

8. Natural Resources

The county's natural resource base is an essential element of land use planning. The county's natural resource base encompasses the physiographic, geologic, vegetative, and hydrologic characteristics of the following elements:

- ◆ Topography and Soils
- ◆ Surface Water
- ◆ Floodplains
- ◆ Wetlands
- ◆ Groundwater
- ◆ Woodlands
- ◆ Areas of Critical Environmental Sensitivity

The natural resource base of Vilas County is the critical influence upon land development patterns of the county. It is the abundance of natural resources, especially lakes and forests, which create an attractive and highly-desired location for residential (primarily seasonal) development, outdoor recreation, and tourism. The natural resource base in Vilas County not only holds significant ecological value, but also has great economic, recreational, and aesthetic value. Development pressure for lakefront and wooded property is so significant that, if not properly managed and directed, could pose a threat to the very element which attracts people to be there - the abundant natural resource base.

In order to preserve and protect this important asset, land development patterns should be structured with consideration for impacts on the natural resource base elements. The natural resource base and the perception of development therein is susceptible to substantial damage through inappropriate land uses. Land use plans and development policies, including specific development of housing, roadways, sewer/water systems, etc., must be compatible with, and limit the degradation of, the natural resource base.

This section of the plan will discuss the influence and impact of the county's natural resources. The protection of these resources must be considered for the welfare of both people and the environment prior to making any decisions concerning future land use. In addition, these natural resources have aesthetic and leisure activity values that serve as the catalyst for many who desire to live and own property in the northwoods. A general description of each natural resource base element will now be discussed.

8.1 Geography

Vilas County is located in northern Wisconsin and is bounded by Upper Michigan to the north, Forest 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 549,573.08 acres (84.3%) of land and 101,577.2 acres (15.6%) of surface water (including islands). Approximately 76.9% of the county's surface area is covered by forest land (woodland), which is held in both public and private ownership.

The vast amount of surface water and forest land present in Vilas County is the driving force behind the county's economy, which is supported primarily by recreation/tourism and timber production. Vilas County is a popular vacation area for both in-state and out-of-state visitors who wish to enjoy the abundance of natural resources and recreational opportunities provided in this setting. Areas near the lakes and streams, and more recently within the off-water woodlands, have become increasingly popular for vacation property (cottages), home sites, and as recreational areas. This is evident by reviewing population trends whereby the 2000 estimated year-round population was 21,033 persons, while the peak summer population was 100,405 persons (see Section 4. Community Profile). In addition, building permit data indicates a 52% increase in the average number of building permits granted for new homes from 1980-89 to 1990-1998. As development pressures in the area continue to escalate, the county's land and water resources must be intelligently managed to ensure their protection and quality.

8.2 Topography/Physiography

Vilas County is included in the Northern Highland physiographic region of Wisconsin. The physiology (physical nature of a geographic area) 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 physiographic 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.

8.3 Soils

Soils exert a strong influence on the way land is used. Soils affect the cost and feasibility of building site development, the provision of public facilities, and agricultural production capabilities. Knowledge of the potentials and limitation of soil types is necessary to determine how they can best be used and managed. For example, development may be limited on soils which are characterized by poor filtration, slow percolation, flooding/ponding, wetness, steep slope, and subsidence.

A detailed study of the soils of Vilas County was conducted by the U.S. Department of Agriculture (USDA), Natural Resource Conservation Service (NRCS - formerly Soil Conservation Service, SCS), in 1984 which resulted in the Soil Survey of Vilas County, Wisconsin, June, 1988. The survey includes a detailed identification of the specific soils found throughout the county, and also provides a grouping of soils into generalized soil associations or predominant soil patterns. Further investigation is required for “site-specific” soils information, as is the case with individual soil tests. Soil tests (commonly called perk tests) are completed for each new building site application to determine the sites’ capability to accommodate the septic loads.

Important to land use planning, the study identifies the limitations of each soil type to certain forms of development. A soil which exhibits a “severe” limitation is one in which one or more soil properties or site features are so unfavorable or difficult to overcome that a major increase in construction effort, special design, or intensive maintenance is required. For some soils rated severe, it may not be feasible to proceed with development.

The soils of Vilas County are primarily sandy and loamy soils which are suited to, and do, support forested/woodland uses. Due to the sandy and droughty nature of the soils, most are of relatively low agricultural value; in addition the growing season in the county is rather short.

The following provides a general discussion of the general soil associations found within Vilas County. It should be noted however, that these general descriptions are only guidelines and should be referred to as such.

The majority of the county (42%) is dominated by the Rubicon-Sayner-Karlin association which includes most of the southern and central portions of the county. The far eastern portion of the county, including primarily the Town of Phelps and portions of Conover and Washington, is dominated by the Champion association and Padus-Pence association. The Champion association comprises 8% of the county and the Padus-Pence association comprises approximately 21%. The Padus-Pence association is also found along the Presque Isle/Boulder Junction border, in the central portion of Land O’ Lakes, the Sayner and Star Lake areas, and the majority of southern/central Arbor Vitae. The majority of Winchester and Presque Isle, and approximately half of Land O’ Lakes, are comprised of the Gogebic-Pence-Fence association which comprises approximately 14% of the county. The Croswell-Dawson-AuGres association is found scattered throughout the county, comprising a total of 8% of the soils. The Loxley-Dawson association and the Keweenaw-Karlin association comprise the remaining 2% and 5% of the county’s land area, respectively. These areas are also scattered throughout the county

The State of Wisconsin Department of Commerce adopted revisions February 4, 2000 to the existing on-site sanitary system disposal code (called COMM 83). The revisions change the private, on-site treatment system options allowed in the state septic system code by adding an assortment of sewage treatment options for residential applications that have not been previously allowed. For example, existing state code allows sanitary systems to be approved for conventional septic systems and certain types of above ground mound systems. Holding tanks are also allowed under state code, but counties and local municipalities have the authority to ban holding tanks within their jurisdiction (Vilas County allows holding tanks as a system of choice). The COMM 83 revisions expand treatment options to include five additional designs which

would allow greater flexibility in siting and treating private septic system waste. For example, the construction of new septic systems would be allowed on land with 6-24 inches of native soil - areas where now only holding tanks are allowed. Vilas County modified its sanitary ordinance to implement the new rule.

The implications of the proposed state code revisions may have dramatic land use impact. According to the Department of Commerce, the previous state code regulations allowed 47% of lands in the state to be permitted with conventional, in-ground septic systems due to the existing soil characteristics and depth to groundwater. The new code allows nearly 81% of lands in the state to be developable due to allowing the installation of treatment systems such as sand filters and aerobic treatment that require less restrictive depths to groundwater, while effectively treating wastewater at levels the same or better than current technology. Overall, the proposed COMM 83 revisions open approximately 9 million acres for development throughout the state.

The proposed revisions have significant land use impacts in terms of emphasizing the importance of land use planning in managing how much land can be developed, where development could occur, and how dense the housing could. Hence, code revisions and their potential land use implications should be offset by the county land use plan's ability to direct the location, use, and density of development, regardless of how the state will permit septic systems in the future.

8.4 Surface Water

Surface water resources constitute an extremely valuable part of the natural resource base of Vilas County. Vilas County is home to over 1,320 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. These surface water resources are vital natural resources which are held in the public trust by the state. The abundance of water resources provides the public with unique recreational opportunities and the enjoyment of scenic beauty, and therefore plays a primary role in sustaining tourism, the major economic force of Vilas County.

Unfortunately, the quality of these surface water resources is highly susceptible to deterioration from pollutant runoff. Therefore, land uses and related activities must be carefully managed in order to achieve a balance between the level and extent of use, and the maintenance of water quality. This portion of the plan provides a general inventory and discussion of the significant surface waters in Vilas County. In addition, this section also identifies the impact of development on these features, and discusses the approach which was recently implemented by Vilas County toward managing development patterns in order to protect surface water quality.

Watersheds and Sub-watersheds

Surface water quality is directly affected by the land uses of the area which drain to it, which is called its watershed. A watershed is an interconnected area of land in which water drains to a common point, such as a stream, lake or wetland. All lands and waterways are within one watershed or another. In Wisconsin, watersheds vary in scale from major river systems to small creek drainage areas, and typically range in size from 100 to 300 square miles. In relation, river basins are defined within the state which encompass numerous watersheds. There are 32 river

basins in Wisconsin which range in size from 500 to over 5,000 square miles. The WDNR prepares water quality management plans for each river basin which identify the sources of water quality problems and identify management objectives that the WDNR, local communities, counties and other agencies should take to protect and improve the water resources within the basin.

The majority of Vilas County lies within two basins - the Upper Chippewa River Basin in the west/northwest, and the Upper Wisconsin River Basin in the central, southern and eastern areas. In addition, a small portion in the east is included in the Upper Green Bay Basin. Overall, 13 watersheds are included within the county either completely or partially.

Water Features/Surface Water Quality

Vilas County contains approximately 101,577.2 acres of surface water, including lakes, streams, and islands, which comprise approximately 15.6% of the county's total area. Table 8-1 provides a breakdown of the total surface water acreage in the county by individual municipalities, while Map 8-1 illustrates the hydrographic features of the county. In addition, Figure 8-1 illustrates the distribution of surface water throughout the county based on the acreage of surface water in each municipality, and Figure 8-2 portrays the surface water in each municipality as a percentage of its total individual municipality acreage.

Table 8-1 Surface Water Acreage Vilas County

Municipality	Water	Islands	Total Surface Water	Percent of County Total	Percent of Individual Municipality
Acres					
Arbor Vitae	6,055.0	49.5	6,104.5	6.0%	13.4%
Boulder Junction	12,699.6	150.4	12,850.0	12.7%	20.4%
Cloverland	2,639.7	9.7	2,649.4	2.6%	11.8%
Conover	5,396.4	153.9	5,550.4	5.5%	10.1%
Lac du Flambeau	17,923.9	413.6	18,337.5	18.1%	22.4%
Land O' Lakes	8,761.7	87.6	8,849.3	8.7%	14.0%
Lincoln	2,949.8	46.1	2,995.9	2.9%	12.6%
Manitowish Waters	4,502.8	563.4	5,066.2	5.0%	22.1%
Phelps	9,234.6	31.6	9,266.2	9.1%	13.4%
Plum Lake	7,448.8	105.6	7,554.5	7.4%	12.0%
Presque Isle	9,466.6	119.7	9,586.3	9.4%	19.5%
St. Germain	4,522.4	7.3	4,529.8	4.5%	17.6%
Washington	4,142.0	26.6	4,168.6	4.1%	13.7%
Winchester	3,927.3	23.5	3,950.8	3.9%	11.4%
C. Eagle River	117.9	0.0	117.9	0.1%	6.9%
Vilas County Total	99,670.7	1,788.6	101,577.2	100.0%	15.6%

Source: Vilas County Mapping Department, 1999.

Figure 8-1 Surface Water per Municipality as a Portion of County Total Vilas County

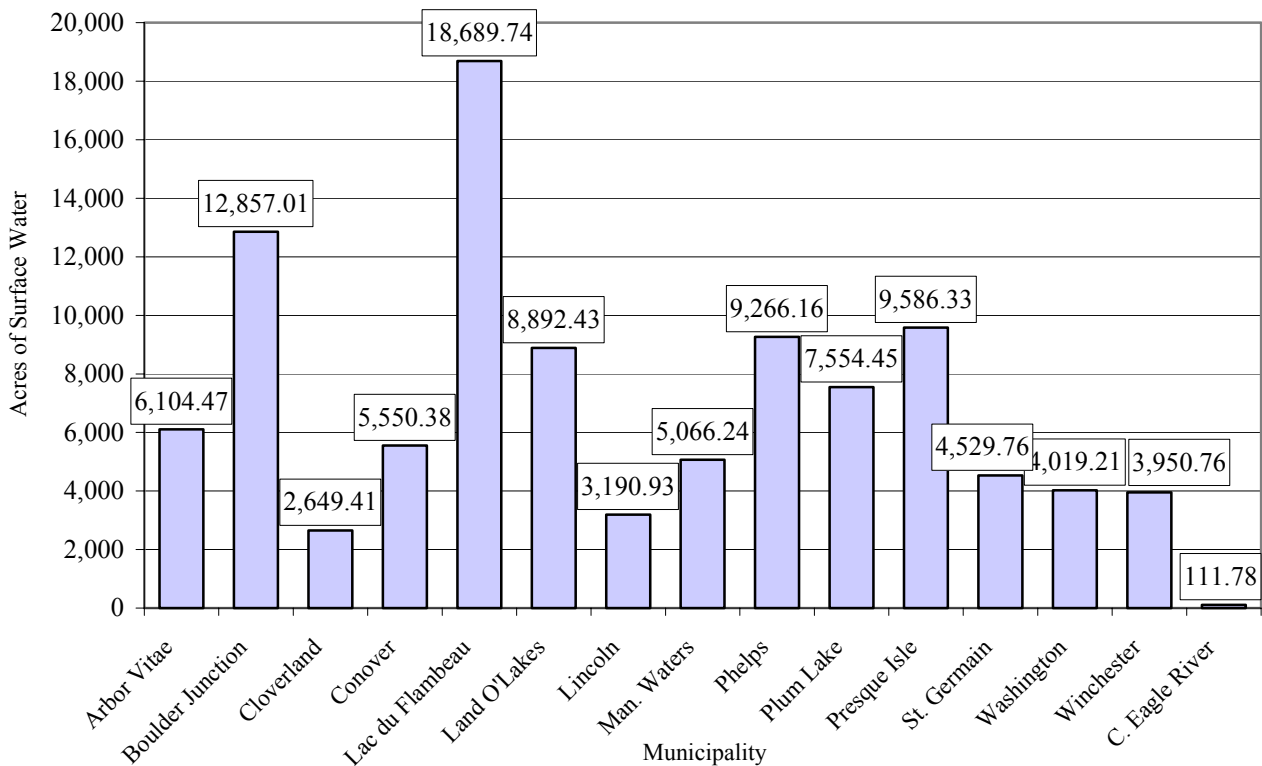


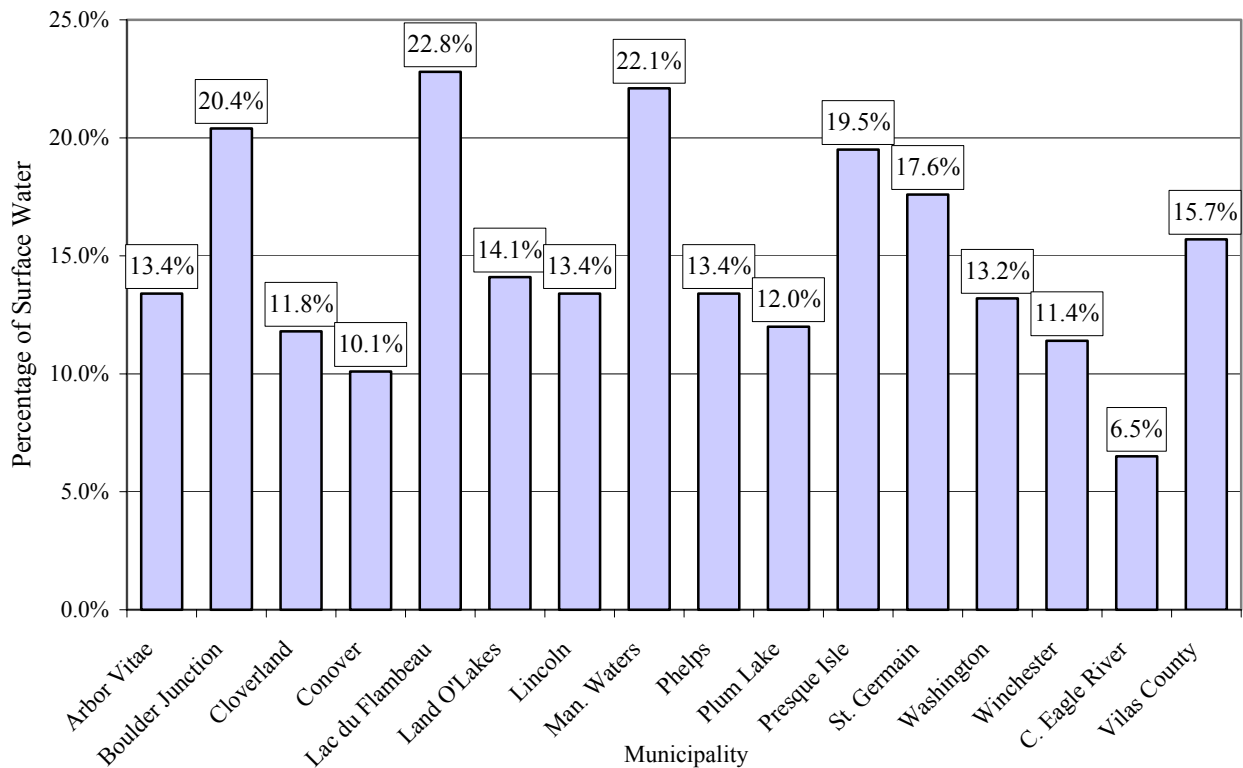
Table 8-1 and Figure 8-1 identify that the greatest amount of surface water in the county is located in the Town of Lac du Flambeau (18.3%), followed by the Towns of Boulder Junction (12.6%), Presque Isle (9.4%), and Phelps (9.1%), which combined comprise about half of the county’s total surface water. Figure 8-2 identifies that in the Towns of Lac du Flambeau, Boulder Junction, Manitowish Waters, and Presque Isle, surface water comprises approximately 20% of each municipality’s total area.

The primary component of surface water in Vilas County is lakes. There are approximately 1,320 lakes in Vilas County, including 563 named lakes and 757 unnamed lakes. As mentioned previously, this is more lakes than any other county in the state. In addition, the county is located in the heart of the highest concentration of fresh water lakes in the world; when combined with Oneida County. However, development around lakes may be affecting water quality and wildlife habitat. Alterations to the shoreline, such as that experienced with development, harms the productivity, diversity, and natural scenic beauty of lakes. Therefore, it is important to protect and maintain the quality of these invaluable resources, not only to ensure the region’s biological integrity, but also to preserve the sociological, cultural, subsistence, and economic values that these lake resources provide.¹ There are 3,383 miles of shoreline in Vilas County. There is a total of 1,117.5 miles of shoreline along the lakes in the county which are 50

¹ WDNR, December 1995, “Northern Wisconsin’s Lakes and Shorelands: A Report Examining a Resource Under Pressure,” Madison, Wisconsin.

acres or greater in size and are not located within public ownership boundaries. Of this, 78% of the shoreline is privately developed, while 22% is owned publicly. A total of 17,179 structures were identified as being located along the private shorelines, resulting in an average of approximately 19.71 structures per private mile of shoreline.² Based on the county existing land use map, a large percentage of existing shoreline is developed on lakes 50 acres and above. The focus will move to smaller lakes and stream areas, then to the off-water parcels.

Figure 8-2 Surface Water as Percentage of Total Individual Municipality Acreage Vilas County



Source: Vilas County Mapping Department, 1999.

Development trends indicate that the desire to own lakefront [waterfront] property sparked after WWII, as more families began to move to the cities, and began to seek waterfront property as a “getaway”. Between 1965 (after WWII) and 1995, there was an overall average increase of 216% in the number of dwelling units on all sizes of lakes in northern Wisconsin. As the demand for lake frontage increased during these years, large parcels of land were further subdivided into narrow “slices” of frontage which resulted in fragmented shorelines. In fact, an aerial survey completed by the WDNR revealed that since the mid-1960s, approximately two-thirds of previously undeveloped lakes (10 acres or larger) in northern Wisconsin had been developed (one or more dwellings along shore). If this trend continues, it is projected that all undeveloped lakes not in public ownership could be developed within the next 20 years.

² Vilas County Lake and River Classification Study, February 1999.

This ever-increasing demand for land near water has resulted in significant impacts to lakefront property values. This is especially evident in more recent years as lakefront property is becoming harder to find. For example, in Vilas County, shoreland selling for \$225/foot of shoreline in 1990 was going for more than \$1,500/foot in 1998; that's an increase of over 500% within an eight-year period.³ In fact, because lake water quality is significantly affected by surrounding land use, this significant increase in lakeshore development has already led to an apparent decrease in water quality on many lakes, ultimately changing the very nature of lake ecosystems. Water quality often changes as a result of increased levels of such nutrients as nitrogen and phosphorus which are directly resultant of residential development activities including private sewer systems, lawn fertilizers, etc., and the removal of natural shoreline vegetation.

Vilas County officials and supporting agencies are continuously faced with the challenge of balancing the continuing development pressures and their stewardship responsibilities to maintain the ecological integrity of the lakes with the county's need to provide basic economic opportunities. Therefore, in response to the dramatic increase in lakeshore development and development pressures, and the potential impacts of this development on the surface water resources and associated wildlife habitat and recreational opportunities, Vilas County initiated development of the Vilas County Lake and River Classification System. This system was ultimately adopted as part of the Vilas County Shoreland Zoning Ordinance in May 1999. The system establishes varying degrees of protection and mitigation to water bodies based on the varied sensitivity levels and existing development characteristics of lakes. The purpose of the Lakes Classification System is to manage further development as determined by the waterway's ability to accommodate the development, thus providing enhanced protection to surface water quality, fish and aquatic life, shoreland communities and natural beauty, and compatibility of proposed development with existing land and water usage. The Lakes Classification System is also designed to maintain safe and healthful conditions, prevent and control water pollution and soil erosion, and control building sites and the placement of structures and other land uses.

Each lake in Vilas County greater than 50 acres in surface area, which included 270 lakes (approx 20.5% of all county's lakes), was individually evaluated and classified as either low, medium, or high in regards to both its sensitivity to development and the level of existing development along privately-owned shoreline. The lake sensitivity ratings were determined by evaluating five scientific criteria which were based on the physical characteristics of lakes, not on the chemical or biological characteristics which may change over time. Existing levels of development were determined based upon the number of visible structures per mile of privately owned shoreline as identified by 1996 aerial photos. Prevention strategies such as minimum lot size, setback requirements, and mitigation strategies, were then developed for each lake classification category. Table 8-2 and Map 8-2 displays the Lakes Classification Matrix which identifies the minimum lot size and setback requirements by classification category, while mitigation strategy information may be reviewed in the Vilas County Shoreland Zoning Ordinance, Article XI: Mitigation.

³ Wisconsin Lakes Partnership (Wisconsin Association Lakes, WDNR, UW-Extension), by Robert Korth and Paul Cunningham, 1999. "Margin of Error? Human Influence on Wisconsin Shores."

Lakes 50 acres and less in surface area, which includes approximately 1,050 lakes, were not individually evaluated, but were classified as warranting the highest level of protection based on their small surface areas, proportionately larger shoreline lengths/surface area, less water volume to assimilate excess nutrients, and generally small-sized watersheds. The minimum lot size and setback requirements established for lakes 50 acres and less are as follows:

- Minimum lot area = 60,000 ft²
- Minimum frontage width = 300 ft
- Minimum lot width = 270 ft

Approximately 23% (63 lakes) of the lakes over 50 acres in size were classified as having a medium sensitivity to development and a low level of existing development (0-13 structures/mile). Prevention strategies will be applied to these lakes to help protect them from experiencing degraded water quality as a result of unplanned/inappropriate land use and associated applications. Over 17% (47 lakes) were classified as having a medium sensitivity to development and medium level of existing development, while 16% (43 lakes) were identified as being highly sensitive to development with a low level of existing development. Prevention strategies will also be targeted on these lakes. Only 2.2% (6 lakes) of the lakes which were classified were identified as being highly sensitive to development and having high levels of existing development. These lakes include Alma Lake in the Town of St. Germain, Bills Lake in the Town of Lac du Flambeau, Edith Lake in the Town of Boulder Junction, and Sumach (Long), Towanda (Bass), and Vandercook (Crane) lakes in the Town of Arbor Vitae. More extensive mitigation strategies will be applied to these lakes.

**Table 8-2 Lake Classification Matrix for Lakes Greater than 50 Acres
Vilas County**

Sensitivity to Development	Current Level of Development		
	Low Development Level	Medium Development Level	High Development Level
High Sensitivity	Minimum Lot Area = 60,000 ft ²	Minimum Lot Area = 40,000 ft ²	Minimum Lot Area = 40,000 ft ²
	Minimum Frontage Width = 300 ft	Minimum Frontage Width = 200 ft	Minimum Frontage Width = 200 ft
	Minimum Lot Width = 270 ft	Minimum Lot Width = 180 ft	Minimum Lot Width = 180 ft
Medium Sensitivity	Minimum Lot Area = 40,000 ft ²	Minimum Lot Area = 40,000 ft ²	Minimum Lot Area = 30,000 ft ²
	Minimum Frontage Width = 200 ft	Minimum Frontage Width = 200 ft	Minimum Frontage Width = 150 ft
	Minimum Lot Width = 180 ft	Minimum Lot Width = 180 ft	Minimum Lot Width = 135 ft
Low Sensitivity	Minimum Lot Area = 30,000 ft ²	Minimum Lot Area = 30,000 ft ²	Minimum Lot Area = 30,000 ft ²
	Minimum Frontage Width = 150 ft	Minimum Frontage Width = 150 ft	Minimum Frontage Width = 150 ft.
	Minimum Lot Width = 135 ft	Minimum Lot Width = 135 ft	Minimum Lot Width = 135 ft

Source: Vilas County Shoreland Zoning Ordinance, Article IV, 4.3, May, 1999.

In addition to the significant number of lakes in the county there are also numerous rivers and streams, some of which interconnect lakes. The major river system which travels through Vilas County is the Wisconsin River, which originates at Lac Vieux Desert in the Town of Phelps. Overall, there are no widespread water quality problems with streams in the county. Beavers and beaver dams probably cause the most nuisance problems by obstructing flows and changing fish habitat. However, shoreline development and development pressures are increasing river resource management issues.

The Vilas County Lake and River Classification portion of the Shoreland Zoning Ordinance separates rivers and streams into two classes for management and development purposes, based upon factors set forth in the Vilas County Lake and River Classification Study. Class I rivers and streams were designated as those water bodies having low or limited adjacent development or potential for development, and which were classified as outstanding or exceptional resource waters, or cold water trout streams. Class I rivers and streams are considered highly sensitive waters, and include the majority of rivers and streams in the county. Development regulations applied to Class I rivers and streams include a minimum lot area of 60,000 ft², minimum frontage of 300 ft, and a minimum lot width of 270 ft. Class II rivers and streams were individually reviewed and classified. Class II rivers and streams are generally larger in size and have higher flushing volumes, and therefore are less vulnerable to impacts from nutrient or sediment runoff. Many rivers which were classified as Class II have high levels of existing shoreline development. Development regulations applied to Class II rivers and streams include a minimum lot area of 30,000 ft², minimum frontage width of 150 ft, and minimum lot width of 135 ft. The rivers and streams which were approved for inclusion as Class II include:

- ◆ Wisconsin River downstream of Hwy G
- ◆ Eagle River
- ◆ Manitowish River from Johnson Lake to Rest Lake Dam
- ◆ St. Germain River downstream of Big St. Germain Lake
- ◆ Military Creek downstream of Hwy E
- ◆ Tomahawk River
- ◆ Deerskin River downstream of Range Line Road
- ◆ Muskellunge Creek downstream of Birchwood Drive
- ◆ Johnson Creek
- ◆ Mud Creek

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8.5 Floodplain

Floodplains include land which has been or may be covered by floodwater during the regional flood. The regional flood may be expected to occur on a particular lake, river, or stream once in every 100 years. Areas susceptible to flooding are considered unsuitable for development because of risks to lives and property. Therefore, from a planning perspective, floodplains are a very important land use feature. Construction or development within these areas should be limited to uses which are associated with the floodplain, such as recreational activities, wildlife applications, or open space areas.

The most recent source for identifying areas subject to flooding in Vilas County is the Flood Hazard Boundary Map (FHBM) for Vilas County developed by the Federal Emergency Management Agency (FEMA) which became effective in 1981. The flood hazard boundary map delineates the special flood hazard areas within the county. These areas are primarily located along major rivers and streams, along with several creeks. Floodplains are also present around several lakes in the county, however the areas subject to flooding around these typically do not extend much past the existing shoreline.

The FHBM's are intended to be interim maps prior to the completion of a more detailed FEMA study, and therefore may not include all flood hazard areas. Additional field checking may be required to determine whether or not a given area is in the floodplain before development is authorized or denied.

8.6 Wetlands

Wetlands are part of the region's hydrologic and ecological structure. They act as sources, sinks, or routes for water, materials (e.g., nutrients, pollutants), energy, and biological activity. Maintaining the integrity of wetlands promotes a region's health and sustains its capability to survive disturbance. It also affects the beneficial functions and values that wetlands provide to society such as:

- ◆ Wetlands act as a natural filtering system for nutrients such as phosphorus and nitrates, 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.
- ◆ Wetlands provide open/green space.
- ◆ Wetlands recharge groundwater supplies, the source of drinking water for Vilas County's residents.
- ◆ Wetlands attenuate flood flows which decreases the risk of flood damage to property owners.

- ◆ Wetlands maintain base flows of streams and watercourses which is important to the continued well-being of aquatic ecosystems and associated wildlife habitat.
- ◆ Wetlands reduce soil erosion.
- ◆ Wetlands serve as a natural buffer protecting shorelines and streambanks.

The state of Wisconsin's operational definition of a wetland is defined as an area where water is at, near, or above the land surface long enough to be capable of supporting aquatic or hydrophytic vegetation and which has soils indicative of wet conditions (s. 23.32(1) Wis. Stat.). Most wetlands are dominated by plants which can tolerate various degrees of flooding, with species composition and productivity dependent on the variations in water patterns and human activities (e.g., cultivation, grazing, logging).

Map 8-1 delineates wetlands (2.5 acres and greater) as determined by the WDNR's digital Wisconsin Wetland Inventory (WWI) maps from 1996. These wetlands may not reflect all areas considered wetlands by the U.S. Department of Agriculture (USDA) Natural Resource Conservation Service (NRCS), or the U.S. Army Corps of Engineers. As indicated on the map, wetlands of varying size are scattered throughout the county. Wetlands comprise approximately 110,632 acres of land in Vilas County, or 17.0% 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 8-3 and Figure 8-5 identify the wetland acreage by municipality within the county.

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 8-3 also identifies the percentage of each individual municipality's total area which 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.

An interesting and important wetland analysis is that of their rate of loss. Wisconsin originally had between 10 and 12 million acres of wetlands; today, over one-half of these have been drained for agriculture or development (residential, roads, commercial, etc.). As of this writing the WDNR is updating the 1987 wetland inventory maps, and is in the process of determining wetland loss rates that occurred in the county over the last 20 years. The County should follow up with the WDNR to obtain this information when it becomes available.

Due to the significant environmental functions served by wetlands, there is a complex set of local, state and federal regulations which place limitations on the development and use of wetlands [and shorelands]. Counties are mandated to establish shoreland-wetland zoning districts. The Vilas County Shoreland Zoning Ordinance regulates use and development in all shoreland areas (300' of navigable streams, 1000' of lakes), including all shorelands which are designated as wetlands on the Wisconsin Wetland Inventory maps. The WDNR regulates the placement of structures and other alterations below the ordinary high water mark of navigable streams and lakes. In addition, the U.S. Army Corps of Engineers has authority over the placement of fill materials in many wetlands, while the USDA incorporates wetland preservation criteria into its crop price support programs. Therefore, prior to placing fill or altering a wetland

resource, the appropriate agency(ies) must be contacted to receive authorization. Ultimately, development within wetland areas should be avoided due to the benefits earlier described.

Table 8-3 Wetland Acreage by Municipality Vilas County, 1999

Municipality	Wetlands (Acres)	Percent of Total Wetlands	Percent of Total Municipal/County Area
Arbor Vitae	5,117.6	4.6%	11.5%
Boulder Junction	8,821.4	8.0%	14.2%
Cloverland	3,812.0	3.4%	17.2%
Conover	11,579.8	10.5%	21.3%
Lac du Flambeau	18,716.6	16.9%	23.0%
Land O' Lakes	11,719.3	10.6%	18.7%
Lincoln	5,441.5	4.9%	23.0%
Manitowish Waters	6,746.3	6.1%	29.4%
Phelps	8,475.4	7.7%	12.5%
Plum Lake	6,639.3	6.0%	10.8%
Presque Isle	8,586.7	7.8%	17.8%
St. Germain	3,057.7	2.8%	12.0%
Washington	3,685.4	3.3%	13.7%
Winchester	8,141.1	7.4%	23.8%
C. Eagle River	92.2	0.1%	5.5%
Vilas County Total	110,632.3	100.0%	17.0%

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

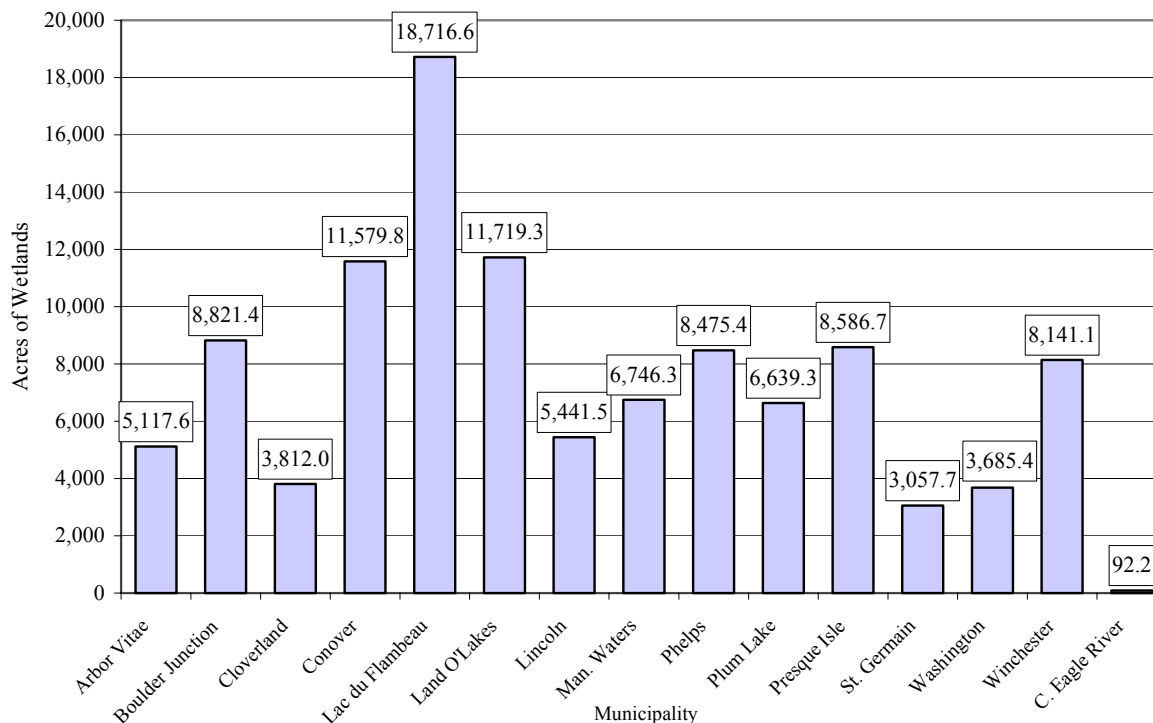
8.7 Groundwater

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 (or 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, this vast resource is replenished with water moving by gravity through permeable soils down to the water table. In some instances, groundwater moves because of pressure created by a confining layer of impervious rock or clay soils which creates an artesian system. The groundwater system is the source of potable water in Vilas County. 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.

Figure 8-3 Wetland Acreage by Municipality as a portion of County Vilas County



Source: WDNR, Wisconsin Wetland Inventory, 1996; Vilas County Mapping Department, February, 2001.

Contamination of groundwater almost always results directly from land uses associated with modern society. Almost anything which can be spilled or spread on the land has the potential to seep through the ground and enter the groundwater. The impacts of improper land uses or waste management are usually determined by the physical characteristics of that area. By locating, constructing, and operating development and waste management systems appropriately, these negative effects can be minimized.

Most groundwater contamination is related to poorly-sited land uses such as agricultural manure, petroleum, and salt storage in areas of high groundwater tables or fractured bedrock. Contamination of groundwater reserves can also result from such sources as improperly placed or maintained landfill sites, private waste disposal (septic effluent), excessive lawn and garden fertilizers and pesticides, and leaks from sewer pipes. Runoff from livestock yards and urban areas, improper application of agricultural pesticide or fertilizers, and leaking petroleum storage tanks and spills can also add organic and chemical contaminants in locations where the water table is near the surface. Once groundwater contamination has occurred, successful remediation can take years, or may never occur, depending upon the pollutant. Therefore, when considering specific land uses for an area, it is vital to consider the relationships between the land, the proposed/actual use, the physical characteristics, and the potential for contamination to help ensure that groundwater contamination does not occur. Protection of these groundwater reserves is necessary to ensure adequate quality water to all users.

Map 8-3 identifies the groundwater elevations of the water table within Vilas County. The map identifies that groundwater elevations range from approximately 1,560 feet above mean sea level in the southwest to 1,780 feet above mean sea level in the east. Elevations primarily range in the mid-1,600s. A comparison between the county land surface elevation to groundwater elevation indicates that the water table is very high (near land surface) in the county as land elevations range from approximately 1,560 to 1,845 feet above mean sea level. The depth to groundwater is generally less than 50' throughout the county, and is typically less than 20'. Shallow depths coupled with highly permeable sandy soils means the groundwater in Vilas County is highly susceptible to contamination. This can be confirmed by viewing the Map 8-3 titled Groundwater Contamination Susceptibility in Wisconsin, 1989, which was prepared by the U.W. Extension, Geological and Natural History Survey. Nearly all of Vilas County is identified on the map as being most susceptible to groundwater contamination.

Groundwater flow in the county is generally southwesterly, flowing into the Iron, Price and Oneida counties. Major discharge areas are the Wisconsin River system and the Upper Chippewa system (Manitowish River). Therefore, contamination that enters the groundwater today in Vilas County can have serious consequences tomorrow in southern in the other counties.

8.8 Woodlands

Forest cover is a key environmental, economic, and aesthetic feature. Expansive forest lands 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. Regulations concerning removal of woodland vegetation may be necessary to protect natural scenic beauty, control erosion, provide critical wildlife habitat, and reduce effluent and nutrient flows into surface water bodies/courses. Therefore, the 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 forest land in Vilas County primarily included two forest types. Approximately one half of the county included pine forests composed of white pine and red pine mixtures with few hardwoods. A common belief of presettlement forests is that extensive pine forests covered most of northern Wisconsin. This forest type was actually very limited even before settlement, with the most extensive block occurring in Vilas and Oneida counties. The remaining half of the county was comprised of hemlock, sugar maple, and yellow birch with mixtures of white and red pine.⁴ This forest type was the largest, most characteristic forest composition type in northern Wisconsin. [Finley, 1976, modified by Kotar, 1990, Wisconsin Biodiversity as a Management Issue].

Between the mid-1800s and early 1990s, forests throughout Wisconsin were almost entirely cut. White pine, and to some extent red pine, was the concentration of early logging practices, which virtually eliminated the white pine seed source in northern Wisconsin. Remaining forests were logged for commercial and industrial purposes or were cleared for agriculture.⁵

⁴ Original Vegetation Cover of Wisconsin (Map), compiled from U.S. General Land Office Notes by Robert W. Finley, 1976, of UW Extension.

⁵ Wisconsin's Biodiversity as a Management Issue: A Report to the Department of Natural Resource Managers.

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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 76.9% of the county's total area.

Woodlands or forest covered areas in the county are owned and managed by several different entities including public, conservation/educational organizations, private industrial forest investors, and other private landholders. Some private landowners may have their wooded land enrolled in one of the management programs offered by the WDNR, including the Managed Forest Law (MFL) program, or the Forest Crop Law (FCL) and Woodland Tax Law programs (no longer open to new enrollment). Such programs have been established to preserve and protect woodlands through practicing proper management techniques. It is important to identify the land ownership patterns within the county in order to analyze their potential impacts to land use, and to ensure and encourage the protection of the forest and related resources in the future.

Table 8-4 identifies the total acreage of wooded land within the county, by municipality, which is owned and managed by the various stakeholders including public sector, conservation and/or educational organizations, privately-held industrial forests, and private lands enrolled in forest management programs (see Map 8-4). Please note, the acreage owned by entities in the public sector includes all publicly-held lands for forestry or other uses such as administration buildings and service facilities. The lands identified on the map are referred to as properties under some form of land or resource protection, meaning that ownership or management practices of the property are unlikely to change during the planning period. In addition, the table also identifies the total impact of surface water and other privately-held lands which are not enrolled in a formalized management program. The information presented in this table will be utilized in identifying the impacts of various land ownership/management patterns on the county's landscape and tax base. This information is also depicted in Figure 8-6.

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**Table 8-4
Land and Resource Protection
Vilas County, Wisconsin
2000**

MUNICIPALITY	PUBLIC 1		National Forest		State Lands/Forest		County Lands/Forest		Town Lands/Forest		Tribal Lands		PRIVATE - FOREST PROGRAMS 2		Managed Forest Law		Forest Crop Law		Woodland Tax Law		PRIVATE - INDUSTRIAL FOREST		CONSERVATION/ EDUCATIONAL ORGANIZATION		PRIVATE (OTHER)		SURFACE WATER*		TOTAL ACRES
	Acres	% Total Acres	Acres	% Total Acres	Acres	% Total Acres	Acres	% Total Acres	Acres	% Total Acres	Acres	% Total Acres	Acres	% Total Acres	Acres	% Total Acres	Acres	% Total Acres	Acres	% Total Acres	Acres	% Total Acres	Acres	% Total Acres	Acres	% Total Acres	Acres	% Total Acres	Acres
Arbor Vitae	26,837.4	59.1%	-	0.0%	26,738.4	58.9%	-	0.0%	99.0	0.2%	-	0.0%	1,362.9	3.0%	1,083.9	2.4%	199.0	0.4%	80.0	0.2%	40.0	0.1%	-	0.0%	11,075.7	24.4%	6,104.5	13.4%	45,420.5
Boulder Junction	39,528.3	62.7%	-	0.0%	39,511.5	62.7%	-	0.0%	16.8	0.0%	-	0.0%	417.3	0.7%	175.3	0.3%	154.0	0.2%	88.0	0.1%	-	0.0%	257.0	0.4%	10,003.1	15.9%	12,850.0	20.4%	63,055.7
Cloverland	8,126.9	36.2%	-	0.0%	507.9	2.3%	7,574.6	33.8%	44.3	0.2%	-	0.0%	421.8	1.9%	341.8	1.5%	80.0	0.4%	-	0.0%	400.0	1.8%	41.3	0.2%	10,798.4	48.1%	2,649.4	11.8%	22,437.7
Conover	25,850.8	47.1%	669.6	1.2%	1,628.6	3.0%	23,514.1	42.8%	38.6	0.1%	-	0.0%	1,629.2	3.0%	1,246.7	2.3%	360.0	0.7%	22.5	0.0%	562.7	1.0%	110.4	0.2%	21,228.5	38.6%	5,550.4	10.1%	54,931.9
Lac Du Flambeau	35,939.3	43.9%	6,294.6	7.7%	442.7	0.5%	38.7	0.0%	163.5	0.2%	28,999.8	35.4%	4,490.0	5.5%	2,929.5	3.6%	1,498.6	1.8%	61.9	0.1%	1,941.4	2.4%	103.1	0.1%	21,086.0	25.7%	18,337.5	22.4%	81,897.2
Lincoln	1,760.5	7.5%	32.1	0.1%	942.5	4.0%	706.9	3.0%	79.1	0.3%	-	0.0%	843.8	3.6%	803.3	3.4%	40.4	0.2%	-	0.0%	-	0.0%	77.6	0.3%	17,917.6	75.9%	2,995.9	12.7%	23,595.3
Land O' Lakes	16,013.4	25.4%	-	0.0%	12,440.3	19.7%	2,132.4	3.4%	1,440.8	2.3%	-	0.0%	6,765.4	10.7%	4,452.5	7.1%	2,254.9	3.6%	58.0	0.1%	2,189.4	3.5%	75.9	0.1%	29,170.1	46.3%	8,849.3	14.0%	63,063.5
Manitowish Waters	10,451.1	45.6%	-	0.0%	10,028.4	43.7%	-	0.0%	422.7	1.8%	-	0.0%	470.4	2.1%	470.4	2.1%	-	0.0%	-	0.0%	-	0.0%	35.6	0.2%	6,902.5	30.1%	5,066.2	22.1%	22,925.8
Phelps	38,226.4	55.1%	37,578.1	54.2%	412.1	0.6%	-	0.0%	121.9	0.2%	114.3	0.2%	1,644.9	2.4%	1,604.9	2.3%	40.0	0.1%	-	0.0%	156.8	0.2%	761.1	1.1%	19,321.3	27.8%	9,266.2	13.4%	69,376.6
Plum Lake	40,194.4	63.9%	-	0.0%	34,592.2	55.0%	5,513.9	8.8%	88.3	0.1%	-	0.0%	2,101.1	3.3%	1,501.1	2.4%	600.0	1.0%	-	0.0%	160.0	0.3%	23.3	0.0%	12,906.4	20.5%	7,554.5	12.0%	62,939.6
Presque Isle	9,381.0	19.1%	-	0.0%	8,154.5	16.6%	-	0.0%	1,226.5	2.5%	-	0.0%	2,271.8	4.6%	800.7	1.6%	1,430.1	2.9%	41.0	0.1%	654.4	1.3%	175.0	0.4%	27,070.8	55.1%	9,586.3	19.5%	49,139.3
St. Germain	8,583.2	33.3%	-	0.0%	8,156.7	31.7%	-	0.0%	426.5	1.7%	-	0.0%	837.4	3.3%	717.4	2.8%	80.0	0.3%	40.0	0.2%	280.0	1.1%	37.1	0.1%	11,489.4	44.6%	4,529.8	17.6%	25,756.8
Washington	10,920.7	35.7%	9,394.7	30.7%	279.1	0.9%	22.0	0.1%	1,224.9	4.0%	-	0.0%	1,267.5	4.1%	774.5	2.5%	493.0	1.6%	-	0.0%	80.0	0.3%	165.2	0.5%	13,987.3	45.7%	4,168.4	13.6%	30,581.4
Winchester	6,069.0	17.5%	-	0.0%	5,898.7	17.0%	-	0.0%	170.2	0.5%	-	0.0%	1,116.9	3.2%	910.5	2.6%	142.4	0.4%	64.0	0.2%	9,098.3	26.2%	1,753.3	5.1%	12,676.8	36.6%	3,950.8	11.4%	34,665.1
Eagle River	-	0.0%	-	0.0%	-	0.0%	-	0.0%	-	0.0%	-	0.0%	-	0.0%	-	0.0%	-	0.0%	-	0.0%	-	0.0%	-	0.0%	1,613.5	93.2%	117.9	6.8%	1,731.4
County Totals	277,882.4	42.7%	53,969.1	8.3%	149,733.6	23.0%	39,502.5	6.1%	5,563.1	0.9%	29,114.1	4.5%	25,640.1	3.9%	17,812.4	2.7%	7,372.3	1.1%	455.4	0.1%	15,562.9	2.4%	3,615.8	0.6%	227,239.5	34.9%	101,577.0	15.6%	651,517.7

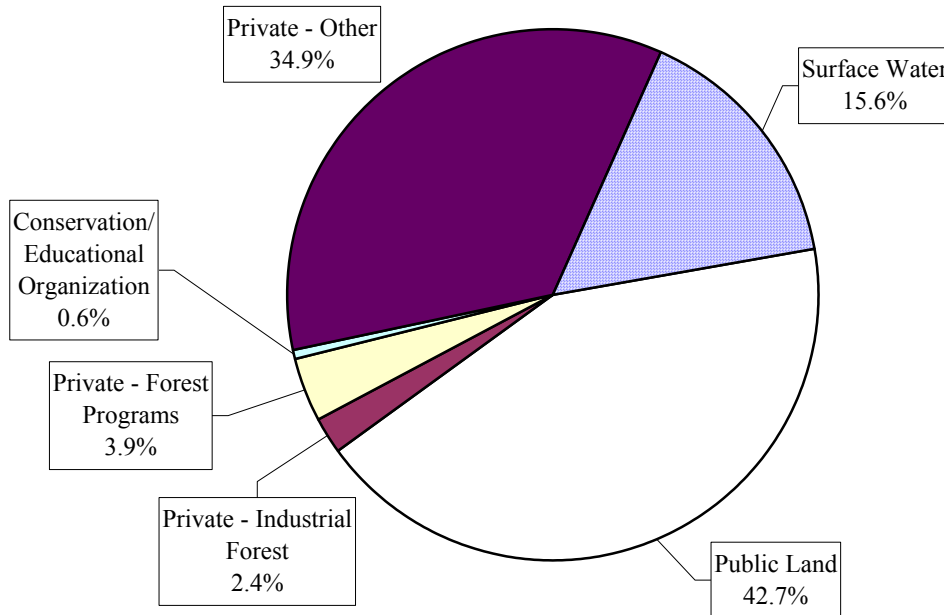
* Includes Islands

1 PUBLIC = total of National Forest, State Lands/Forest, County Lands/Forest, Town Lands/Forest, and Tribal Land

2 PRIVATE - FOREST PROGRAMS = total of lands enrolled in Managed Forest Law, Forest Crop Law, and Woodland Tax Law program

Last revised: 6/6/00

Figure 8-4 Land and Resource Protection Acreage Vilas County 1999



Source: Wisconsin Department of Natural Resources, 1999; Vilas County Mapping Department; North Central Regional Planning Commission.
 *Includes islands.

This information reveals that 65.1% of the county’s area is either in public ownership (42.7%), surface water (15.6%), or formally managed by private-sector individuals/organizations including industrial forest land (2.4%), conservation/education organization owned (0.5%), and 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. The following identifies the ownership patterns more specifically, and also identifies the potential impacts, implications, and land use management issues associated with each.

Public Ownership

State of Wisconsin Ownership

Within the county, the state of Wisconsin owns the majority of the publicly-owned land with approximately 149,733.6 acres (23% of land in county), the majority of which is included in the Northern Highland - American Legion State Forest (NHAL). Every municipality in the county has some state forest land within its boundaries, except for the City of Eagle River. There are 39,511 acres of state forest land in the Town of Boulder Junction, approximately 34,592 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. Ultimately, the management goal is to benefit the people of Wisconsin, both current and future generations.⁶ The acquisition of property for inclusion in the NHAL state forest is based on “willing sellers”.

The master plan for the management of the NHAL property is currently being revised. Public involvement in the forest planning process is encouraged, and interested persons should contact the WDNR NHAL headquarters in Woodruff for additional details. It would be advantageous for county residents to participate in the Forest Plan Revision process to ensure the county’s needs and ideas are being considered with regard to the NHAL, as it comprises a significant portion of the county

Federal Ownership

Lands in the county owned by the federal government total approximately 53,969.1 acres (8.3% of land in county), which are primarily part of the Nicolet National Forest, but include some Chequamegon National Forest lands. The majority of this acreage is located in the Town of Phelps where the Nicolet National Forest comprises 37,578.1 acres, or 54.2% of the town. The remaining federally-owned lands are located in Washington, Lac du Flambeau, and relatively small amounts in the Towns of Conover, Lincoln, and the City of Eagle River.

The Nicolet National Forest (NNF) occupies approximately 47,000 acres or 7% of the county’s total area. The NNF covers over 661,000 acres in Vilas, Florence, Forest, Langlade, Oconto and Oneida counties in Wisconsin. Historically, this area, which is now forest land, was subject to destructive logging practices and was then sold to immigrants for farms and homesteads. Farming was not viable in the area’s soils which are 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 NNF not only provides abundant recreational opportunities, but is also a working forest which provides for timber production.⁷

⁶ Northern Highlands American Legion State Forest Land Acquisition Agent, phone conversation with Foth & Van Dyke, October 1999.

⁷ USDA Forest Service, Chequamegon-Nicolet National Forest, at www.fs.fed.us/r9/cnnf/.

The United States Department of Agriculture (USDA) Forest Service is currently revising the forest plans of the Chequamegon - Nicolet National Forests. The two forests were merged in 1993 to be managed as one administrative unit, though each have retained their individual identity. The most current forest plans were completed in 1986, and were designed to last 10-15 years. Revision of the plans, including the consolidation into one forest plan, officially began in 1996. It was determined by the Forest Service through monitoring, evaluation, and public comment that there was a need to make changes to the 1986 plans. Major revision topics which will be addressed in the revised plan include 1) access and recreational opportunities, 2) biological diversity, 3) special land allocation, and 4) timber production. Public involvement in the forest planning process is encouraged, and interested persons should contact the Nicolet National Forest office in Rhinelander or the Eagle River Ranger District. It would be advantageous for county residents to participate in the forest plan revision process to ensure local needs and ideas are being considered with regard to the NNF.

Land acquisition for inclusion in the NNF is done on a “willing seller” basis. However, the Forest Service has identified types of land they would be interested in acquiring, which includes land with threatened and/or endangered species present, land within the “forest block” which can therefore be easily and efficiently managed, land adjacent to lakeshores, and in general any lands which warrant protection. The Forest Service also entertains land exchanges, however the agency will not sell land. The acquisition of land by the Forest Service is variable. For example, between 1987 and 1996, the Forest Service acquired a total of 331 acres for inclusion in the Chequamegon and Nicolet National Forest.⁸

There is a little over 6,000 acres of Chequamegon National Forest (CNF) land located in the Town of Lac du Flambeau which comprises approximately 1% of the county’s total area. The same discussion provided under the NNF applies to the CNF, as both are managed as one forest unit.

Vilas County Ownership

Vilas County owns 39,502.5 acres, most of which is part of the Vilas County Forest, comprising 6.1% 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 VCF provides abundant recreational opportunities, and is also a working forest which provides for timber production. The current management plan for the VCF was written in 1995, and will be reviewed and discussed at public hearings in the year 2005, as state law requires counties to review management plans every 10 years. On average, approximately 600 acres of VCF land is logged each year which brings approximately \$200,000-\$350,000 into the county annually.⁹ Ten percent of the profits received are returned to the towns where county forest land is located to make up for the loss of property taxes.

⁸ USDA Forest Service, Chequamegon-Nicolet Forest, Foth & Van Dyke phone conversation with supervisor’s office, Rhinelander, Wisconsin, October 1999.

⁹ Krembs, Dorothy, “County Forest Management Practice Has Eye Toward Global Perspective,” The Lakeland Times, January 19, 1999., p. 3,8.

In terms of acquisition of property for inclusion in the Vilas County Forest, the plan is to obtain lands as they become available. The desire is to obtain those properties which would result in the “filling in” of the existing forest boundary block which is currently rather fragmented. In recent years the County has been relatively unsuccessful in acquiring property due to the continually rising land prices, and the county cannot compete with the private market at these prices. The County will trade isolated lands for in-fill parcels.

The significant amount of land in public ownership (federal, state, and county) in the county provides many benefits including the following:

- ◆ Long-term preservation of the county’s “northwoods” character. Amidst a time of rapid development of private land within the county, lands in public ownership remain “untouched”, providing the basis for the county’s northwoods appeal which is sought by tourists and recreational enthusiasts.
- ◆ Provides the basis for recreational and aesthetic opportunities, the driving force behind the county’s tourism-focused economy.
- ◆ Requires minimal services from local units of government, therefore less cost. Contrary to popular belief, publicly-owned land does not burden the tax base of local municipalities. In fact, the higher assessments and property taxes generated by development are often offset by the increased services that must be provided, whereas minimal services are required by local government to support public lands. In addition, the recreationalists/tourists who utilize public lands will bring money to the local economy during their stay in the area.
- ◆ Provides managed commercial timber production which is an integral part of the regional and national economy for consumer goods.

Tribal Ownership

Tribal lands comprise approximately 4.5% of the county’s total acreage. Most are located in the Town of Lac du Flambeau which comprise the Lac du Flambeau Indian Reservation. A small amount of tribal land in the Town of Phelps has been acquired as part of the Lac Vienx Desert Reservation.

Town Ownership

Town-owned lands comprise less than 1% of the county’s total acreage. Primarily, town-owned land is 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 forest land for the purpose of commercial timber production.

Private Ownership

It is important to identify how the remaining woodlands in the county are (or are not) managed and the value private landowners place on maintaining their wooded property.

Private - Forest Programs

Over 25,600 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 forest land 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 (6,765.4 acres), Lac du Flambeau (4,490 acres), and Presque Isle (2,272 acres). Overall, each town in the county has some acreage enrolled in one or more of these programs.

Private - Industrial Forest

Over 15,500 acres are owned by private entities for industrial purposes, such as for paper making 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, along with some others. [Corporate ownership of these lands has been changing rapidly in recent years through acquisitions by Stora Enso, Plum Creek, and others.] 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 forest land 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, which is managed for industrial use within their boundaries, however the amount is not very significant. The importance of identifying lands which are currently owned for industrial purposes is that major land use impacts could occur if the large, contiguous tracts of industrial forest lands would ever be sold, divided, and/or used for private purposes other than timber production. Some sale of blocks of industrial forestland is occurring now. Such private uses may significantly change the landscape and impact the county's rural character in these areas. However, a large amount of the industrial forest land is also enrolled in the WDNR's forest management program(s), and therefore is contractually obligated to remain forested for some time. In essence, the very large tracts of industrial forest add to the county's rural, wooded northwoods character and appeal, and generally provide large area for public hunting and other outdoor recreational activities.

Conservation/Educational Organization Ownership

Conservation/educational organizations own over 3,500 acres in the county comprising approximately 0.6% 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. School district property is also included in this section. 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.

Private - No Management

The remaining acreage, which comprises approximately 34.9% of land in the county, is not enrolled in any type of formalized management program. This land typically includes existing intensive development (i.e., residential, commercial, industrial). These private uses may have the largest impact the county's rural character and quality of natural resources if not properly planned for.

In recent years, the demand for private forest land has increased dramatically. The reason for this can be primarily attributed to the decreasing available supply of waterfront property. As the amount of available waterfront property in the county declines, the demand for forest land has been increasing. For example, several years prior to this writing, hunting land was selling for approximately \$300/acre. In 1999, market prices reflect a minimum of \$1,000/acre, an increase of over 230% in a few years time¹⁰. Private woodland management will continue to have significant impact in Vilas County. Private landowners should be encouraged to participate in the Managed Forest Law program, or engage in some other form of formalized forest management practices such as the tree farm programs sponsored by the paper companies, to ensure the preservation and health of the county's woodland resources and wildlife habitat. There are numerous benefits which result from properly managing woodlands, including:

- ◆ Protection against overcutting
- ◆ Low regular property tax (MFL)
- ◆ Protection against annual property tax hikes (MFL)
- ◆ Technical assistance for private forest lands (MFL)
- ◆ Predictable property tax (MFL)
- ◆ Long term forestry investment
- ◆ Encourages woodland expansion
- ◆ Preserves and manages wildlife habitat
- ◆ Preserves "Northwoods" character

8.9 Areas of Critical Environmental Sensitivity

Areas of critical environmental sensitivity are those unique elements/areas of the natural resource base which should be preserved, and therefore excluded from urban/intensive development. Typically, areas of critical environmental sensitivity include wetlands, floodplains/floodways, critical shorelands, areas of steep slope (especially those adjacent wetlands and shorelands), publicly-owned scientific and natural areas (i.e. fish & wildlife habitats), and identified archaeological sites. The protection of such areas is intended to 1) protect the health, safety, and welfare of the general public, 2) protect surface water and groundwater quality, 3) reduce

¹⁰ Krueger, Kurt, "Property Values Rise Again As Water Lots, Forests Lead." Vilas County News Review, Wednesday, August 18, 1999, Vol. 114, No. 20, p. 1, 2.

damage from flooding and stormwater runoff, and 4) maintain important wildlife habitats or recreational areas.

Most of the areas of critical environmental sensitivity within Vilas County are already managed/regulated at the federal, state, and/or county level, such as wetlands, floodplains, shoreland buffer zones, and publicly-owned scientific and natural areas. There are nine publicly-owned state natural areas located within Vilas County. Table 8-5 identifies each of these significant areas and provides a brief description of each.

In addition, the WDNR maintains a listing of all rare, threatened, and endangered species and natural communities within the state. A listing of these species and communities which exist in Vilas County is included in Appendix A.

Table 8-5 State Natural Areas Vilas County

State Natural Area	Location	Acres	Reason for I
High Lake Spruce - Balsam Forest	Presque Isle, T43N R7E, Sec. 35, NE¼ NE¼, in NHAL	40	Designated in 1953 as representat Wisconsin. Research on the ecol disturbance has become major va budworm infestation killed about
Plum Lake Hemlock Forest	Plum Lake, T41N R8E, Sec. 21&22, in NHAL	228	Contains a near virgin, old-growtl associated hardwoods. White pin 1880's, otherwise the forest is in p (estimated origination = 1810).
Bittersweet Lakes	Arbor Vitae, T40N R7E, Sec. 15, 22, & 27, in NHAL	568	Contains four clear (oligotrophic) setting, each separated by isthmus
Black Tern Bog	Arbor Vitae, T40N R6E, Sec. 11, pt. NE¼, in NHAL	26	Bog has an outstanding collection and unusual species. Large numb bog.
Johnson Lake Barrens	Land O' Lakes, T42N R8E, Sec. 8&9, in NHAL	189	Contains most of the remaining p Also present are northern sedge m and a shallow, soft drainage lake.
Aurora Lake	Plum Lake, T41N R8E, Sec. 18&19, in NHAL	250	The lake is a shallow, soft, draina and has a wilderness aspect. A st tract.
Goodyear Springs – East	Land O' Lakes, T42N R8E, Sec. 14, pt. E½, in NHAL	180	Contains a spring and northern se the few unaltered spring ponds le
Day Lake	Boulder Junction, T41N R6E, Sec. 1&2, in NHAL	117	Lake is an exceptionally oligotrop specialized flora of rosette-formin scenic lake is designated a Wild L
Pine-Oak Grove*			

*No information available

Source: WDNR, State Natural Areas by County, last revised April 30, 1999