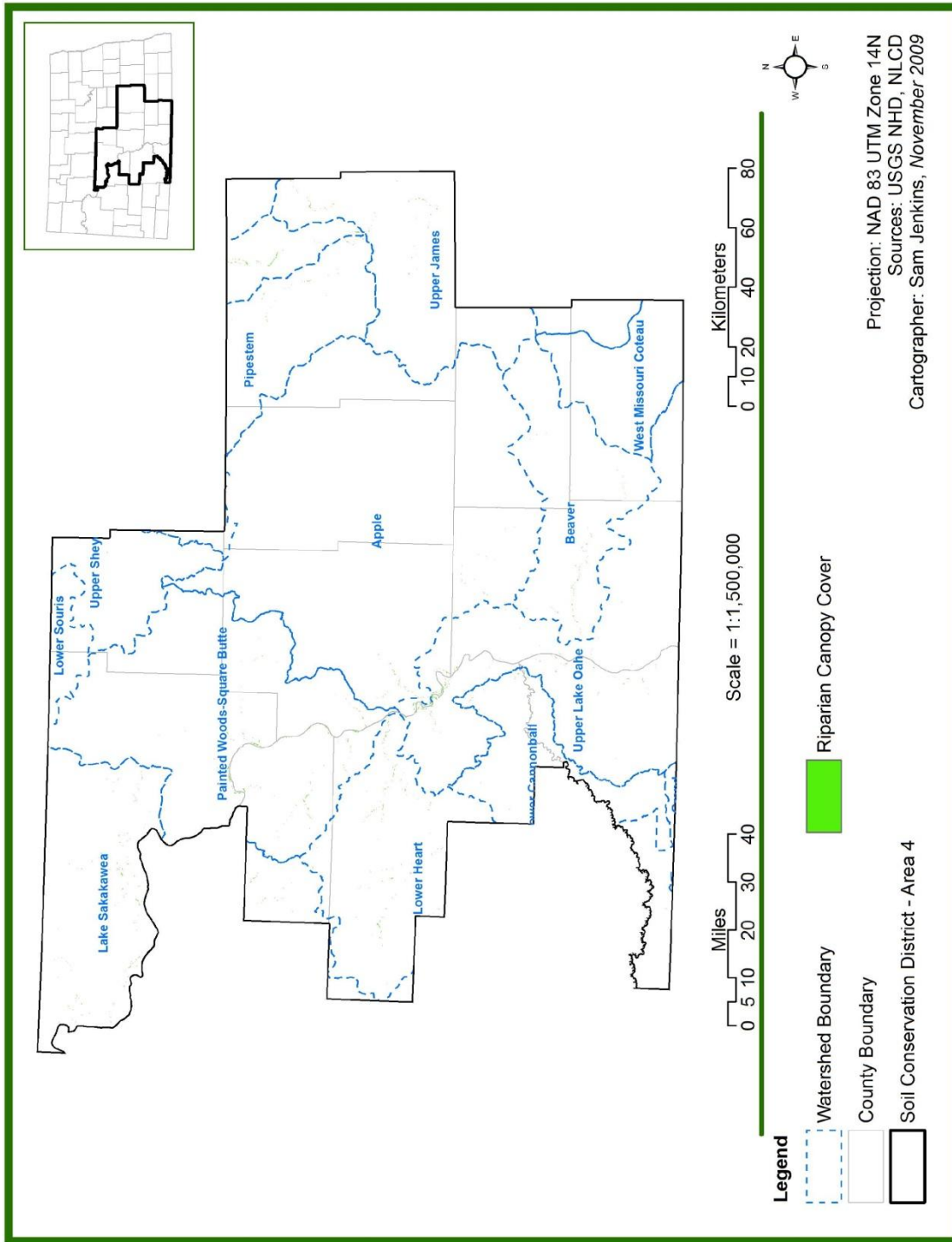
Map 2. SCD Area 2 Riparian Forests.



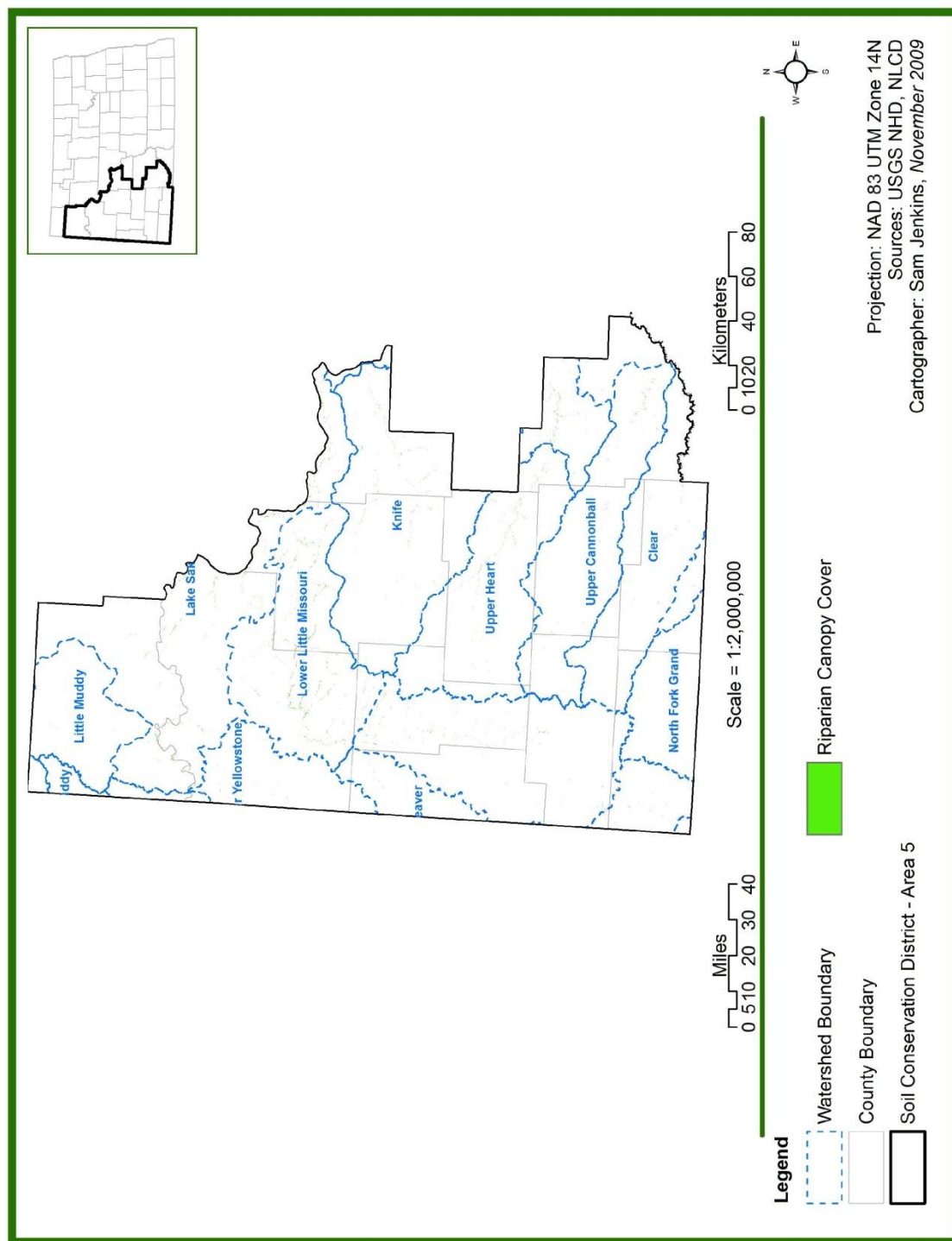
Map 3. SCD Area 3 Riparian Forests.



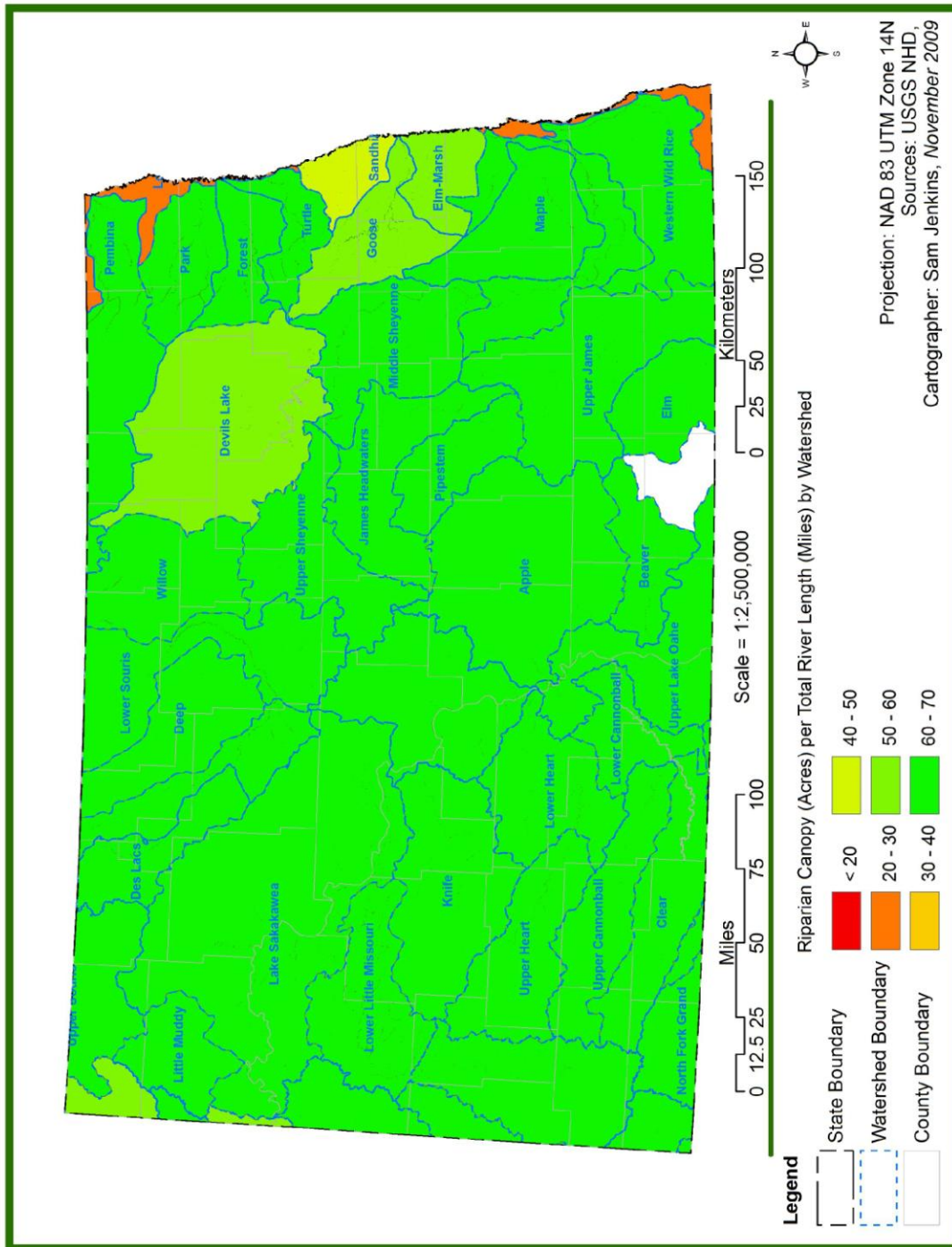
Map 4. SCD Area 4 Riparian Forests.



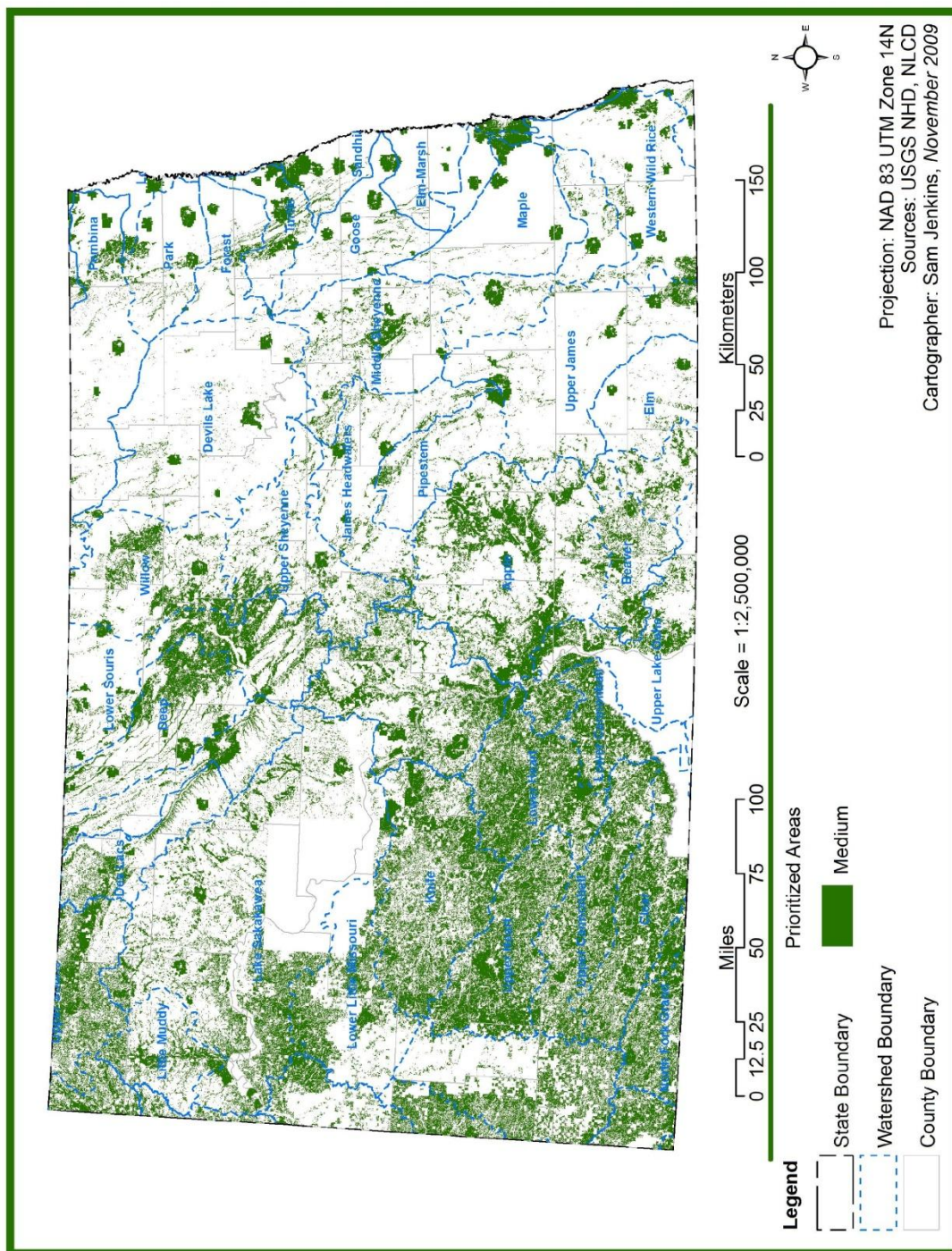
Map 5. SCD Area 5 Riparian Forests.



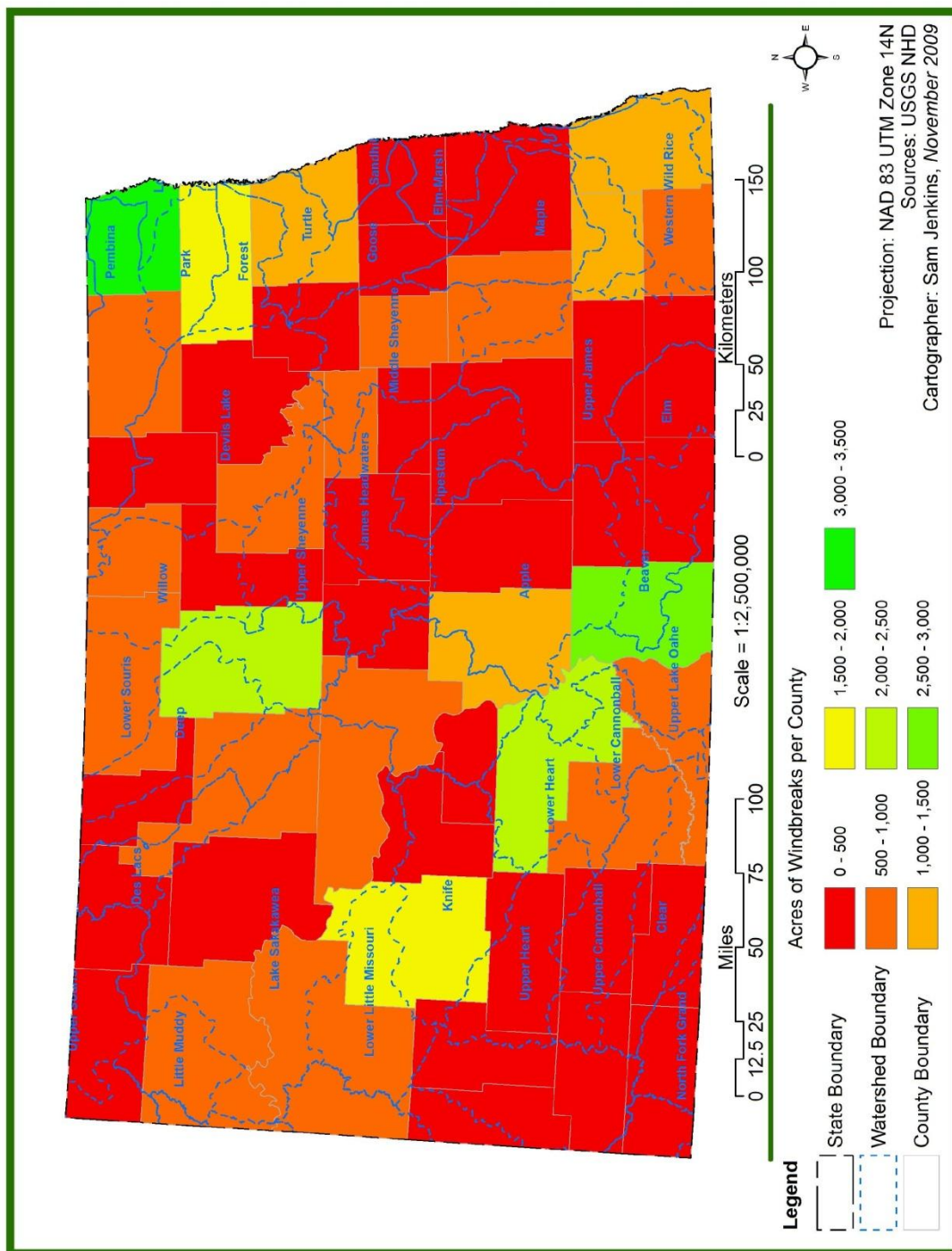
Map 6 Ratio of Riparian Forest Cover / River Length



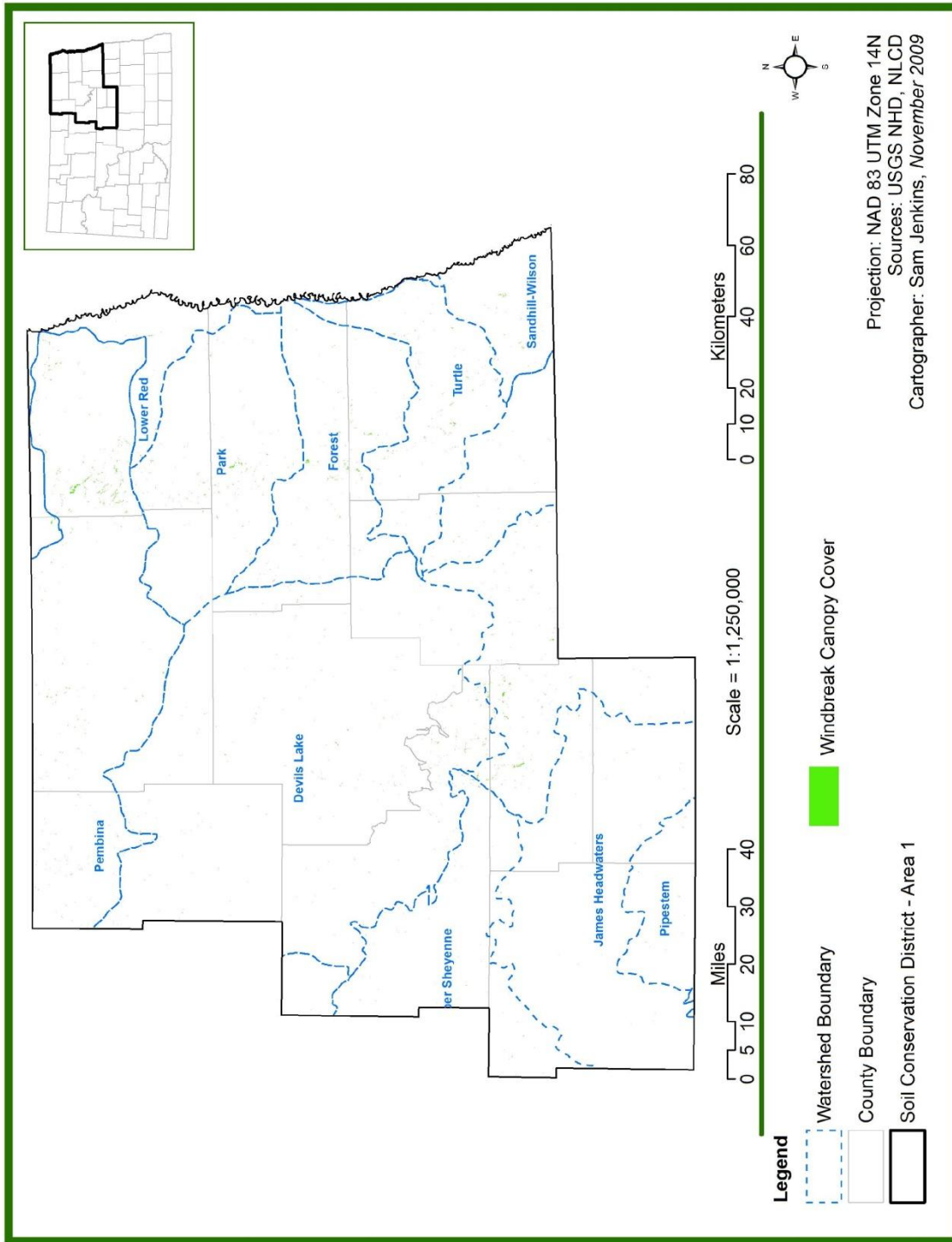
Map 9. Medium Priority Areas for North Dakota – Spatial Analysis Project



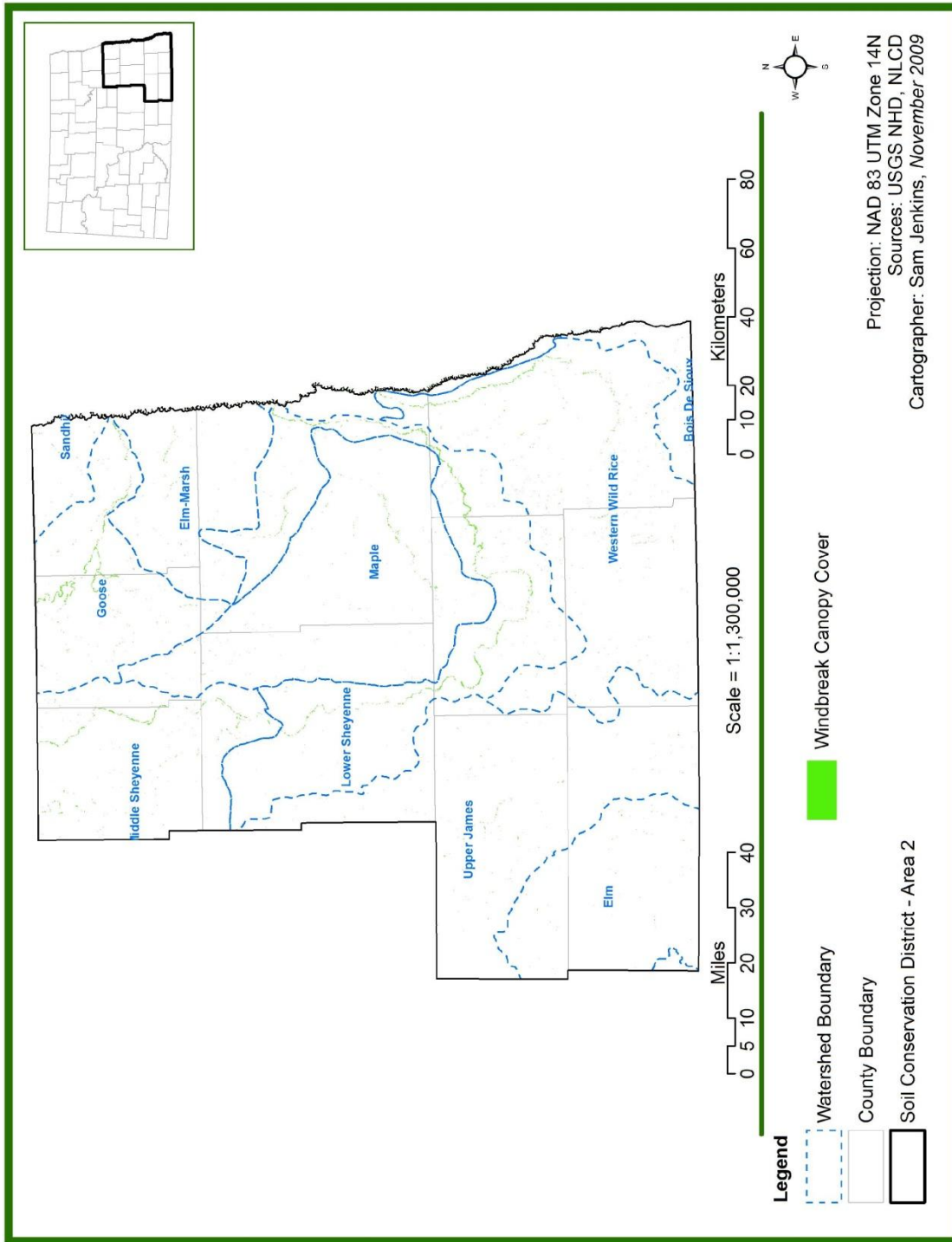
Map 11. Acres of Windbreaks by county in North Dakota



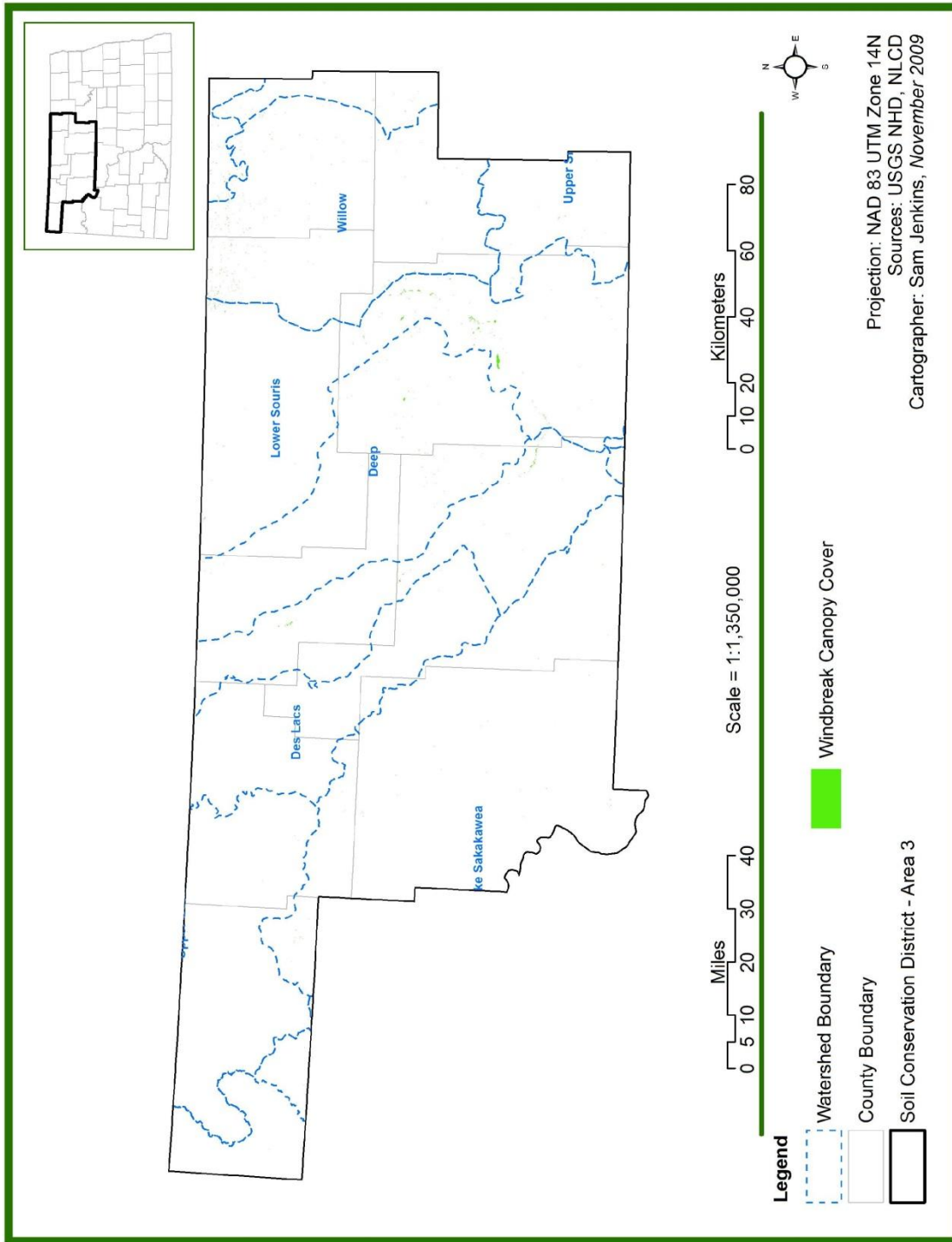
Map 13. SCD Area 1 Windbreaks



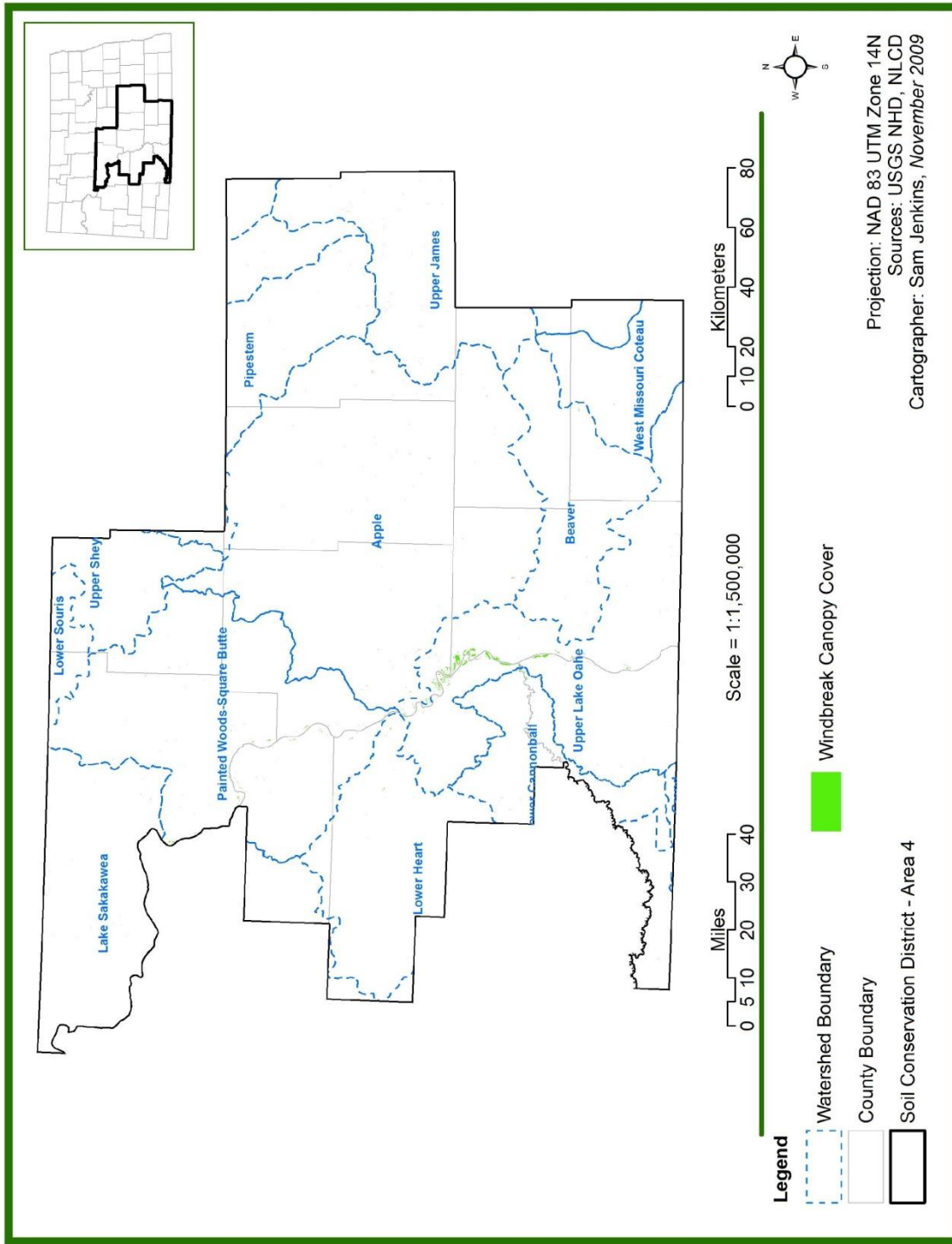
Map 14. SCD Area 2 Windbreaks



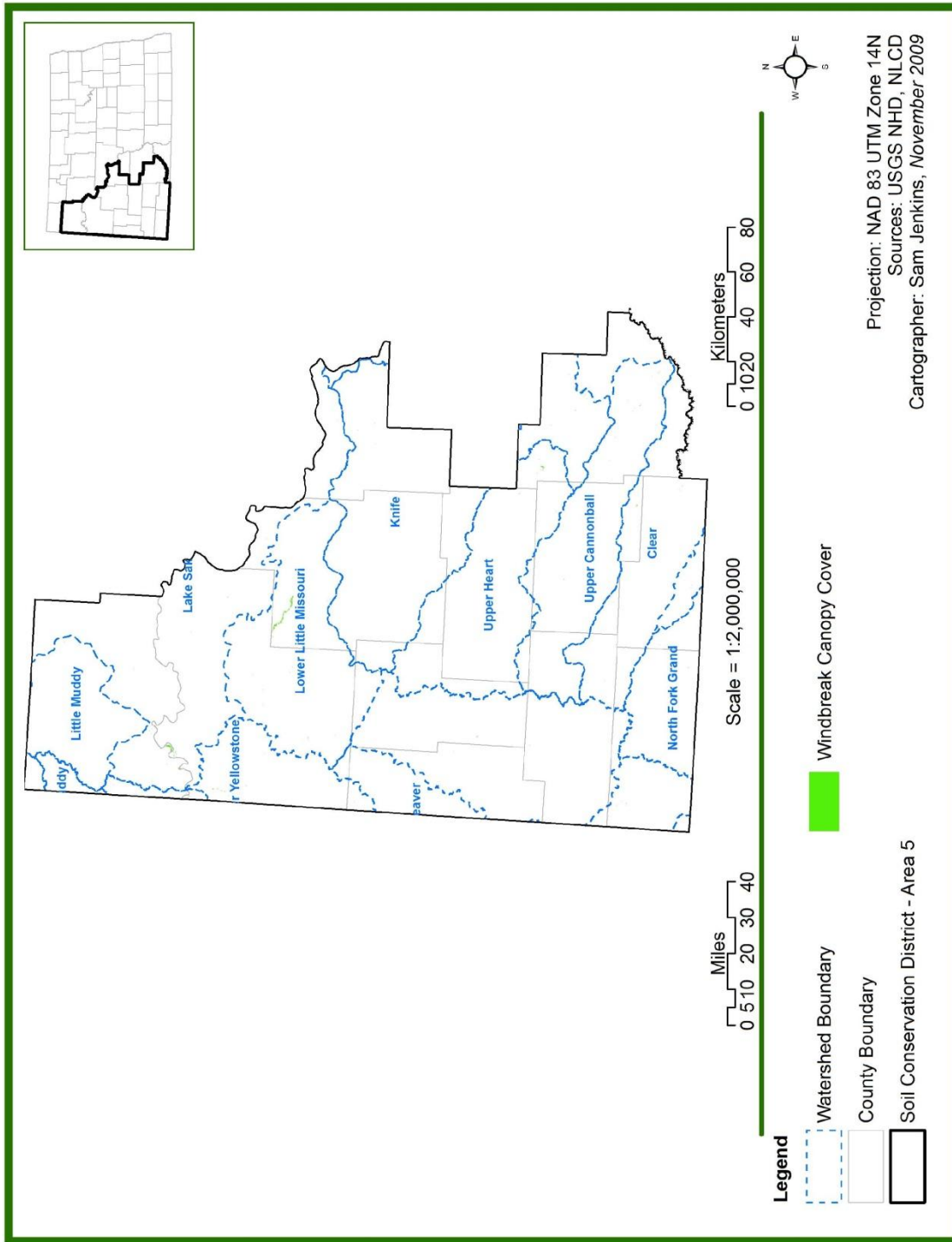
Map 15. SCD Area 3 Windbreaks



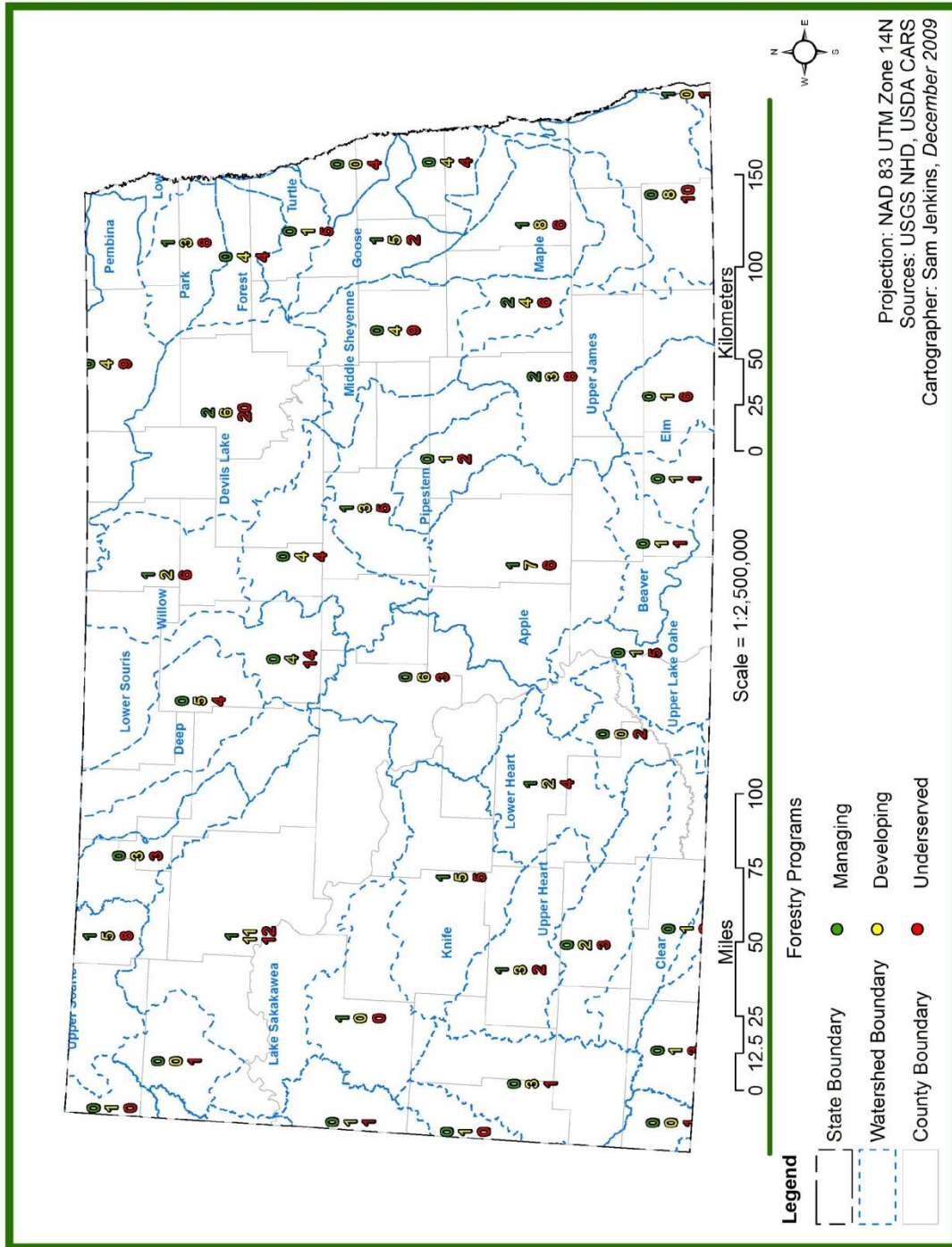
Map 16. SCD Area 4 Windbreaks



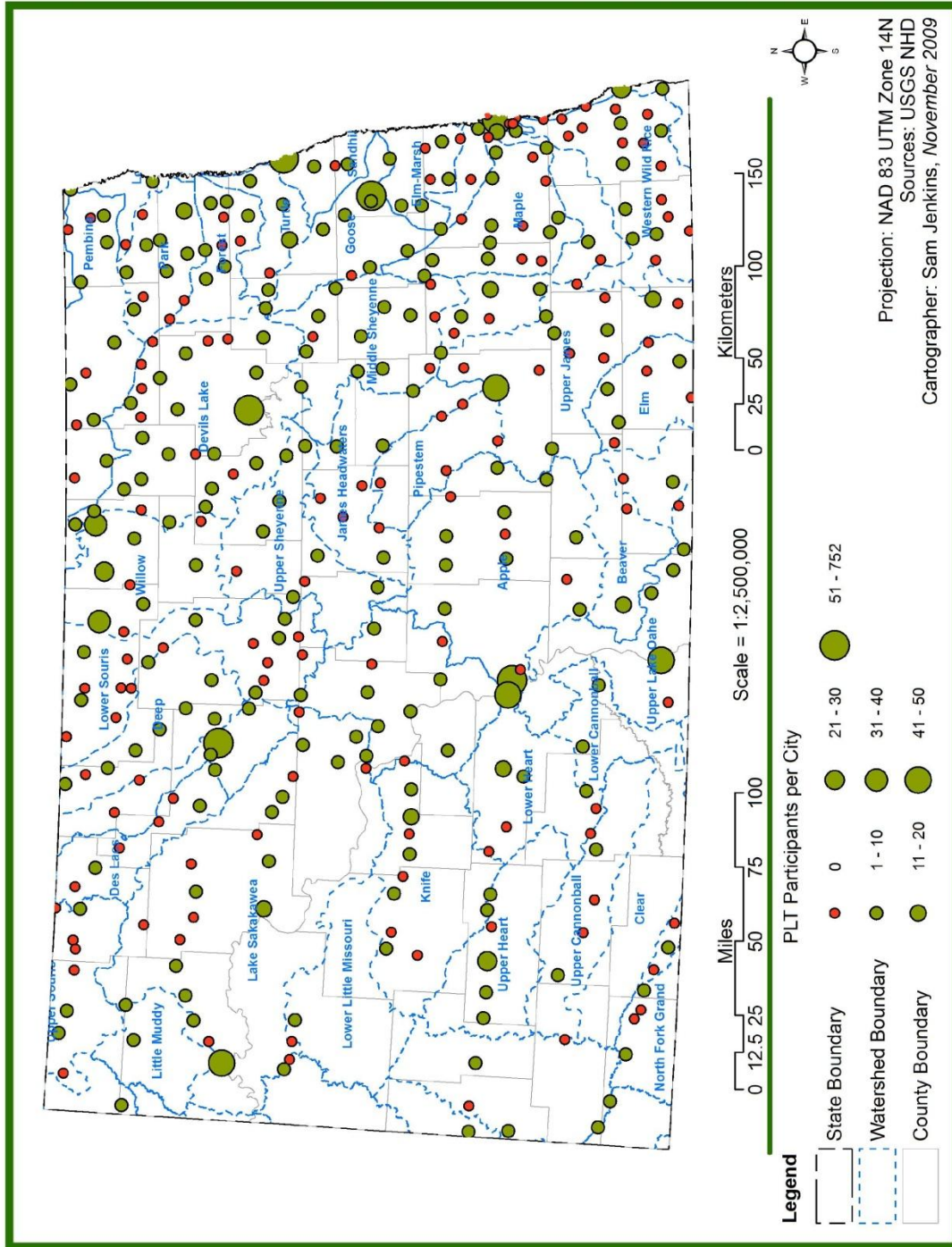
Map 17. SCD Area 5 Windbreaks



Map 19. Community Forestry Programs by Watershed



Map 20. Number of Project Learning Tree Workshop Attendees by Community (1986-2009)



Appendix A – Strategy Matrix

Issue 1: Invasive Tree Pests and Weeds Effects on Forest Resources

Strategy	Priority Area	Programs that Contribute	Potential Stakeholders	Resources Required	Measures of Success	Supports National Objectives
<p>Assist communities in planning to mitigate potential damage caused by invasive tree pests</p> <p>Develop multi-agency task force to develop a state (and/or community) invasive action plan</p>	Communities	Urban and Community Forestry Grants Tree inventories S&PF UCF S&PF FH S&PF NRCE	Master Gardeners Arborists Utility Companies League of Cities NDUCFA Extension USFS Media PSC	Partnerships Funding I&E Inventory Data (incl GIS) Targeted Grant Program EAB Response Plan Community Planning efforts Wood Utilization opp. S&PF UCF S&PF FH	Percentage of communities with an Invasive tree pest response and readiness plan State (and/or community) invasive action plan is developed	2.2 1.2 1.1
<p>Restore Native Forests impacted by Invasive Tree Pests (EAB, gypsy moth, ALB) and Invasive weeds (buckthorn, Russian olive, saltcedar, etc..)</p>	Native Forests (upland and riparian)	319 projects USDA prog – CRP, EQIP, CREP, WHIP Tree Promotion mtg S&PF FSP S&PF FH S&PF SFA (prescribed fire effects on weeds or dead ash) S&PF NRCE	NDG&F Private Landowners State health Dept and local 319 sponsor BLM Water Resource Dists River Keepers Nature Conservancy BIA Audubon soc NPS Extension USFS Media PSC NRCS NDASCD APHIS NDDA	Partnerships Funding I&E Inventory Data (incl GIS) Targeted Grant Program Wood Utilization opp. S&PF FSP S&PF FH	# of acres being managed sustainably as def by FSP % of at-risk forests surveyed for damaging agents (NDFS acc meas 11)	2.2 1.2 1.1

Reduce risk of introduction in areas where risk of introduction is greatest Development of a first detectors program	Campgrounds, Travel corridors, nurseries	CAPS and other detection projects Firewood restrictions First Detector training S&PF UCF S&PF FH S&PF NRCE	APHIS NDDA NDP&R Master Gardeners Arborists Utility Companies League of Cities NDUCFA NPS Extension USFS Media PSC GPI states – SD, NE, and KS	Partnerships Funding I&E Inventory Data (incl GIS) Targeted Grant Program EAB Response Plan Survey equipment S&PF UCF S&PF FH	# and % of forest acres that are surveyed for invasive threats # of people (person days) engaged in environmental stewardship activities (including detection activities) as part of S&PF program # of persons trained in first detector training	2.2 1.2 1.1 3.6
Development of a first detectors program		S&PF UCF S&PF FH S&PF NRCE	League of Cities NDUCFA NPS Extension USFS Media PSC GPI states – SD, NE, and KS	Survey equipment S&PF UCF S&PF FH	Environmental Stewardship activities (including detection activities) as part of S&PF program # of persons trained in first detector training	
Restore/renovate rural tree plantings impacted by Invasive Tree Pests (EAB, gypsy moth, ALB) and Invasive weeds (buckthorn, Russian olive, saltcedar, etc.)	Rural agricultural tree plantings	USDA prog – CRP, EQIP, CREP, WHIP Tree Promotion mtg S&PF FSP S&PF FH S&PF SFA S&PF NRCE	Private Landowners Water Resource Dists BIA Extension USFS Media PSC NRCS NDASCD	Partnerships Funding I&E Inventory Data (incl GIS) Targeted Grant Program Wood Utilization opp. S&PF FSP S&PF FH	# of ac being managed sustainably as def by FSP # of acres treated	2.2 1.2 1.1

Issue 2: Over Maturity of Forest Resources Coupled with Limited Natural Regeneration

Strategy	Priority Area	Programs that Contribute	Potential Stakeholders	Resources Required	Measures of Success	Supports National Objectives
<p>Identify, conserve, and actively manage high priority native forest lands</p> <p>Development of incentives and cost-effective measures for management (harvesting, Rx burn, thinning)</p> <p>Promote Forest health concepts to reduce grazing, inv, promote management</p>	Turtle Mountains	Forest Conservation Program NRCS-Forest Reserve Program Fuels Reduction/mitigation efforts State Wildlife Action Plan Fuels for Schools Firewise Natural Heritage Program EQIP, WHIP BIA RC&D S&PF FSP, SFA, & FH, & NRCE	Private Landowners NDG&FD NDP&RD BIA/Tribal govts USFS NDASCD NRCS C2E2 Wildlife groups Extension	Partnerships Funding I&E Inventory data (incl GIS) Equipment Native nursery stock Management tools incl Fire Demonstration areas Cost share Wood utilization opps S&PF FSP, FM, & FH	# of acres being managed sustainably as def by FSP % of family forest acreage in active management and/or protected (NDFS acc meas 9) # of acres treated	1.1 1.2 3.4 3.5
<p>Identify, conserve, and actively manage high priority native forest lands</p>	Pembina Gorge	Forest Conservation Program NRCS-Forest Reserve Program Fuels Reduction/mitigation efforts State Wildlife Action Plan Fuels for Schools Firewise Natural Heritage Program EQIP, WHIP BIA RC&D S&PF FSP, SFA, & FH & NRCE	Private Landowners NDG&FD NDP&RD BIA/Tribal govts USFS NDASCD NRCS C2E2 Wildlife groups Extension	Partnerships Funding I&E Inventory data (incl GIS) Equipment Native nursery stock Management tools incl Fire Demonstration areas Cost share Wood utilization opps S&PF FSP, FM, & FH	# of acres being managed sustainably as def by FSP % of family forest acreage in active management and/or protected (NDFS acc meas 9) # of acres treated	1.1 1.2 3.4 3.5
<p>Identify, conserve, and actively manage high priority native forest lands</p>	Missouri River Bottoms (including SD)	Forest Conservation Program NRCS-Forest Reserve Program Fuels Reduction/mitigation efforts State Wildlife Action Plan Fuels for Schools Firewise Natural Heritage Program EQIP, WHIP	Private Landowners NDG&FD NDP&RD BIA/Tribal govts USFS NDASCD NRCS C2E2 Wildlife groups Water Resource Dists State Health Dept and local 319 sponsor	Partnerships Funding I&E Inventory data (incl GIS) Equipment Native nursery stock Management tools incl Fire Demonstration areas Cost share Wood utilization opps S&PF FSP, FM, & FH	# of acres being managed sustainably as def by FSP % of family forest acreage in active management and/or protected (NDFS acc meas 9) # of acres	1.1 1.2 3.1 3.4 3.5

Strategy	Priority Area	Programs that Contribute	Potential Stakeholders	Resources Required	Measures of Success	Supports National Objectives
		BIA RC&D MRRIC/MRERP S&PF FSP, SFA, & FH& NRCE	Corps of Eng EPA Bur of Recl Extension Water Commision PSC City Foresters SDDA Div RCF		treated	
Identify, conserve, and actively manage high priority native forest lands	Other River Corridors	Forest Conservation Program NRCS-Forest Reserve Program Fuels Reduction/mitigation efforts State Wildlife Action Plan Fuels for Schools Firewise Natural Heritage Program EQIP, WHIP BIA RC&D S&PF FSP, SFA, & FH& NRCE	Private Landowners NDG&FD NDP&RD BIA/Tribal govts USFS NDASCD NRCS C2E2 Wildlife groups Water Resource Dists State Health Dept and local 319 sponsor Corps of Eng EPA Bur of Recl Extension Water Commision PSC City Foresters	Partnerships Funding I&E Inventory data (incl GIS) Equipment Native nursery stock Management tools incl Fire Demonstration areas Cost share Wood utilization opps S&PF FSP, FM, & FH	# of acres being managed sustainably as def by FSP % of family forest acreage in active management and/or protected (NDFS acc meas 9) # of acres treated	1.1 1.2 3.1 3.4 3.5
Identify, conserve, and actively manage high priority native forest lands	Devils lake Hills	Forest Conservation Program NRCS-Forest Reserve Program Fuels Reduction/mitigation efforts State Wildlife Action Plan Fuels for Schools Firewise Natural Heritage Program EQIP, WHIP BIA RC&D S&PF FSP, SFA, & FH& NRCE	Private Landowners NDG&FD NDP&RD BIA/Tribal govts USFS NDASCD NRCS C2E2 Wildlife groups ND Nat Guard Extension	Partnerships Funding I&E Inventory data (incl GIS) Equipment Native nursery stock Management tools incl Fire Demonstration areas Cost share Wood utilization opps S&PF FSP, FM, & FH	# of acres being managed sustainably as def by FSP % of family forest acreage in active management and/or protected (NDFS acc meas 9) # of acres treated	1.1 1.2 3.1 3.4 3.5

Issue 3: Conversion From Historic Vegetation Type

Strategy	Priority Area	Programs that Contribute	Potential Stakeholders	Resources Required	Measures of Success	Supports National Objectives
Mitigate forestland lost due to urban sprawl, agricultural clearing, and utility development	Riparian forests	USDA prog – CRP, EWP State Wildlife Grants 319 projects Missouri river Master Manual T&E species WUI WOGI S&PF UCF, FSP, FSA, NRCE	Water Resource Dists USFS SSCC NDASCD NRCS City Foresters Extension NDP&RD NDG&F C2E2 State Health and Local 310 sponsors Private landowners USFWS Corps of Eng EPA Bur of Recl 'friends of' groups MRRIC/MRERP Red R intern Joint commission Tribal govts Grazing associations	Technical and financial info Inventory data (incl GIS) Mitigation opps I&E S&PF UCF, FSP	# of trees and shrubs planted	1.1 1.2 3.1 3.7
Incorporate management techniques and/or disturbances that promote/sustain terrestrial ecosystems Develop learn and teach methods to remove nuisance woody plants	Woody plant encroachment into grasslands	USDA prog – CRP, EWP State Wildlife Grants T&E species WUI WOGI S&PF FSP, SFA	USFS SSCC NDASCD NRCS USFWS Extension NDP&RD NDG&F C2E2 Bur of Recl 'friends of' groups Tribal govts Grazing associations	Technical and financial info Inventory data (incl GIS) Mitigation opps I&E Management tools incl Fire S&PF FSP, FM	# of acres treated	2.1 1.2 3.5
Mitigate forestland lost due to urban sprawl, agricultural clearing, and utility development	Turtle mountains	USDA prog – CRP, EWP State Wildlife Grants T&E species WUI WOGI S&PF FSP, SFA	USFS SSCC NDASCD NRCS Extension NDP&RD NDG&F C2E2 'friends of' groups Tribal govts Grazing associations	Technical and financial info Inventory data (incl GIS) Mitigation opps I&E S&PF FSP	# of trees and shrubs planted	1.1 1.2 3.5 3.7

Issue 4: Wildfire

Strategy	Priority Area	Programs that Contribute	Potential Stakeholders	Resources Required	Measures of Success	Supports National Objectives
Assist communities in planning for and reducing wildfire risks	WUI (incl CWPP's, industrial interface, other infrastructure, etc...)	CWPP's WUI Tribal Programs Firewise VFD's training State Fire School FEPP program S&PF UCF, SFA,VFA, NRCE	Oil and Gas Industry ND Fire Council NDFS Dept of Emergency Serv County Emerg Managers Private Landowners VFD's Rural Fire depts. USFS BLM BIA ND/SD Joint Volunteer Firefighter Engine Academy	I&E CWPP's Grant funding – FEMA Inventory data (incl GIS) Equipment and training Use of Rx fire Demonstration areas S&PF UCF, SFA, VFA	# of trained fire fighters # of depts. with upgraded of new suppression equipment obtained # of communities assisted # of wildfire hazard mitigation projects completed # of training hrs provided	2.1 3.3
Restore fire-adapted lands and reduce the risk of wildfire impacts	Ponderosa Pine in SW ND *State Agency Lands	Firewise VFD's training State Fire School FEPP program S&PF SFA,VFA, FSP,NRCE	USFWS NDG&F NDP&RD Oil and Gas Industry ND Fire Council NDFS Dept of Emergency Serv County Emerg Managers Private Landowners VFD's Rural Fire depts. USFS BLM BIA Bur Rec Tribal NPS	I&E CWPP's Grant funding – FEMA Inventory data (incl GIS) Equipment and training Use of Rx fire Demonstration areas S&PF SFA,VFA FSP	# of acres treated # of wildfire hazard mitigation projects completed	2.1 3.3
Wildland restoration and fuels reduction	Missouri River Bottoms (including SD)	S&PF SFA,VFA, NRCE, FSP	SDDA Div RCF, NDG&F, BoRec, Tribal, CorpsEng	S&PF SFA, VFA, FSP	# of acres treated # of wildfire hazard mitigation projects completed	2.1

Restore fire-adapted lands and reduce the risk of wildfire impacts	Grassland ecosystems	Firewise VFD's training State Fire School FEPP program S&PF SFA,VFA, NRCE, FSP	USFWS NDG&F NDP&RD Oil and Gas Industry ND Fire Council NDFS Dept of Emergency Serv County Emerg Managers Private Landowners VFD's Rural Fire depts. USFS BLM BIA	I&E CWPP's Grant funding – FEMA Inventory data (incl GIS) Equipment and training Use of Rx fire Demonstration areas S&PF SFA,VFA, FSP	# of acres treated # of wildfire hazard mitigation projects completed	2.1 3.2
--------------------------------------------------------------------	----------------------	--------------------------------------------------------------------------------------------	----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	------------------------------------------------------------------------------------------------------------------------------------------------------------	------------------------------------------------------------------------------	------------

Issue 5: Limited Species Diversity and Vulnerability to Damaging Agents

Strategy	Priority Area	Programs that Contribute	Potential Stakeholders	Resources Required	Measures of Success	Supports National Objectives
Identify seed sources and species adapted to biotic (pests) and abiotic (climate and soils) conditions of the state Promote species diversity and forest health practices in communities	Communities	Community tree inventories Urban and community forestry grants ARS Mandan research NRCS PMC NDSU Plant Sciences Dept S&PF UCF, FH	NDUCFA and city foresters NRCS NDSU NRCS PMC Nurseries (NDNGA) Plant breeders	Research funding for tree improvement grants S&PF UCF	# trees planted # of communities assisted	2.2 3.7 3.4
Identify seed sources and species adapted to biotic (pests) and abiotic (climate and soils) conditions of the state Promote species diversity and forest health practices in tree plantings	Rural tree plantings	ARS Mandan research NRCS PMC NDSU Plant Sciences Dept USDA programs – EQIP, CRP WHIP, EWP, PFCP S&PF FH	NRCS PMC NDASCD Conservation tree nurseries	Research funding for tree improvement Grants	# of new species added to eFOTG	2.2 3.7 3.4

Issue 6: Strengthen Educational Outreach

Strategy	Priority Area	Programs that Contribute	Potential Stakeholders	Resources Required	Measures of Success	Supports National Objectives
Increase awareness (educational sessions and distance learning) of and benefits of and threats to forest resources Connect people to trees and forests and engage them in environmental stewardship activities	K-12 Students (ND and region)	Envirothon Eco-ed Ag in the classroom FFA Project WET, WILD, PLT, KNDC Scouts 4-H Extension League of Cities S&PF NRCE, FH, SFA Firewise	C2E2 DPI Natural Resource agencies KNDC NDASCD League of cities NDUCFA GPI states (ND, SD, NE, KS)	Visibility Partnering with national activities S&PF NRCE, FH Distance Education Equipment S&PF SFA	# of people (person days) engaged in environmental stewardship activities as part of S&PF program	3.6
Increase awareness of and benefits of and threats to (educational sessions and distance learning) forest resources Connect people to trees and forests and engage them in environmental stewardship activities	Teachers	Envirothon Eco-ed Ag in the classroom FFA Project WET, WILD, PLT, KNDC Scouts 4-H Extension League of Cities S&PF NRCE, FH, SFA Firewise	C2E2 DPI Natural Resource agencies KNDC NDASCD League of cities NDUCFA	Visibility Partnering with national activities S&PF NRCE, FH Distance Education Equipment S&PF SFA	# of people (person days) engaged in environmental stewardship activities as part of S&PF program % of K-12 teachers and students participating in educational opportunities (NDFS acc meas 6)	3.6
Increase awareness of and benefits of and threats to forest resources	Community Leaders, landowners, partners, and other customers	Extension League of Cities S&PF NRCE, FH, SFA Firewise	C2E2 DPI Natural Resource agencies KNDC NDASCD League of cities NDUCFA	S&PF NRCE, FH Distance Education Equipment S&PF SFA	# of people (person days) engaged in environmental stewardship activities as part of S&PF program	3.6

Increase awareness of and benefits of and threats to forest resources	Media, nat res agencies, lawmakers, and gen public	S&PF NRCE, FH, SFA Firewise	C2E2 DPI Natural Resource agencies KNDC NDASCD League of cities NDUCFA	S&PF NRCE, FH S&PF SFA	# of people (person days) engaged in environmental stewardship activities as part of S&PF program	
-----------------------------------------------------------------------	----------------------------------------------------	-----------------------------	------------------------------------------------------------------------------------------	---------------------------	---------------------------------------------------------------------------------------------------	--

Issue 7: Limited Wood Utilization Opportunities

Strategy	Priority Area	Programs that Contribute	Potential Stakeholders	Resources Required	Measures of Success	Supports National Objectives
Identify wood utilization and biomass opportunities Actively and sustainably manage trees and forests	Native Woodlands	NRCS – CIG, FFS, EA, WHIP UND-EERC NRCS Biomass assistance Renewable energy resources RC&D S&PF FSP, UCF	EERC BSC Commerce Dept ND Industrial commission ND Renewable resources coalition NDSU – biosystem eng Energy industry	Funding Demonstration areas Contemporary market analysis Infrastructure S&PF FSP, UCF	# of acres being managed sustainably as def by FSP	1.2 3.4
Identify wood utilization and biomass opportunities	Community Wood Waste (ash)	UND-EERC NRCS Biomass assistance Renewable energy resources RC&D S&PF UCF	EERC BSC Commerce Dept ND Industrial commission ND Renewable resources coalition NDSU – biosystem eng Municipalities/league of cities Energy industry GPI states (ND, SD, NE, KS)	Funding Demonstration areas Contemporary market analysis Infrastructure S&PF UCF	% of biomass and wood utilization businesses assisted (NDFS acc meas 1)	1.2 3.4

Issue 8: Climate Change

Strategy	Priority Area	Programs that Contribute	Potential Stakeholders	Resources Required	Measures of Success	Supports National Objectives
Manage existing forests to improve health Reduce forest conversion	Native Forestlands	Farmers Union – carbon credits USDA programs – LSF, WHIP, CRP, EQIP, CSP EPA S&PF FSP	Farmers Union Farmers and ranchers EERC Natural resource agencies NDASCD NRCS DOT Assn of Counties Township assn's NDSU Sch of Nat Res	Funding Research Education Cost share	Potential carbon sequestered through implementation of forest management practices on private forest lands # of ac being managed sustainably as def by FSP	3.7 1.2 2.2
Plant new trees to increase carbon sequestration	Spatial analysis priority areas	Farmers Union – carbon credits USDA programs – LSF, WHIP, CRP, EQIP, CSP EPA S&PF FSP	Farmers Union Farmers and ranchers EERC Natural resource agencies NDASCD NRCS DOT Assn of Counties Township assn's NDSU Sch of Nat Res	Funding Research Education Cost share	Potential carbon sequestered through implementation of forest management practices on private forest lands # of acres planted	3.7 1.2 2.2

Appendix B – Existing Plans Consulted

The Farm Bill requires states to consider existing State Wildlife Action Plans and Community Wildfire Protection Plans as state forest assessments are being developed. The intent is to build upon and complement such resource plans, identify opportunities for coordination, and avoid contradictions or omission of key items.

State Wildlife Action Plan

The North Dakota Comprehensive Wildlife Conservation Strategy, developed by the North Dakota Game and Fish Department, represents a strategy rather than a detailed plan to guide the process of preserving the state's fish and wildlife resources for the foreseeable future. The plan is habitat based, rather than species based. North Dakota was divided into nine primary landscape components, which are essentially the state's major habitat types. They include tallgrass prairie (Red River Valley); eastern mixed-grass prairie (Drift Prairie); mixed-grass prairie (Missouri Coteau); western mixed-grass/short-grass prairie (Missouri Slope); planted or tame grasslands; wetlands and lakes; rivers, streams, and riparian areas; Badlands; and upland deciduous forests.

The North Dakota Forest Service will coordinate with the North Dakota Game and Fish Department to identify areas of mutual interest to address resource needs.

Community Wildfire Protection Plans

The North Dakota Forest Service will address Community (or County) Wildfire Protection Plans (CWPP) in the implementation of the state forest assessment. CWPPs are developed to address issues such as wildfire response, hazard mitigation, community preparedness, structure protection in communities, and other issues. The local scale of these plans may limit their incorporation into the state forest assessment. However, the ND Forest Service will analyze the CWPPs that have been developed and provide a summary of those communities. Currently, 17 counties in North Dakota have CWPP's in place. These include: Barnes, Bottineau, Burke, Burleigh, Grant, Griggs, Hettinger, Kidder, McHenry, McKenzie, Mountrail, Oliver, Sargent, Slope, Stutsman, Traill, and Williams.

Appendix C – Stakeholders Involved/Consulted

The North Dakota Forest Service coordinated with the North Dakota State Stewardship Coordinating Committee, North Dakota Community Forestry Council, North Dakota State Technical Committee, North Dakota Game and Fish Department, US Forest Service- Dakota Prairie Grasslands, and other land management agencies in the development of the Statewide Assessment of Forest Resources and Forest Resource Strategy (North Dakota State Technical Committee membership can be found at: http://www.nd.nrcs.usda.gov/news/tech_committee.html). These required stakeholders, along with other key representatives including North Dakota's Tribes, participated in two partner sessions to prioritize forestry issues, identify opportunities for collaboration, and develop long-term strategies for addressing priority landscapes. In addition, the draft Statewide Forest Resource Assessment and Forest Resource Strategy was made available for a 30-day public comment period.

Stakeholders invited to the ND Forest Service sponsored partner sessions included:

- Badlands Commission
- Bureau of Land Management
- Bureau of Reclamation
- Coalition for Conservation and Environmental Education
- Dacotah Chapter of Sierra Club
- Dakota Prairie Grasslands
- Dakota Prairies RC&D
- Dakota West RC&D
- Department of Energy-Western Area Power Administration
- Division of Community Services
- Eco-Industries
- Environmental Health-ND State Health Department
- Federal Highway Administration
- Governor's Office
- Great Plains Bureau of Indian Affairs
- Lake Agassiz RC&D
- Lake Agassiz Regional Council
- Lewis & Clark Regional Development Council
- Lincoln-Oakes Nursery
- Medora Grazing Association
- Missouri River Recovery Implementation Committee
- Natural Resources Committee
- ND Aeronautics Commission
- ND Agricultural Experiment Station
- ND Association of Rural Electric Cooperatives

ND Association of Counties
North Central Planning Council
ND Chamber of Commerce
ND Community Foundation
ND Department of Agriculture
ND Department of Commerce
ND Department of Health
ND Department of Human Services
ND Department of Public Instruction
ND Department of Transportation
ND Ducks Unlimited
ND Economic Development Foundation
ND Emergency Management-Division of Homeland Security
ND Farm Bureau
ND Farmers Union
ND Firefighters Association
ND Game and Fish Department
ND Geological Survey
ND Indian Affairs Commission
ND League of Cities
ND National Guard
ND Natural Resources Trust
ND Nursery and Greenhouse Association
ND Parks and Recreation Department
ND Rural Water Systems Association
ND State Historical Preservation
ND State Horticultural Society
ND State Land Department
NDSU Extension Service
ND State Water Commission
ND Stockmen's Association
ND Tourism Division
ND Wildlife Federation, Inc.
ND Urban and Community Forestry Association
Northern Plains RC&D
Pheasants Forever, Inc.
Public Service Commission
Red River Basin Commission
Red River RC&D
Red River Regional Council

Renewable Energy Council
Rocky Mountain Elk Foundation
Roosevelt-Custer Regional Council
South-Central Dakota Regional Council
Sheyenne James RC&D
Sheyenne Valley Grazing Association
Sierra Club
Sisseton-Wahpeton Ovate
Souris Basin Planning Council
Spirit Lake Dakotah Nation
Spirit Lake Sioux Tribe
Standing Rock Sioux Tribe-EPA
State Historical Society of North Dakota
State Soil Conservation Committee
The Nature Conservancy
Theodore Roosevelt National Park Service
Three Affiliated Tribes
Tri-County Regional Development Council
Turtle Mountain Band of Chippewa Indians
Upper Dakota RC&D
US Army Corps of Engineers
US Department of Agriculture
US Department of Commerce
US Environmental Protection Agency-8WM-SP
US Fish and Wildlife Service
USDA-Farm Service Agency
Wild Turkey Federation
Williston RC&D