

The following overview of natural resources was compiled by the Vilas County Land, Air and Water Conservation Department for the 2000 Land and Water Resource Management Plan. For more information, see the Lakes Program located within this site.

## **Overview of Vilas County Natural Resources**

### **Location/Background:**

Vilas County is located in northern Wisconsin and is bounded by Upper Michigan to the north, Florence County to the east, Oneida County to the south, and Iron County to the west. The county is approximately 651,529 acres in size, including approximately 549,510 acres (84.3%) of land and 102,019 acres (15.7%) of surface water. Approximately 70% of the county's surface area is covered by forest land (woodland), which is held in both public and private ownership. A small percentage of land is dedicated to agriculture, which consists mainly of commercial cranberry bogs and potato farming.

There are 14 towns and one city located within Vilas County. A majority of the Lac du Flambeau Indian Reservation is also located within the boundaries of Vilas County, with the remainder of the reservation located in Iron and Oneida Counties.

### **Recreation:**

With more than 44% of the land acreage in Vilas County in public ownership, and approximately 16% of the county is contained in surface water, recreation plays a large role in Vilas County's economy. There are over 170 miles of cross-country ski trails, and over 70 miles of trails that have been developed and closed to motor vehicle access for hunting, hiking, and cross-country skiing.

As of 1998, there were 10 federal campgrounds, 19 state campgrounds, 2 county campgrounds and 32 private campgrounds. Vilas County contains 8 public and private golf courses located throughout the area. There are also over 600 miles of snowmobile trails. Fishing is also a major recreational activity, and many fishing tournaments are held around the county every year.

### **Land Use:**

Existing land uses in the county were surveyed in 2000 as part of the county comprehensive planning process. Overall, Vilas County is characterized by a large amount of forestland and an abundance of lakes and streams. Approximately 77% of the land is covered by forests or open space and 16% by surface water. Other land uses include residential (5.5%), commercial (0.6%), industrial (0.1%), government/public (0.3%), parks and recreation (0.2%), and farmland (0.8%).

### **Topography and Geology:**

Vilas County is located in the Northern Highland region of Wisconsin. The physical geography of the county resulted from glacial activity, which occurred 10,000-25,000 years ago. The last retreat of the glaciers transformed the formerly uneven, rocky terrain of the county into a diverse landscape. The county's landscape ranges from broad, nearly level glacial outwash plains to rough, broken glacial moraines and areas of pitted outwash. There are three distinct geographic regions in the county. The drumlins and ground moraines in the eastern portion of the county are characterized by low, smoothly rounded, elongated, and oval ridges that are nearly level to moderately steep and are interspersed with long, narrow drainageways. The Winegar moraine area, in the western portion of the county is characterized by short, steep slopes and ridges, and by numerous wet depressions, most of which have no outlets. Outside of these moraine areas is an outwash plain, characterized by a rolling or hilly topography with many enclosed basins and depressions. In scattered areas on this plain, including the communities of Eagle River, Manitowish Waters, Conover, St. Germain, and Boulder Junction, sand flats are present, while end moraines and drumlins are scattered throughout. The glacial melt is directly related to the amount and location of surface water.

Overall, relief in the county is low. However, the county has some of the highest elevations in the state, which range from approximately 1,560 feet above sea level in an area along Squaw Creek in the southwest corner of the county, to 1,845 feet above sea level at Muskellunge Hill.

### **Basins and Watersheds:**

Vilas County drains into four major basins – the Upper Chippewa River Basin in the west/northwest, and the Upper Wisconsin River Basin in the central, southern and eastern areas, the Lake Superior Basin in the north, and the Upper Green Bay Basin in the far eastern part of the county. Thirteen watersheds are contained completely or partially within the county.

### **Surface Water:**

Surface water resources constitute an extremely valuable part of the natural resource base of Vilas County. The county contains approximately 102,019.06 acres of surface water, including lakes, streams, and islands, which comprise approximately 16% of the county's total area. Table 1 provides a breakdown of the total surface water acreage in the county by individual municipalities.

**Table 1**  
**Surface Water Acreage**  
**Vilas County**

Municipality	Water	Islands	Total Surface Water	Percent of County Total	Percent of Individual Municipality
	Acres				
Arbor Vitae	6,055.02	49.45	6,104.47	6.0%	13.4%
Boulder Junction	12,706.62	150.39	12,857.01	12.6%	20.4%
Cloverland	2,639.67	9.74	2,649.41	2.6%	11.8%
Conover	5,396.44	153.94	5,550.38	5.4%	10.1%
Lac du Flambeau	18,276.15	413.59	18,689.74	18.3%	22.8%
Land O' Lakes	8,804.85	87.58	8,892.43	8.7%	14.1%
Lincoln	3,144.85	46.08	3,190.93	3.1%	13.4%
Manitowish Waters	4,502.80	563.44	5,066.24	5.0%	22.1%
Phelps	9,234.59	31.57	9,266.16	9.1%	13.4%
Plum Lake	7,448.81	105.64	7,554.45	7.4%	12.0%
Presque Isle	9,466.62	119.71	9,586.33	9.4%	19.5%
St. Germain	4,522.42	7.34	4,529.76	4.4%	17.6%
Washington	3,992.57	26.64	4,019.21	3.9%	13.2%
Winchester	3,927.27	23.49	3,950.76	3.9%	11.4%
C. Eagle River	111.78	0.00	111.78	0.1%	6.5%
<b>Vilas County Total</b>	<b>100,230.46</b>	<b>1,788.60</b>	<b>102,019.06</b>	<b>100.0%</b>	<b>15.7%</b>

Source: Vilas County Mapping Department, 1999.

Vilas County is home to over 1,320 lakes (563 named lakes and 757 unnamed lakes), more than any other county in Wisconsin, resulting in one of the highest concentrations of inland freshwater lakes in the world. Numerous rivers and streams are also located within the counties boundaries. There are 35 cold-water streams and 116 warm water streams.

There are eight natural reservoirs in Vilas County that are controlled by the Wisconsin Valley Improvement Company (WVIC). The WVIC-controlled reservoirs in the county are Lac Vieux Desert, Twin Lakes, Buckatabon, Long-on-Deerskin (Long Lake and Sand Lake), Little Deerskin, Lower Nine Mile, Little St. Germain, and Big St. Germain. Together the acreage of these reservoirs totals 14,872 acres. The WVIC stores water in reservoirs during wet periods and releases water during dry periods in order to maintain uniform water flow in the Wisconsin River for hydroelectric purposes.

There are currently 70 lake organizations in Vilas County. Six of the organizations are lake districts which have the authority to exercise taxing power. The remaining 63 organizations are voluntary lake associations. The focus on many of the organizations is providing lake education and information to members. Several organizations are also participating in lake management studies funded through the WDNR Lake Planning Grant program.

### **Outstanding and Exceptional Resource Waters:**

The WDNR has given special designations to water resources throughout the state of Wisconsin that have the highest water quality and fisheries in the state and therefore deserve special protection from point source pollution discharges. There are 13 lakes and 10 streams in Vilas County that have been designated as Outstanding Resource Waters (ORW), and 1 stream that has been designation as an Exceptional Resource Water (ERW). Outstanding resource water lakes include - Black Oak Lake, Crab Lake, Crystal Lake T41N R7E S27, Lac Vieux Desert, North Twin Lake, Palette Lake (Clear), Partridge Lake, Plum Lake, South Twin Lake, State Lake, Stormy Lake, Trout Lake, and White Sand Land T42N R7E S26. Outstanding resource water rivers and streams are: Allequash Springs – Class I & II portions, Brule Creek, East Br. Blackjack Creek, Elvoy Creek & Springs – Class I & II portions, Mishonagon Creek – Class I & II portions, Siphon Creek, Spring Meadow Creek – Class I portion, Tamarack Creek, Manitowish River – Rest Lake Dam downstream to Iron County Line, Deerskin River, and Plum Creek. The Manitowish River from Rest Lake Dam downstream to the Iron County Line is designated as an Exceptional Resource Water.

Waters designated as Outstanding Resource Waters (ORW) receive the highest level of protection. No discharge is allowed to these waters unless the quality of the discharge equals or surpasses the quality of the receiving water body. No lowering of the current water quality is allowed.

Exceptional Resource Waters (ERW) are streams that have excellent water quality and valued fisheries but already receive and/or may receive wastewater discharges. Increased discharges from existing point sources or new discharges from communities that currently are unsewered may be allowed if that discharge is necessary to correct an environmental or public health problem.

### **Wetlands:**

Wetlands are part of Vilas County's hydrologic and ecological structure. They act as a natural filtering system for nutrients such as phosphorous and nitrogen, and thus aid in maintaining surface water and groundwater quality. Wetlands are very productive wildlife habitat, and consequently provide recreational activities such as hunting, trapping and bird watching. They recharge groundwater supplies, the source of drinking water for Vilas County's residents, and provide open/green space. Wetlands maintain base flows of streams and watercourses which are important to the health of aquatic ecosystems and associated wildlife habitat. Wetlands attenuate flood flows, which decreases the risk of flood damage to property owners. Wetlands also reduce soil erosion and serve as a natural buffer protecting shorelines and streambanks.

Wetlands comprise approximately 112,328 acres of land in Vilas County, or 17.2% of the county's total area. These wetlands include a wide diversity of wetland types ranging from emergent/wet meadow to scrub/shrub; to deciduous and coniferous-forested wetlands. Table 5 identifies the mapped wetlands that are 5 acres and larger by municipality within the county as determined by the WDNR's digital Wisconsin Wetland Inventory Maps for 1996. These wetland may not reflect all areas considered wetlands by the U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS), or the U.S. Army Corps of Engineers.

**Table \_\_\_**  
**Wetland Acreage by Municipality**  
**Vilas County, 1999**

Municipality	Wetlands (acres)	Percent of Total Wetlands	Percent of Total Municipal/ County Area
Arbor Vitae	5,218.6	4.6%	11.5%
Boulder Junction	8,976.6	8.0%	14.2%
Cloverland	3,859.6	3.4%	17.2%
Conover	11,686.0	10.4%	21.3%
Lac du Flambeau	18,850.9	16.8%	23.0%
Land O' Lakes	11,790.6	10.5%	18.7%
Lincoln	5,470.2	4.9%	23.0%
Manitowish Waters	6,746.3	6.0%	29.4%
Phelps	8,638.5	7.7%	12.5%
Plum Lake	6,767.0	6.0%	10.8%
Presque Isle	8,731.6	7.8%	17.8%
St. Germain	3,086.2	2.7%	12.0%
Washington	4,169.4	3.7%	13.7%
Winchester	8,243.4	7.3%	23.8%
C. Eagle River	93.5	0.1%	5.5%
<b>Vilas County Total</b>	<b>112,328.4</b>	<b>100.0%</b>	<b>17.2%</b>

Source: WDNR, Wisconsin Wetland Inventory, 1996; Vilas County Mapping Department, 1999.

Nearly 40% of the wetlands in the county are located in the towns of Lac du Flambeau (17%), Land O' Lakes (11%), and Conover (10%). Table 5 also identifies the percentage of each individual municipality's total area that is comprised of wetlands. Approximately 30% of the town of Manitowish Waters is wetlands, while approximately

23% of the towns of Winchester, Lincoln, and Lac du Flambeau are comprised of wetlands.

### **Groundwater:**

Groundwater is an extremely important resource in Vilas County as it is the source of the entire county's potable water supply and serves many agricultural, commercial, and industrial purposes as well. Because of its importance, a greater understanding of groundwater is needed to gauge existing and potential threats to its quantity and quality.

Groundwater is comprised of rainfall and snowmelt, which percolates down through the soil until it reaches the zone of saturation, often called an aquifer. Water in an aquifer then travels from its source to a discharge point such as a well, wetland, spring or lake. During periods of increased precipitation or thaw, groundwater is replenished with water moving by gravity through permeable soils. Regional groundwater flow in Wisconsin tends to follow surface topography, and usually enters the aquifer in upland areas and flows towards low points in the drainage basin.

In the north central Wisconsin region, deposits of sand and gravel are highly permeable and yield large quantities of water both for recharge and to wells. Less expansive recharge areas also are found in areas where decomposed and fractured granite lies at or near the surface.

Groundwater elevations within Vilas County range from approximately 1,560 feet above mean sea level in the Southwest to 1,780 feet above mean sea level in the east.

The depth to groundwater is generally less than 50' throughout the county, and is typically less than 20'. Due to the shallow depth to groundwater and also the soils in the area, newly all of Vilas County has been classified as *most susceptible* to groundwater contamination, according to the Wisconsin Geological and Natural History Survey.

Groundwater flow in the county is generally southwesterly, flowing toward the major discharge areas including the Wisconsin and Manitowish Rivers into Iron, Price and Oneida counties

### **Woodlands:**

Forest cover is a key environmental, economic, and aesthetic feature of Vilas County. Expansive forestlands provide recreational and aesthetic opportunities for residents and tourists, and also function as sources of commercial timber production. In addition, woodland cover plays a key role in the function and value of sensitive environmental areas like steep slopes, wetlands and floodplains. Preservation and protection of forest resources is critical to sustain and enhance both the economic and environmental health of Vilas County.

The presettlement composition of forestland in Vilas County primarily included two forest types. Approximately ½ of the county included pine forests composed of white pine and red pine mixtures with no hardwoods. The remaining ½ of the county was comprised of hemlock, sugar maple, and yellow birch with mixtures of white and red pine.

Between the mid-1800s and early 1990s, forest throughout Wisconsin was almost entirely cut. Early logging practices concentrated on white pine, and to some extent red pine, virtually eliminating the white pine seed source in northern Wisconsin. Remaining forests were logged for commercial and industrial purposes or were cleared for agriculture.

Through the years, Vilas County has regained much of its forest cover, although the species composition is not the same as that of presettlement times. Overall, forest cover comprises approximately 70% of the county's total area.

### **Ownership:**

A Majority of the county's area (65.1%) is either in public ownership (42.6%), surface water (15.7%), or family managed by private-sector individuals/organization (6.8%) including industrial forest land (2.4%), conservation/education organization owned (0.5%), privately held and enrolled in a forest management program (3.9%). The remaining 34.9%, or approximately one-third of the county, is privately-owned and is not known to be enrolled in any formalized management program.

### **Public Ownership:**

#### *State Wisconsin Ownership*

Within the county, the state of Wisconsin owns the majority of the publicly-owned land with approximately 149,679 acres (23% of land in County). The majority of this land is included in the Northern Highlands-American Legion State Forest (NHAL). Every municipality in the county has some state forestland within its boundaries, except for the City of Eagle River. There are nearly 40,000 acres of state forestland in the town of Boulder Junction, approximately 35,000 in the town of Plum Lake, and roughly 27,000 in the town of Arbor Vitae, while in some other towns the state forest only comprises a few hundred acres. This forest is the largest and most –visited state property in Wisconsin, and occupies a total of over 220,000 acres in Vilas, Oneida, and Iron Counties. The NHAL State Forest not only provides abundant recreational opportunities, but is also a working forest, which provides for timber management and production. The NHAL State Forest is managed using sustainable forestry practices to provide a combination of recreational opportunities, timber production, aesthetics, watershed protection, and as habitat for a variety of plant and animal species.

#### *Federal Ownership*

Lands in the county owned by the federal government total approximately 53,872 acres (8.3% of land in county), which are primarily part of the Nicolet National Forest, and include some Chequamegon National Forest lands. The majority of this acreage is located in the town of Phelps where the Nicolet National Forest comprises over 37,000 acres. The remaining federally-owned lands are located in the towns of Washington, Lac du Flambeau, and relatively small amounts in Conover, Lincoln, and the City of Eagle River.

The Nicolet National Forest occupies approximately 47,000 acres or 7% of the county's total area. The Nicolet National Forest covers over 661,000 acres in Vilas, Florence, Forest, Langlade, Oconto and Oneida counties in Wisconsin. There are a little over 6,000 acres of Chequamegon National Forest land located in the town of Lac du Flambeau, comprising approximately 1% of the county's total area.

Historically, these areas, which are now forestland, were logged and were then sold to immigrants for farms and homesteads. Farming was not viable in the area's soils, which were better suited to trees, and as a result most farms were abandoned. Therefore, the forest was established in 1933 by Presidential proclamation to reestablish the area's original tree-covered vegetation. Today, public access is allowed within the forest for enjoyment of its abundant natural resources and beauty. The Nicolet and Chequamegon National Forests not only provide abundant recreational opportunities, but are also working forests, which provide for timber production.

### *Vilas County Ownership*

Vilas County owns approximately 40,000 acres, most of which is part of the Vilas County Forest, comprising about 6% of the county's total area. Approximately 60% of the county-owned land is located in the town of Conover, 19% in the town of Cloverland, and 14% in the town of Plum Lake. The remaining 7% is distributed in Land O' Lakes, Lincoln, and small portions in the towns of Lac du Flambeau and Washington. The county forest provides abundant recreational opportunities, and is also a working forest, which provides for timber production. On average, approximately 600 acres of county forest land is logged each year which brings approximately \$200,000-\$350,000 into the county annually.

### *Tribal Ownership*

Tribal lands comprise approximately 4.5% of the county's total acreage, and all are located in the Lac du Flambeau Indian Reservation.

### *Town Ownership*

Town-owned lands comprise less than 1% of the county's total acreage. Primarily, town-owned lands are used for town facilities such as administration buildings, community centers, garages/maintenance buildings, fire stations, etc. Several towns such as Land O' Lakes, Presque Isle, and Washington own forestland for the purpose of commercial timber.

## **Private Ownership:**

### *Forest Programs*

Over 25,000 acres of woodlands were enrolled in the various WDNR forest management programs such as the Managed Forest Law, Forest Tax Law, and Woodland Tax Law programs in 1999, totaling approximately 4% of the county's total acreage. These programs provide tax relief to landowners of enrolled property in return for the landowner entering into a contract to manage the land as forestland for a

specified length of time. Property enrolled in these programs will likely remain under management through the planning period and possibly beyond, as many of the contract agreements associated with these programs are 25 years or longer in length. The towns with the largest amount of land enrolled in such programs include Land O' Lakes (6,694 acres), Lac du Flambeau (4,490 acres), and Presque Isle (2,272 acres).

### *Industrial Forest*

Over 15,000 acres are owned by private entities for industrial purposes, such as for papermaking and lumber; comprising 2.4% of the county's total acreage. The major industrial forest owners include Consolidated Papers, Four States Timber Venture Industrial Investors, and Pukall Lumber Company. The majority of the industrial forest property is located within the town of Winchester where over 9,000 acres is managed for industrial use, comprising more than 25% of the town's acreage. In addition, the towns of Land O' Lakes and Lac du Flambeau also contain rather large amounts of forestland which is currently owned and managed for industrial purposes, totaling approximately 2,000 acres in each town. Most other municipalities in the county also have forestland that is managed for industrial use within their boundaries, however the amount is not very significant. A large amount of the industrial forestland is enrolled in the WDNR's forest management program(s).

### *Conservation/Educational Organization Ownership*

Conservation/educational organizations own over 3,500 acres in the county comprising approximately 0.5% of the county's total area. These organizations are primarily established with the intent of managing and maintaining woodlands and other natural features for the purpose of providing recreational, educational, or aesthetic opportunities, and for the protection/preservation of natural resources. Approximately 50% of conservation/educational organization ownership is located in the town of Winchester. Such ownership includes the Papoose Creek Hunting Club, which comprises approximately 1,120 acres. Conservation/educational organization property within the county primarily includes sportsman/hunting clubs, youth camps, and conservation association ownership.

### **Soils:**

The majority of the soils in Vilas County are sandy and loamy soils. The major soil types found in Vilas County are described below. The Soil Survey of Vilas County was prepared by the US Department of Agriculture Soil Conservation Service (now Natural Resource Conservation Service) and includes detailed maps and descriptions of these major soil types.

#### *Rubicon-Sayner-Karlin Association*

Nearly level to very steep, excessively drained and somewhat excessively drained, sandy soils on uplands

#### *Padus-Pence Association*

Nearly level to very steep, well drained, loamy soils on uplands

*Gogebic-Pence-Fence Association*

Nearly level to steep, moderately well drained and well drained, loamy and silty soils on uplands

*Champion Association*

Nearly level to moderately steep, moderately well drained, silty soils on uplands

*Loxley-Dawson Association*

Nearly level, very poorly drained, organic soils in depressions and on low lying flats

*Keweenaw-Karlin Association*

Nearly level to steep, moderately well drained to somewhat excessively drained, loamy and sandy soils on uplands

*Croswell-Dawson-Au Gres Association*

Nearly level and gently sloping, moderately well drained, very poorly drained, and somewhat poorly drained, sandy and peaty soils on flats and in upland drainageways and depression.

**Cropland:**

Croplands in Vilas County are concentrated near Eagle River, Phelps and Woodruff with scattered cropland elsewhere. Concern regarding cropland soil erosion is generally low in the county because of the limited amount of cropland and low erosion rates. The Northern Wisconsin Cropland Study (1999) identified just 2 percent of non-federal rural county land as cropland.

The amount of cropland harvested has decreased from about 52,279 acres in 1935 to slightly over 8,000 acres in 1997, according to the USDA Census of Agriculture. During 1935-1999, the number of full time farms has decreased from about 673 to 50. Most recently the overall number of farms and total land in farming has decreased much less significantly because of a large number of part time farms.