

CHAPTER 4: AGRICULTURAL AND NATURAL RESOURCES

INTRODUCTION

Natural resources are materials that occur in nature such as water, air, forests, soil, minerals, and geologic features, as well as biological communities comprised of plants and animals. According to the United States Forest Service's Wildland Planning Glossary, natural resources may also be defined as:

- a feature of the natural environment that is of value in serving human needs;
- a feature about which choices must be made;
- original, basic, or primary aspects of nature, not a manufactured or processed product;
- commodities such as timber, water, minerals, or amenities such as scenery or scenic viewing points; and/or
- a relative concept depending on the needs and wants of the planning agent, the planning purpose, the technological means of using a feature, and the ability to make use of a feature given social constraints on its use.

Natural resources and agricultural activities have played important roles in Door County's economic, social, environmental, and cultural growth and health for more than 150 years. Agricultural practices have always been closely intertwined with the county's natural resources, but more attention is now paid to their sometimes negative impact on water quality. Multiple voluntary and regulatory programs administered at both the state and county levels have been implemented in order to improve this relationship. Overall, agricultural lands and adjacent natural areas, such as woodlots and stream corridors, provide habitat for wildlife and waterfowl as well as scenic vistas valued by both residents and visitors.

This chapter first discusses the area's climate, geology, topography, air quality, soils, and runoff/stormwater management, all of which are related to both the agricultural and natural resources in the county. Then follows discussion of agricultural resources, including agricultural soils, numbers and types of farms, trends in agriculture, economic impacts of agricultural activity, and environmental impacts of agriculture. Specific natural resources then discussed are Lake Michigan, watersheds, surface waters, groundwater, and wetlands; shorelands and floodplains; woodlands; wildlife habitats; ecologically important natural areas; currently preserved areas in the county; and non-metallic mineral resources.

GENERAL INFORMATION

CLIMATE

Door County's climate is a cool, humid, continental type in which temperature varies greatly from summer to winter. The surrounding Green Bay and Lake Michigan modify the climate somewhat: there are fewer days with extremely high and low temperatures than is common for this latitude. The water, cooled during winter, delays spring and early summer, and, warmed during the summer, delays the first freeze in the fall. Mild and pleasant summers prevail.

About two-thirds of the annual precipitation falls during the growing season or the "freeze-free" period. It is normally adequate for crop production, although droughts are occasionally reported. The climate is generally favorable for dairy farming, fruit production (primarily cherries, apples, and berries), and crops such as corn, small grains, hay, and vegetables.

According to data taken from the weather center at the Sturgeon Bay Experimental Farm, between 1971 and 2000 the mean annual temperature was 43.6 degrees Fahrenheit. Mean temperatures between 1905 and 2001 were 20.3 in the winter, 65.8 in the summer, 48.4 in the fall, and 41.6 in the spring. The freeze-free season is a median of 148 days with a range between 132 and 161 days. The extended length of the growing season at this northern latitude (the 45th parallel runs through approximately the middle of the county) is due primarily to the moderating effect of Lake Michigan and Green Bay. The average date of the last spring freeze is May 12th and the average date of the first autumn freeze is October 8th.

The average annual precipitation between 1971 and 2000 in the county was 31.5 inches. For the same time frame, the mean number of snowfall inches was 47.9 and thunderstorms averaged about 33 per year. Occasional hail, wind, and lightning damage is also reported. The first snowfall of consequence, an inch or more, is usually in late November. Average annual duration of snow cover is approximately 111 days. The snow cover acts as protective insulation for grasses, autumn-seeded grains, alfalfa, and other vegetation.

According to the National Climatic Data Center Climate Division Dataset, the state's climate has changed over time since the beginning of modern records in 1895. Over the past 112 years, Wisconsin's average annual temperature has risen by 1.1 degrees Fahrenheit and average annual precipitation has increased by 2.24 inches.

GEOLOGY AND TOPOGRAPHY

Door County's geology and topography have been largely defined by the county's Silurian dolostone (dolomite limestone) bedrock. Laid down as sediment on the bottom of a warm shallow sea over 400 million years ago, the rock has been modified by weathering and erosion over long periods of time and by the action of continental glaciers during the last several million years. These glaciers smoothed hilltops, filled in valleys, and left deposits of glacial drift of various types and amounts. The result is a complex landscape of Silurian dolostone, prominently exposed in some areas and thinly or even deeply buried by glacial deposits in others. Silurian dolostone is the bedrock of most of Door County, except for a narrow area along the Green Bay shore in the southwest corner of the county where shale and carbonate rocks of the older Maquoketa Formation are exposed.

This Silurian bedrock forms the extensive physiographic feature or ledge known as the Niagara Escarpment. The Escarpment forms the "backbone" of the Door Peninsula, arcs through Canada for more than 900 miles, and finally forms Niagara Falls at the east end of Lake Erie. The Escarpment in Door County is most prominent – and in many places exposed – along the western side of the county, including the Brussels Hill and the 60- to 200+-foot cliffs along or near the Green Bay shoreline, such as in Potawatomi and Peninsula State Parks.

Dolostone is a sedimentary rock similar to limestone, but slightly harder and dissolves more slowly than limestone. Geologists from the Wisconsin Geological and National History Survey and the University of Wisconsin – Green Bay have found a wide variety of karst features such as sinkholes, enlarged joint openings, and cave systems throughout the bedrock in Door County. These features are the result of small pre-existing fractures in the dolomite bedrock that are slowly enlarged over time by the solution action of slightly acidic groundwater; the Niagara dolomite crevices in Door County have been subjected to considerable dissolution from groundwater activity. The resultant well-developed network of horizontal and vertical crevices provides direct pathways for the effective infiltration of surface water and the rapid flow of groundwater, with velocity in karst aquifers that potentially reach those of surface streams. Furthermore, with surface water able to flow freely into the aquifer due to the presence of surface-level karst features, groundwater in the county has a high chance of becoming contaminated.

Glacial deposits over the land surface of Door County consist of both till and glaciofluvial sediment. Till, or unstratified drift, is a mixture deposited directly by the glacier consisting of an unsorted mixture of clay, sand, gravel, pebbles, and boulders. Till is the surface material of most of the fields and wood lots in the county. Particularly interesting examples of landforms composed of till are the drumlins found south and east of Ellison Bay, northwest of Kangaroo Lake, and between Sturgeon Bay and the Ahnapee River. A drumlin is a smooth, streamlined hill with a blunt nose and a gently sloping tail oriented in the direction of the glacier movement. Drumlins can be found along County Highway ZZ in Liberty Grove and along Highway 42 in Ephraim.

Glaciofluvial deposits are composed of particles moved by glaciers and subsequently sorted and deposited by streams flowing from the melting ice. These deposits are stratified and occur in the county primarily in the form of kames and small eskers. Kames are small hills or short ridges consisting of layers of sand and gravel deposited by a meltwater stream at the margin of a melting glacier. Eskers are ridges of sand and gravel, which were deposited from meltwater running in tunnels below or inside the glaciers. Examples of both can be found in the Kangaroo Lake Moraine which extends westward across the county from Kangaroo Lake. These deposits consist of medium- to coarse-grained sand and gravel with numerous cobbles, boulders, and portions of till.

Other significant topographic features in the county include sand dunes, complexes of beach ridges and swales, and inland lakes. Wetlands of various types and sizes are also scattered throughout the county and are discussed in more detail later in this chapter. In Northern Door, these wetlands primarily drain southeastward into Lake Michigan through small streams. In Southern Door, wetland drainage flows into both Green Bay and Lake Michigan.

AIR QUALITY

In April 2004, Door County was identified by the U.S. Environmental Protection Agency (EPA) as a “non-attainment” zone for their ozone air quality standard. Non-attainment zones are areas that exceed the EPA’s 8-hour ozone national air quality standard that is designed to protect the public from breathing unsafe air. Ozone is unhealthy to breathe, especially for people with respiratory diseases and children; persons active outdoors are also at increased risk. Air quality is currently monitored by one EPA station in the county, located at Newport State Park in the Town of Liberty Grove.

The EPA classifies ozone non-attainment areas based on the severity of their ozone problem: Door County is categorized as a “basic” non-attainment area, subject to the more general requirements of the Clean Air Act. Such areas must comply with the requirements outlined in its state’s EPA-approved plan to reduce the levels of ozone. Methods used to meet the ozone standard may include stricter controls on emissions by industrial sources. In addition to the general environmental and health concerns high ozone levels may pose, Door County’s designation as a non-attainment zone may mean that businesses or industries wishing to move to the county will be subject to additional requirements.

The Wisconsin Department of Natural Resources (DNR) and the Lake Michigan Air Directors Consortium indicate that the majority of the area’s pollutants originate from coal-burning power plants, manufacturing plants, and automobiles operating in northwest Indiana, the Chicago area, and southeast Wisconsin. Research shows that this ozone, transported by weather patterns, contributes significantly to high ozone levels. Given the primary origin of many of the emissions affecting Door County, implementing any controls locally may have very little impact on the problem.

SOILS

The soils in Door County originate from glaciation, bedrock weathering, and fluvial activity. Due to the calcareous nature of the parent material, Door County soils are characteristically alkaline. The majority of the soils came from glacial till laid over the Silurian dolostone and are characteristically reddish brown, heavy loam subsoil over a light brown, permeable loam or sandy loam substratum. A smaller portion of the county's soils come from outwash sand and gravel or lacustrine sediment.

Many of the soils in Door County are very shallow, especially in the northern two-thirds of the county. Across most of the county, soils are less than five feet in depth to bedrock; 22% of the soil is less than 18 inches in depth and another 17% is between 18 to 36 inches in depth. The soils in the northern two-thirds of the county are rough and/or shallow, with much of the land cover remaining in woodland or wetland. The soils in the southern one-third of the county are deeper, smoother, and predominately farmed. The largest acreage of the county's wetlands are also found in this region.

SOIL DESCRIPTIONS

The U.S. Department of Agriculture's (USDA) Natural Resources Conservation Service (NRCS) is responsible for collecting, storing, maintaining, and distributing soil survey information for privately owned lands in the United States. The *Soil Survey of Door County, Wisconsin*, completed in 1978 by the NRCS, provides detailed soil information and maps for the county. Door County has 75 different soil types, grouped into six general soil associations that have similar patterns of relief and drainage. Map 4.1, found at the end of this document, depicts these general soil associations, which typically consist of one or more major soils and some minor soils. Note that the *Soil Survey* is a preliminary reference tool for identifying soil conditions in Door County; actual soil conditions should be verified in the field with on-site inspection and soil testing.

The six major soil associations in Door County, per the *Soil Survey*, are:

- Summerville-Longrie-Omena association:
 - Occupies approximately 40 percent of the county; found mostly in northern Door County.
 - Shallow to deep, well-drained, nearly level to moderately steep soils that have a sandy loam or loam subsoil over sandy loam, fine sandy loam till, or dolomite bedrock.
- Emmet-Solona-Angelica association:
 - Occupies approximately 23 percent of the county; found mostly in the southeastern portion of the county.
 - Deep, well-drained to poorly-drained, nearly level to sloping soils that have a loamy sand to silt loam subsoil over sandy loam or loam till.
- Rousseau-Kiva-Markey association:
 - Occupies approximately 6 percent of the county; mainly found along the eastern coast and in southern Washington Island.
 - Deep, well-drained and moderately well-drained, and gently sloping and sloping soils that have a fine sand or sandy loam subsoil over sand or sand and gravel outwash; and very poorly drained, nearly level organic soils.

- Kewaunee-Kolberg-Manawa association:
 - Occupies approximately 11 percent of the county; found in Southern Door, primarily in the southwest.
 - Deep and moderately deep, well-drained and somewhat poorly drained, nearly level to moderately steep soils that have a dominantly silty clay subsoil over silty clay till or dolomite bedrock.
- Deford-Yahara Variant-Carbondale association:
 - Occupies approximately 5 percent of the county; found in the Mink River and northern Baileys Harbor areas and the eastern half of the canal.
 - Deep, poorly drained, nearly level soils that are underlain by fine sand outwash or that have a silt loam subsoil over stratified lake sediments; and very poorly drained, nearly level organic soils.
- Carbondale-Cathro association:
 - Occupies approximately 7 percent of the county; scattered across the county.
 - Very poorly drained, nearly level organic soils (poorly drained mucks).

RUNOFF/STORMWATER MANAGEMENT

The DNR describes runoff as water from rainfall or melting snow that flows across the landscape, washing soil particles, bacteria, pesticides, fertilizer, pet waste, oil, and other toxic materials into lakes, streams, and groundwater. This is called "nonpoint source pollution," as the source of the pollution cannot be traced to one definitive source. Nonpoint source pollution comes from a diverse number of sources and activities, including use of fertilizers, pesticides, and herbicides on lawns and farm fields; plowing fields for crops and other agricultural activities; driving and maintaining cars; constructing buildings and roads; mining; and maintaining roads in the winter. Actual pollutants found in runoff from agricultural and developed lands include sediment, phosphorus, nitrogen, bacteria, and pesticides. Point source pollution is that which originates from a single point such as pipes, drains, ditches, wells, containers, or other identifiable sources that serve as direct conduits of pollutants into the water.

The DNR states that urban and rural nonpoint source pollution is the leading cause of water quality problems in Wisconsin, degrading or threatening an estimated 40 percent of the streams, 90 percent of the inland lakes, many of the Great Lakes harbors and coastal waters, many wetland areas, and substantial groundwater resources in Wisconsin.

Polluted runoff contributes to habitat destruction, fish kills, reduction in drinking water quality, harbor and stream siltation, and a decline in recreational use of lakes. Both voluntary and regulatory programs have been designed by the DNR in order to decrease the impact of polluted runoff upon the water resources of Wisconsin.

DOOR COUNTY LAND AND WATER RESOURCE MANAGEMENT PLAN

The Door County Soil and Water Conservation Department (SWCD) has the responsibility for the administration of the county's soil and water conservation programs that are designed to halt and reverse the depletion of the county's soil resources and pollution of its waters. The Door County Land and Water Resource Management Plan (LWRMP) 2006-2010 was developed by the SWCD and approved by the Land Conservation Committee in accordance with the requirements set forth in Chapter 92 of the Wisconsin Statutes. This plan identifies current runoff/stormwater management challenges and establishes goals and strategies to protect the land and water resources of Door County. Federal, state, and local agencies as well as the general public participated in the formation of its runoff management goals, listed below.

- **Groundwater protection and improvement:** Improve and maintain the drinking water supply for Door County to acceptable state standards.
- **Impacts of development on natural resources:** Minimize the adverse effects of fragmentation, urban sprawl, construction site erosion, increased impervious areas, and other development pressures on Door County’s land and water resources.
- **Animal waste management:** Reduce the risks to water quality through proper storage, handling, and disposal of animal waste.
- **Surface water protection:** Protect and improve Door County’s surface water resources from nonpoint source pollution and maintain acceptable state surface water quality standards.
- **Stormwater management:** Reduce the risk to Door County’s water quality and prevent flooding through proper stormwater runoff management.
- **Soil erosion control; agricultural and construction site:**
 - Reduce soil erosion rates on agricultural fields through proper soil conservation practices.
 - Reduce soil erosion from construction sites through proper soil erosion control measures.
- **Non-metallic mine reclamation:** Reduce the impacts to Door County’s water quality and other natural resources from nonmetallic mines through proper operation and/or reclamation procedures.

The LWRMP addresses the implementation of these goals through a variety of programs, categorized here by agricultural implementation, urban and rural non-agricultural implementation, and other SWCD programs.

Agricultural Implementation

The SWCD implements agricultural runoff management through a variety of programs, described below.

- ***Voluntary Implementation***
The SWCD provides landowners with assistance in planning, designing, and installing conservation measures appropriate for their resource management needs.
- ***Red River/Sturgeon Bay Priority Watershed***
The Red River/Sturgeon Bay Watershed was designated as a priority watershed in 1992 under the DNR’s Wisconsin Nonpoint Source Water Pollution Abatement Program (NPSP), described later in this chapter. Objectives of this program are to: improve water quality and safeguard wells by reducing nutrients, sediment, and bacteria loading from urban areas, animal lots, improperly stored manure, milkhouse waste, and eroding farm fields; maintain water quality goals within the well head zone of contribution for the city of Sturgeon Bay; stabilize flow rates of creeks in the watershed; and maintain woodland corridors and buffers.
- ***Farmland Preservation Program***
The Farmland Preservation Program is designed to preserve agricultural lands and open spaces through orderly land use planning and development, and promoting soil and water conservation. This program provides tax relief to enrolled farmland owners; \$38,661 in credits was distributed to Door County in 2006.
- ***Nutrient Management Program***
The purpose of the Nutrient Management Program is to develop plans that control the amount, source, form, location, and timing of plant nutrient applications, including

application of organic wastes, commercial fertilizers, soil reserves, and legumes, in order to provide plant nutrients while minimizing the movement of nutrients to surface water and groundwater. Excess application of nutrients, particularly nitrogen and phosphorus, can result in water quality problems such as eutrophication of surface water bodies and introduction of nitrates into groundwater.

- **Chapter NR 243 Program**

Chapter NR 243 of the state administrative rules was designed to address nonpoint sources of pollution due to animal waste.

- **Targeted Runoff Management Program**

The DNR Targeted Runoff Management Grant Program provides cost-share assistance for control of polluted runoff from both urban and rural sites. The grants awarded through this program are typically used to address water quality problems associated with high-priority resources.

- **Agricultural Performance Standards and Prohibitions**

To improve the protection of water resources from nonpoint source pollution, the Agricultural Performance Standards and Prohibitions requires the development of performance standards for agricultural and non-agricultural nonpoint source water pollution. The Door County Land and Water Resource Management Plan is designed to follow the guidelines outlined in the statewide performance standards and prohibitions.

Urban and Rural Non-Agricultural Implementation

The SWCD implements urban and rural non-agricultural runoff management through a variety of programs including voluntary implementation, stormwater runoff management and construction site erosion control, the Wellhead Zone of Contribution Protection Program, the Beach Contamination Source Identification Program, the Well Abandonment Program, and by providing general technical assistance. The SWCD also assists the Village of Ephraim with their Stormwater/Construction Site Erosion Control Ordinance.

- **Voluntary Implementation**

The SWCD provides landowners, contractors, and other agency referrals with assistance in planning, designing, and installing conservation measures appropriate for their resource management needs.

- **Stormwater Runoff Management and Construction Site Erosion Control**

To meet the requirements of the federal Clean Water Act, the DNR developed the Wisconsin Pollutant Discharge Elimination System (WPDES) Storm Water Discharge Permit Program which is regulated under the authority of NR 216 and applies to the discharge of stormwater in Wisconsin from construction sites, industrial facilities, and selected municipalities. In 2004, the DNR received authority through a revision of NR 216 to require landowners of construction sites with one acre or more of land disturbance to obtain permits to meet the standards outlined in NR 151.

NR 151 includes non-agricultural performance standards that encompass the construction and post-construction phases of new development and redevelopment areas, as well as some requirements for developed urban areas. The nonagricultural standards outlined in NR 151 regulate erosion control for both during construction and post-construction. The SWCD implements these standards through their Stormwater Runoff Control Design Criteria Procedural Policy.

- **Beach Contamination Source Identification Program**

Between 2003 and 2007, the Door County Soil and Water Conservation Department conducted an extensive beach contamination source identification effort, with a final report written in 2006 – 2007 that identified stormwater discharge as one of the clear sources of

E. coli contamination. More information on beach and water quality may be found in the Surface Waters section later in this chapter.

- **Well Abandonment Program**

The Well Abandonment Program, implemented by the SWCD, relies on staff contacts, DNR Water Quality Specialist reports, and volunteer reporting of unused wells or drillholes for proper sealing. Proper well abandonment involves properly sealing wells that are no longer in use to prevent any contaminants from using a well as a direct route to the groundwater supply.

- **Wellhead Zone of Contribution Protection Programs**

More on wellhead zone of contribution protection programs may be found in the Groundwater section later in this chapter.

- **Technical Assistance**

The SWCD also provides technical assistance to landowners/operators, interested groups, and other governmental units through general resource management assistance to the public, assistance to other municipalities, and research assistance to universities and other agencies pertaining to Door County's natural resources.

- **Village of Ephraim Stormwater/Construction Site Erosion Control Ordinance**

The Village of Ephraim currently has a Stormwater/Construction Site Erosion Control Ordinance that regulates construction sites within the Village of Ephraim. SWCD assists in its administration.

Other SWCD Runoff Related Programs

SWCD offers other runoff related programs, including the County Water Pollution Abatement Cost-Share Program, County Buffer Program, Conservation Reserve Enhancement Program, and also provides information and education.

- **County Water Pollution Abatement Cost-Share Program**

Adopted by Door County in 1980, the Water Pollution Abatement Cost-Sharing Program Policy was designed to provide cost-share funding to landowners for installing practices designed to abate water pollution. The SWCD provides technical assistance in developing water pollution abatement plans, advises recipients of all cost-share options available, and inspects the installation of projects to ensure compliance.

- **County Buffer Program**

The Door County SWCD offers a Buffer Program as an incentive for landowners to install vegetative buffers along surface water flow channels, including any channels discharging into sinkholes or crevices. Buffers benefit water quality by removing pollutants in two ways: by slowing the speed of runoff water and soaking up runoff water into the soil. Buffers benefit water quality by removing nutrients, organic matter, and pesticides that would otherwise enter the water.

- **Conservation Reserve Enhancement Program**

The Conservation Reserve Enhancement Program (CREP) is a voluntary conservation program. It is a joint federal-state-county and producer partnership designed to conserve soil, to improve and protect water quality, and to create wildlife habitat by restoring natural plant communities on marginal farmland.

- **Information and Education**

The SWCD provides information and education to the general public, schools, and various organizations on conservation programs in the department as well as current conservation issues in the county.

AGRICULTURAL RESOURCES

Participants at the countywide visioning sessions in 2006 and 2007 highly valued the county's agricultural resources for their economic, historical, and cultural value as well as their contribution to the visual character of the county. All these facets of agricultural activity are part of Door County's community character.

AGRICULTURAL SOILS

Soils in Door County are predominantly shallow and feature bedrock outcrops that limit production of agricultural crops. Most of the soils used for agriculture formed from glacial till and are characteristically a reddish-brown heavy loam subsoil over a light brown, permeable loam or sandy loam sub-stratum. Soils generally not suitable for agriculture are formed of silty clay glacial till and are slowly permeable.

The SSURGO database, discussed previously in the general soils section of this chapter, classifies soils as to their suitability for agricultural use. Map 4.2, found at the end of this document, depicts soils in Door County that are considered prime farmland, prime farmland if drained, and soils that are not suitable for farming.

FARM NUMBERS, TYPES, AND TRENDS

According to the USDA Census of Agriculture, Door County had 135,128 acres of farmland and 877 farms in 2002. (See Table 4.1.) The USDA defines a farm as any place from which \$1,000 or more of agricultural products were produced and sold, or normally would have been sold, during the census year. Land in farms includes crop and livestock acreage, pasture, land in summer fallow, idle cropland, and land enrolled in the Conservation Reserve Program (CRP) and other set-aside or commodity acreage programs. Land included in the farmland acreage count, but not used for pasturing or to produce anything, includes woodland areas and wasteland areas (i.e., drainage ditches, low wet depressions, etc.).

Table 4.1: Number, Acreage, and Mean Size of Farms, Door County

Farms	Year			
	1987	1992	1997	2002
Total Number	911	760	702	877
Total Acres	147,860	130,051	121,879	135,128
Mean Size (acres)	162	171	174	154

Source: UW-Extension, Door County, for the years cited.

Farm numbers have been in decline over time in Door County, but between 1997 and 2002 the number of farms increased by 175. This increase in farm numbers is likely due to the 1995 change in the way the USDA Census of Agriculture counted farms; starting that year, operations having five or more horses or ponies and no agricultural sales were counted for the first time as farms. Prior to 1995, farms with horses and ponies were not counted unless they sold more than \$1,000 of an agricultural product. In Door County, farms with horses or ponies increased by 87 from 1997 to 2002. (See Table 4.2.)

Table 4.2: Horse and Pony Farms, Door County

Horse & Pony Farms	Year			
	1987	1992	1997	2002
Number of Farms	93	69	69	156
Number of Animals	378	291	582	887

Source: UW-Extension, Door County, for the years cited.

The 1997 Census of Agriculture also began including Christmas tree farms, farms wholly enrolled in the CRP, and two other industries – maple syrup production and short rotation woody crops, such as aspen and other fast-growing trees – in farm counts. (Short rotation woody crops are grown for the paper and biofuel industry; at this time, none are produced here in Door County.)

From 1987 to 2002, the number of farms in Door County less than 50 acres in size increased by 15%. On the other hand, the number of farms from 50 to 499 acres declined by 17%. This decline perhaps may have been in part due to farm consolidation, as the number of farms with 500 or more acres increased by 6% over this same period. (See Table 4.3.) Note that almost 50% of the farms in Door County had agricultural sales less than \$2,500 in 2002 compared to 27% in 1997 (see Table 4.4), suggesting a large number of “hobby” farms in the county.

Table 4.3: Number of Farms by Acres, Door County

Farm Size (acres)	Year			
	1987	1992	1997	2002
1 to 9	26	37	41	44
10 to 49	161	141	123	263
50 to 179	434	295	301	347
180 to 499	256	258	208	174
500 to 999	31	24	21	38
>1000	3	5	8	11
Total	911	760	702	877
% Change	--	-17%	-8%	25%

Source: UW-Extension, Door County, for the years cited.

Table 4.4: Farms by Value of Sales, Door County

Farm Sales (\$)	Year			
	1987	1992	1997	2002
< 2,500	202	168	190	426
2,500 to 4,999	101	82	78	58
5,000 to 9,999	122	88	57	61
10,000 to 24,999	135	97	98	87
25,000 to 49,999	101	78	85	65
50,000 to 99,999	142	118	74	72
100,000 or >	108	129	120	108
Total	911	760	702	877

Source: UW-Extension, Door County, for the years cited.

Door County farms produce diverse agricultural products ranging from dairy to a wide array of fruits and vegetables. The diversity of agricultural production is one of the benefits of the varying soils, topography, and modified climate.

DAIRY FARMING

According to the USDA, the 877 farms in Door County in 2002 included 151 dairy farms housing 9,286 milk cows. The value of dairy products sold from these farms was valued at over \$20.6 million. Dairy farming continues to decline in the county; from 1992 to 2002, the number of dairy farms declined 46% and the number of dairy cows declined 26%. (See Table 4.5.) This decline in the number of dairy farms occurred mostly in areas north of Sturgeon Bay. The Towns of Liberty Grove, Baileys Harbor, Egg Harbor, and Gibraltar had 59 dairy farms in 1989, but only 15 remained in 2002. The Town of Liberty Grove went from 9 dairy farms in 1989 to zero in 2002; the Town of Washington is the only other town in the county with zero dairy farms.

Table 4.5: Livestock and Other Animals, Door County

Animal (number of)	Year			
	1987	1992	1997	2002
Cattle & calves	28,680	26,658	23,038	22,489
Beef cows	678	573	608	840
Milk cows	13,833	12,578	10,615	9,286
Hogs and pigs	1,828	2,392	910	423
Sheep & lambs	382	728	910	714
Layers & pullets	2,545	1,370	946	1,036

Source: UW-Extension, Door County, for the years cited.

AGRONOMIC CROPS

Door County produces a variety of agronomic crops (see Table 4.6), or feed-stock for dairy production such as forage (hay, haylage, and grass hay) and corn silage. Agronomic crops have been declining in acreage as the dairy industry in the county declines; however, forage crops are produced on more acres than any other crop. Cash-cropping – the production of grains, such as corn, soybeans, and wheat – has increased steadily over time.

Table 4.6: Major Agronomic Crops, Door County

Crop (acres)	Year				
	1987	1992	1997	2002	2007
Corn (grain)	12,179	11,769	12,006	12,864	24,400
Corn (silage)	7,283	9,917	6,997	6,366	7,600
Forage	49,384	43,064	36,225	27,779	26,000
Oats	16,373	11,489	7,900	5,388	4,300
Soybeans	326	1,213	2,756	8,764	7,700
Wheat (all)	2,112	3,147	6,094	8,121	11,500

Source: UW-Extension, Door County, for the years cited.

FRUIT CROPS

Door County's climate is modified by the cooling effects of Green Bay and Lake Michigan, which results in the delay of spring. This delayed spring slows down budburst in cherries, thereby reducing the potential for frost damage to fruit blossoms.

Door County produces several fruit crops on approximately 3,000 acres. In 2002, tart cherries were grown on 2,249 acres and apples on 693 acres. Note that although Door County produces more tart cherries than any county in Wisconsin, both the acreage and number of farms producing cherries are in decline. In the mid-1940s, there were roughly 700 cherry growers in the county. In 1992, 124 farms produced tart cherries on 3,113 acres, but by 2002, only 65 farms remained, with 2,249 acres. (See Table 4.7.) As of 2008, there are about 60 cherry farms and about 20 apple farms remaining.

Table 4.7: Tart and Sweet Cherries, Door County

Type	Farm/ acres	Year			
		1987	1992	1997	2002
Tart	Number of farms	134	124	90	65
	Total acres	3,622	3,113	2,638	2,249
Sweet	Number of farms	17	14	24	22
	Total acres	49	24	30	46

Source: UW-Extension, Door County, for the years cited.

A number of minor fruit crops are also produced in Door County, including raspberries, strawberries, and grapes. (See Table 4.8.) Not shown in the table but also grown in the county are pears, plums, peaches, and apricots.

Table 4.8: Raspberries, Strawberries, and Grapes, Door County

Crop	Farm/acres	Year			
		1987	1992	1997	2002
Raspberries	Number of farms	11	13	17	16
	Total acres/pounds	ND/9,685	13/29,195	12/28,185	ND
Strawberries	Number of farms	6	11	20	13
	Total acres/pounds	8/21,550	16/39,610	27/94,139	ND
Grapes	Number of farms	ND	3	4	12
	Total acres/pounds	ND	ND	ND	20/ND

Source: UW-Extension, Door County, for the years cited.

ND = No Data.

VEGETABLE CROPS

Commercial vegetable production has been increasing since 1992 in Door County. (See Table 4.9.) Snap bean acreage has increased by 40%, whereas green pea production has increased 60% since 1987. These crops may continue to increase in acreage as Door County’s well-drained soils and cool summers provide ideal growing conditions for these cool season crops.

Table 4.9: Snap Beans and Green Peas, Door County

Crop	Farm/acres	Year			
		1987	1992	1997	2002
Snap Beans	Number of farms	41	25	29	51
	Total acres	2,065	1,263	1,806	3,476
Green Peas	Number of farms	49	42	56	84
	Total acres	2,247	1,777	2,480	5,517

Source: UW-Extension, Door County, for the years cited.

ORGANIC AND SUSTAINABLE FARMING

The 2002 Census of Agriculture shows that there were four Door County certified organic farms, selling products with a market value of \$253,000. The USDA defines organic food as produced by farmers who emphasize the use of renewable resources and the conservation of soil and water to enhance environmental quality for future generations. Organic meat, poultry, eggs, and dairy products come from animals that are given no antibiotics or growth hormones. Organic food is produced without using 1) most conventional pesticides, 2) fertilizers made with synthetic ingredients, or sewage sludge, 3) bioengineering, or 4) ionizing radiation. Before a product can be labeled “organic,” a government-approved certifier inspects the farm where the food is grown to make sure the farmer is following all the rules necessary to meet USDA organic standards. Note that not all farmers practicing organic farming techniques choose to become certified due to the rigorous certification requirements. For more information on the USDA National Organic Program, visit their Web site located at <http://www.ams.usda.gov>.

Sustainably-grown foods, which are those produced with organic and other practices, are increasing in popularity. Sustainable agriculture techniques include:

- use of biological control, crop rotations, and other techniques to manage weeds, insects, and diseases;
- an emphasis on biodiversity of the agricultural system and the surrounding environment;
- use of rotational grazing and mixed forage pastures for livestock operations and alternative health care for animal wellbeing;

- reduction of external and off-farm inputs and elimination of synthetic pesticides and fertilizers and other materials, such as hormones and antibiotics;
- awareness and use of fair labor practices and worker treatment; and
- a focus on renewable resources, soil and water conservation, and management practices that restore, maintain, and enhance ecological balance.

For information on organic farms and local producers in Door County, contact the University of Wisconsin-Extension office listed in the Resources and Further Information section at the end of this chapter.

MARKET FARMS

Door County has a large number of agricultural producers that sell their products locally at roadside stands, farmers markets, or directly from the farm. These producers raise an assortment of agricultural products from asparagus to yak meat. Many of these operations are small in comparison to conventional farms and are therefore difficult to identify. Increased interest in buying and consuming locally grown food-stuffs led to an effort by UW-Extension in 2008 to identify these producers, with over 80 producers identified to date that produce and sell agricultural products locally. This is an estimated 15 - 20% of all farmers in Door County. For information on Door County agricultural producers selling products locally, contact the UW-Extension office listed in the Resources and Further Information section at the end of this chapter.

THE GREEN INDUSTRY

The so-called green industry – which consists of production of landscape trees and plants, as well as landscape and grounds maintenance businesses, not to be confused with businesses conducting “green” or “sustainable” activities – is a growing segment of Door County’s agricultural industry. Greenhouse production – plants grown under glass or other protection – is also included in the green industry. In 2002, Door County had over 11 acres of greenhouse production, with the total acreage increasing by more than 50% since 1987. (See Table 4.10.) The horticulture industry generates approximately \$1.5 million in county economic activity and 36 full-time jobs, as well as many seasonal jobs.

Table 4.10: Greenhouse Production, Door County

Farms	Year			
	1987	1992	1997	2002
Number of farms	14	18	35	27
Total Acres	5.1	3.1	8.0	11.4

Source: UW-Extension, Door County, for the years cited.

AGRICULTURAL LAND SALES

Table 4.11 provides information on agricultural land sold in Door County from 2001-2006. Of the 5,027 total acres that exchanged hands during that time, 1,680 acres, or about 33 percent, were converted to non-agricultural uses after selling. For all years, agricultural lands diverted to non-agricultural uses after selling consistently drew a higher market value.

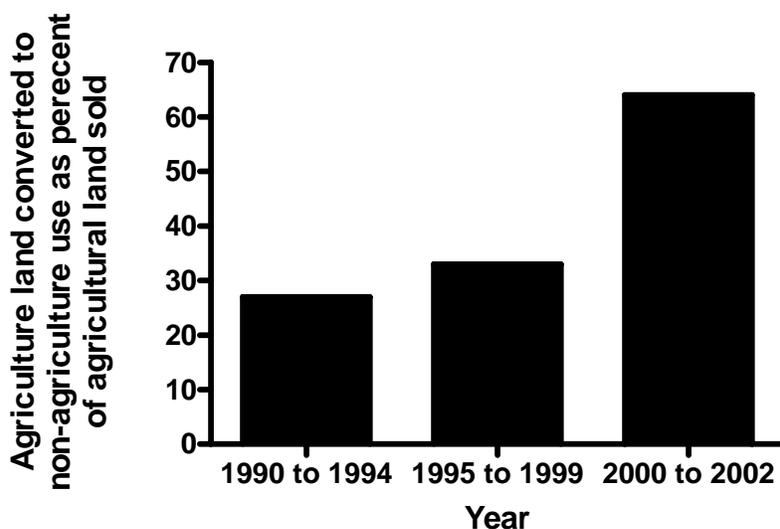
Table 4.11: Agricultural Land Sales, Door County

Year	Acres Sold Continuing as Agriculture	Average Cost per Acre	Acres Sold Diverted from Agriculture	Average Cost per Acre	Total Acres Sold
2001	625	\$2,116	386	\$2,142	1,011
2002	508	\$2,528	543	\$2,670	1,051
2003	468	\$2,404	431	\$3,936	899
2004	946	\$3,409	256	\$8,016	1,202
2005	800	\$3,272	64	\$10,635	864
2006	456	\$3,548	102	\$10,666	558
Total	3,803	\$2,880	1,782	\$6,344	5,585

Source: Wisconsin Agricultural Statistical Survey, 2001 - 2006.

The conversion of agricultural land to non-agricultural use in Door County exceeds the eastern district and the State of Wisconsin averages. Between 2000 and 2002, Door County converted 64% (yearly average) of agricultural land sold to non-agricultural uses. (See Table 4.12.) During this same period, the state of Wisconsin's average was 29%.

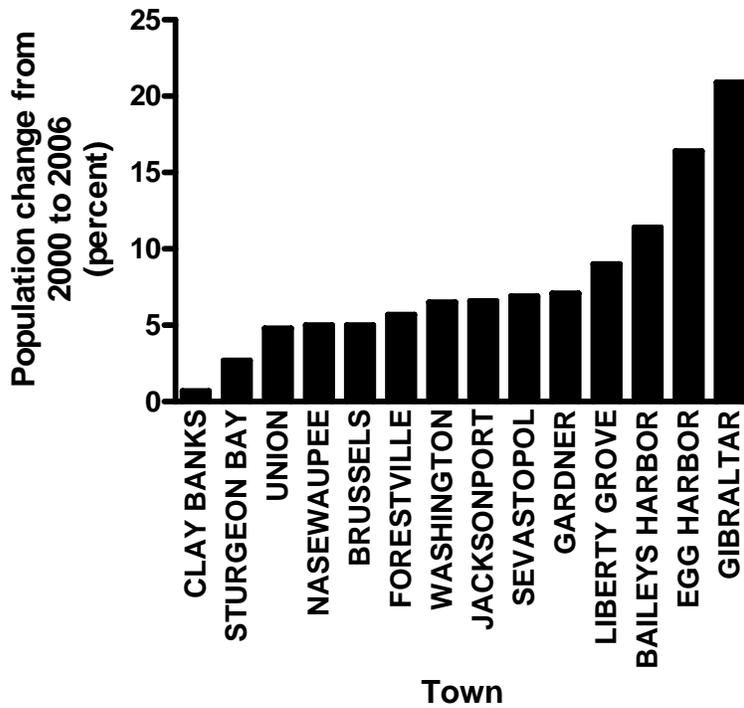
Table 4.12: Agricultural Land Converted to Non-Agricultural Use as a Percent of Agricultural Land Sold, Door County



Source: UW-Extension, Door County, for the years cited.

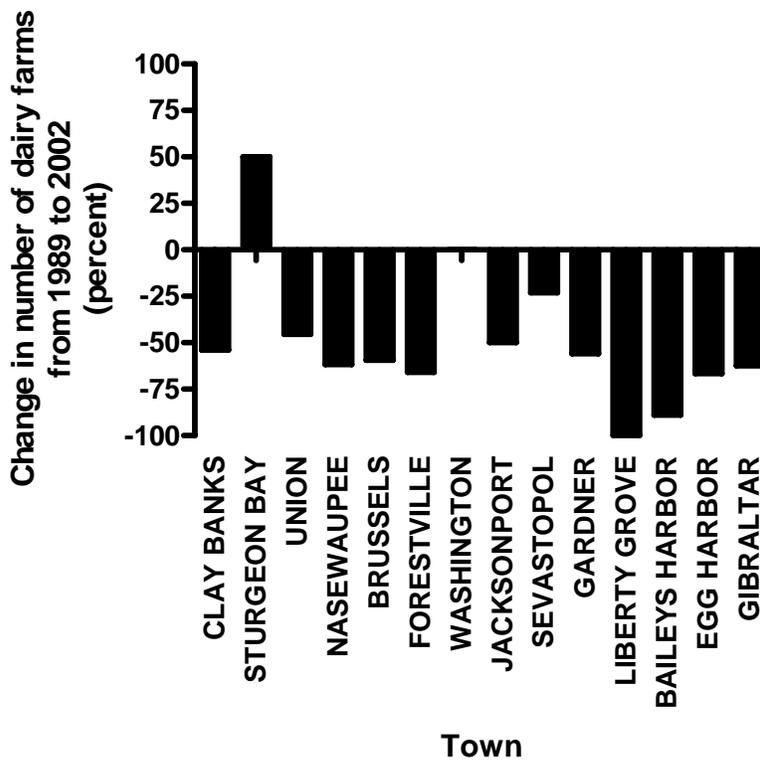
The loss of agricultural land has coincided with significant population growth in northern Door County. (See Table 4.13.) Northern Door County towns experienced high population growth between 2000 and 2006, accounting for 51% of all the population growth in the entire county. The Towns of Liberty Grove, Baileys Harbor, Egg Harbor, and Gibraltar had the greatest population growth. Also, from 1990 to 2000 those four towns had a combined 17% average increase in housing units, compared to only a combined 3% average increase for the Towns of Clay Banks, Sturgeon Bay, Union, Nasewaupsee, Brussels, Forestville, Washington, Jacksonport, Sevastopol, and Gardner. Towns experiencing high population growth in northern Door County also had some of the greatest percentage declines in dairy farm numbers (see Table 4.14), as discussed previously.

Table 4.13: Change in Population of Door County Towns, 2000 - 2006



Source: UW-Extension, Door County, 2001 - 2006.

Table 4.14: Dairy Farm Numbers, Door County



Source: UW-Extension, Door County, 1989 - 2002.

ECONOMIC IMPACTS OF AGRICULTURE

Agriculture is an important economic activity in Door County, with hundreds of family-owned farms and agriculture-related businesses and industries providing equipment, services, and other products farmers need to process, market, and deliver food to consumers. Approximately 90.6 percent of the farms in Door County are owned by individuals or families (an additional 5.9 percent are owned by family partnerships, and another 2.9% are owned by family-owned corporations). The production, sales, and processing of Door County's farm products generate employment, economic activity, income, and tax revenue.

According to the UW-Extension, agriculture in Door County accounted for nearly \$188.9 million, or 14 percent, of the county's total economic activity in 2000. Furthermore, economic activity associated with Door County's farms and agriculture-related businesses generated \$4.6 million in local and state taxes for the same year.

Agriculture provided 2,199 jobs, 11.3% of Door County's total workforce, and contributed \$143.3 million in sales of farm products and value added products in 2000. For the same year, the top five commodities contributing to farm product sales were milk, grains, cattle and calves, vegetables, and tart cherries and apples with each contributing \$20.6, \$4.1, \$4.0, \$3.7, and \$3.5 million, respectively. The purchase of agricultural services and inputs added another \$39.8 million. Finally, \$5.9 million was generated in business-to-business activity or the expenditure of agricultural earnings. Note that more information on Door County's agricultural industry is discussed in Chapter 6, Economic Development.

In addition to contributions to local economic activity, *The Cost of Community Services Study in the Towns of Gibraltar and Nasewaupee*, commissioned in 2004 by the Door County Environmental Council and the Door County Land Trust and conducted by a professor in Urban and Regional Planning at the University of Wisconsin-Madison, concluded that "farmlands, forests, wetlands and other open spaces provide more revenue to a community than they require in expenditures, resulting in a net fiscal benefit to that community," while residential development typically costs a community more than it pays in taxes because of the services required to support the development. Agricultural lands are therefore providing economic benefit to the municipalities within which they are located.

Finally, while not easily quantifiable in terms of exact contributions to the local economy, agricultural lands and their associated rural vistas attract and retain visitors to the area, thereby indirectly contributing to the county's tourism-focused businesses.

ENVIRONMENTAL IMPACTS OF AGRICULTURE

Door County's agricultural land is interspersed with water bodies, wetlands, steep slopes, and other natural resource features. Soil erosion from farm fields and surface runoff of crop nutrients and agricultural chemicals can therefore impact the quality of streams, rivers, lakes and underground aquifers, ultimately impacting drinking water supplies. Specific crop rotations, livestock, and tillage practices can all also affect the amount of soil erosion and nutrient loss.

Most farm operators in the county are working with the Door County Soil and Water Conservation Department and/or local UW-Extension staff to identify and implement specific resource conservation practices to better protect the environmental features in and around farms. These programs are discussed earlier in this chapter under the Runoff/Stormwater Management section.

NATURAL RESOURCES

Participants at all four countywide visioning sessions in 2006 and 2007 highly valued the county's natural resources. Natural resources are valued for their contribution to the county's visual character, ecological systems, and human health as well as to the area's recreation, tourism, and residential development industries.

LAKE MICHIGAN

As a peninsula surrounded by Lake Michigan and Green Bay, Door County has approximately 300 miles of coastal shoreline, one of the highest amounts of coastal shoreline miles of any county in the United States.

Lake Michigan is the third largest of the Great Lakes by surface area and the sixth largest fresh waterbody on Earth. The lake is an environmental and ecological resource for humans and natural communities, providing habitat to a wide variety of aquatic as well as terrestrial plants and animals. The lake is a resource for humans living in and visiting Door County specifically with regard to its role in the ground/surface water cycle, as a food source, and for the recreational activities it supports. There is no doubt that Lake Michigan is an ecosystem that greatly affects our way of life, as well as all aspects of the natural environment, from weather and climate to wildlife and habitat.

Lake Michigan is, therefore, also a significant economic resource for the area; the two systems, economic and environmental, are closely interdependent. In the past, the Lake Michigan ecosystem has been put under tremendous stress by a variety of economic activities. Today, it is better understood that this ecosystem is fragile and cannot withstand unlimited reliance on its resources, and that our economic, environmental, and physical health depends on this complex system. Issues that directly affect Door County's beach and lake water quality are described below and include *E. coli* contamination, cladophora, water diversion, and point and nonpoint source pollution.

WATERSHEDS AND SURFACE WATERS

WATERSHEDS

The DNR applies the Watershed Approach – the presence, movement, and interaction of water in the landscape – in categorizing drainage patterns within the state. The two main management units used by the DNR are basins that are further subdivided into watersheds. Basins and watersheds are interconnected areas of land draining from surrounding ridge tops to a common point such as a lake or stream to their confluence with a neighboring watershed. All lands and waterways can be found in one basin and watershed or another. These watershed units are used in the DNR Priority Watershed Program, as described later in this chapter.

The state is divided into 3 major basins, each identified by the primary waterbody into which the basin drains. In Wisconsin, they are the Lake Superior Basin, Mississippi River Basin, and the Lake Michigan Basin. Door County lies entirely within the Lake Michigan Basin, which encompasses a large portion of eastern Wisconsin. Within Door County there are four major watersheds: 1) Upper Door County Watershed; 2) Red River and Sturgeon Bay Watershed; 3) Ahnapee River Watershed; and 4) Stony Creek Watershed. Map 4.3, at the end of this document, displays the location of each. Note that a majority of the county's land area lies in the Upper Door County Watershed.

SURFACE WATERS

Door County has a total of 25 named inland lakes, ponds, swamps, and marshes and 37 named rivers, creeks, streams, and springs. Table 4.15 lists the county's named lakes, ponds and marshes; Table 4.16 lists the county's named rivers, creeks, streams, and springs. Map 4.4, located at the end of this document, illustrates all the surface water features listed in these tables.

Chapter 281 of the Wisconsin Statutes authorized the DNR to establish water quality standards that are consistent with the Federal Clean Water Act (Public Law 92-500). These water quality standards are explained in detail in Chapters NR 102, NR 103, NR 104, and NR 207 of the Wisconsin Administrative Code. Water quality standards are the foundation of Wisconsin's water quality management program, serving to define the goals for a waterbody by designating its uses, setting criteria to protect those uses, and establishing provisions to protect water quality from pollutants.

Table 4.15: Lakes, Ponds, and Marshes, Door County

Name	Acres	Max. Depth
Arbter Lake	16	2
Gunnerson (Big) Marsh	31	2
Bley Pond	5	3
Bradley Lake (Little)	19	7
Butler Pond	3	2
Clark Lake	868	25
Coffee Swamp	2	2
Dunes Lake	80	1
Europe Lake	273	10
Forestville Millpond	65	5
Kangaroo Lake	1,123	12
Krause Lake (Mud)	4	24
Little Lake	24	6
Lost Lake	91	5
Mackaysee Lake	347	27
Mink River Lake	70	13
Mud Lake	155	5
Pinney Lake	2	6
Pluff Pond	1	5
Schwartz Lake	30	4
Thorp Pond	6	3
Upper Lost Lake	5	3
Voecks Marsh	19	2
Wickman (Little) Marsh	14	2
Zoo Lake	1	3

Source: Door County Land and Water Resource Management Plan, 2006 - 2010.

Table 4.16: Rivers, Creeks, Streams, and Springs, Door County

Name	Length in Miles	Width in feet
Ahnapee River	6.0	2.5
Bear Creek	4.0	---
Big Creek	13.0	4.5
Ephraim Creek	1.5	9
Fabry Creek	1.0	4
Fish Creek	1.0	8
Geisel Creek	3.6	20
Goldenrod/Fischer Creek	1.17	---
Heins Creek	2.9	14
Hibbards Creek	5.4	15
Hidden Spring	1.0	2
Kayes Creek	7.0	4
Krueger Creek	1.0	---
Larson Creek	4.0	---
Lily Bay Creek	3.4	5
Little Creek	---	---
Logan Creek	4.8	---
Lost Creek	2.5	8
Malvitz Creek	1.0	---
May Creek	3.0	---
Mink River	11.1	---
Peil Creek	---	---
Reibolt Creek	---	---
Renard Creek	6.0	6
Samuelson Creek	1.3	---
Schuyler Creek	4.0	27
Shivering Sands Creek	1.1	---
Silver Creek - Brussels	---	---
Silver Creek - Forestville	5.0	---
Silver Creek - Union	---	6
Stony Creek	13.6	6
Strawberry Creek	1.6	12
Sugar Creek	9.0	9
Three Springs Creek	2.3	4
Twin Harbor Creek	1.0	---
Whitefish Bay Creek	1.1	28
Woodard Creek	4.0	---

Source: Door County Land and Water Resource Management Plan, 2006 - 2010.

WATERS AT RISK

A significant portion of Door County's economy benefits from the county's water resources, whether as a direct source – such as for commercial or sport fishing and shipping routes – or indirect – such as general tourism and recreation. All surface waters are potentially at risk for overuse and abuse. An understanding of surface waters is important to maintaining and sustaining the habitat and recreational benefits they provide.

In recent years, Door County has suffered both environmentally and economically due to beach and water quality issues such as *E. coli* contamination and increased levels of algae/cladophora. Water quantity has also become an increasing concern as surface water levels continue to drop and all Great Lakes states face pressure from communities outside the Great Lakes basins to divert water for their own drinking water needs.

In addition to water quality and quantity issues, described in detail in the next section, Door County has state-classified watersheds and waterbodies that have been identified as particularly threatened or susceptible to primarily nonpoint source pollution. These watersheds and waterbodies are classified under the Priority Watershed Program, and the Outstanding and Exceptional Resource Waters Program. Other waterbodies have been identified as already impaired – not meeting state water quality standards – and necessitate proper monitoring and protection. These waterbodies are classified under the Impaired Waters (303(d)) program.

As discussed previously in the Runoff/Stormwater Management section earlier in this chapter, there are two types of water pollution: point source and nonpoint source. Listed below are examples of both types of sources that contribute to impaired water quality:

- Industrial point source discharges
- Municipal point source discharges
- Agricultural nonpoint sources (cropland, stream banks, animal waste)
- Urban nonpoint sources (stormwater)
- Construction site runoff
- Proposed hydrologic modifications (dams, ditching, water withdrawal, stream enclosures, dredging)
- In-place pollutants/sediment contamination (site-specific determination)
- Landfill leachate
- Septic system leakage
- Atmospheric deposition (i.e., mercury)

BEACH AND WATER QUALITY AND QUANTITY ISSUES

Beach and water quality and quantity are equally important for both the ecology and economy of Door County. Programs and legislation have been put into motion to reduce *E. coli* contamination and algae/cladophora, and also to prevent diversion of Lake Michigan water to communities that live outside the Lakeshore Basin.

E. Coli Contamination

In 2002, the Door County Public Health Department (DCPHD) began to monitor *E. coli* in the water at many Door County beaches because of an outbreak of a gastrointestinal illness traced back to Nicolet Beach in Peninsula State Park, one of Door County's most popular beaches. In 2003, the Door County Soil & Water Conservation Department (SWCD) began an extensive beach contamination source identification effort. Data was collected at 31 beaches from 2003 through 2006, and at 34 beaches in 2007. The sampled beaches are located along both sides of the peninsula, on Washington Island, within the Sturgeon Bay Canal, and at three inland lakes. A final report written in 2006 and 2007 addresses the *E. coli* monitoring and beach contamination source identification data collected during the summers of 2003 – 2007.

Stormwater discharge during and after rain events is one of the clear sources of *E. coli* contamination in beach water throughout the county. The most contaminated water samples came from shallow waters, indicating that contamination is originating from onshore sources. Considerable data collected over the years has allowed the beach source identification project to concentrate less on data collection and analyzing, and more on abatement. Because stormwater discharge has been consistently shown to negatively impact beaches in the county, the SWCD is now working with local municipalities to install stormwater management infrastructure in order to prevent the transportation of *E. coli* to these beaches. The SWCD Beach Contamination Reduction project develops conceptual design options for minimizing the amount of stormwater runoff at or near the beaches. In cooperation with nine different Door County municipalities, SWCD is in the process of coordinating final construction plans for up to eleven beaches.

Algae/Cladophora

Door County has seen increasing amounts of cladophora along its beaches – a green, slimy algae that stinks when it starts to rot. Cladophora is a native aquatic plant that has grown naturally in Door County waters for hundreds of years in relative harmony with other plants. More recently, two major human-induced environmental impacts have increased the amount of cladophora to nuisance levels – the introduction of the non-native zebra mussel and the increase of the chemical phosphorus in the waters.

The zebra mussel, introduced to Lake Michigan through the bilge waters of European ships, procreates quickly and eats by filtering water, making the water much more clear than it would be naturally. Sunlight then penetrates deep into the water, expanding the habitat where cladophora can grow and allowing for massive expansion.

Exacerbating the situation are phosphates, an essential nutrient that feeds the cladophora. Currently, phosphate levels in the bay of Green Bay are at least 15 times higher than what is considered to be representative of healthy water. The EPA attributes most of the phosphate load to non-point sources, runoff from farmland, lawns, and failing septic systems. Much of it also comes from sewage treatment plants that discharge significant amounts of phosphate despite the employment of water treatment techniques to reduce phosphate content of the outflow, but significant amounts of phosphate are still being discharged. The main household sources of phosphate are lawn fertilizer and the detergents formulated for automatic dish washers (containing up to 8% phosphate). In both applications the use of phosphate is unnecessary.

The Partnership for Phosphate Reduction is a coalition of primarily local organizations to reduce phosphate in the water through the elimination of usage of lawn fertilizer and dishwashing detergents that contain phosphorous. See the Resources and Further Information section at the end of this chapter for contact information.

Water Diversion

The Great Lakes are a vast resource unique to the Great Lakes region, including Wisconsin and Door County. The combined Great Lakes support a \$15 billion economy, contain 20% of the earth's fresh surface water, and 90% of North America's fresh surface water. With the increasing demands of industry and a growing population in the Great Lakes region, this water resource is becoming more vulnerable.

Lake water levels in recent years are dropping and Lake Michigan is facing near historic lows, creating multiple negative economic and environmental consequences, including increased transportation expenses, reduced wildlife habitat, and the spread of invasive species. Communities outside the Great Lakes basin, including other states and countries, have been looking to divert water from the Great Lakes to help them with their water shortages. Diverting

water outside of the Great Lakes basin is a problem because there is no natural way to return it to the lake and future diversions would only contribute to the dropping water levels. When Great Lakes water is used by communities within the basin, it generally makes its way back to the lake it came from.

States within the Great Lakes region, and Canadian provinces bordering the Great Lakes, have been working together to address these severe environmental and economic challenges. In 1983, the Great Lakes region's governors joined forces to create the Council of Great Lakes Governors, a non-partisan partnership between Illinois, Indiana, Michigan, Minnesota, New York, Ohio, Pennsylvania, and Wisconsin. In more recent years, the Premiers of Ontario and Québec have also joined with the governors. In December 2005, following a nearly five-year negotiation, the council reached agreement on the Great Lakes-St. Lawrence River Basin Water Resources Compact. This compact provides a comprehensive management framework for achieving sustainable water use and resource protection. The council also reached a similar, good faith agreement with Ontario and Québec, which the provinces are using to amend their existing water programs for greater regional consistency. During 2007 and 2008, each of the eight state legislatures ratified the compact. Federal legislative approval was completed by the U.S. Senate on August 1, 2008, and by the U.S. House of Representatives on September 23, 2008. On October 3, 2008, President George W. Bush signed a joint resolution of Congress providing consent to the Great Lakes-St. Lawrence River Basin Water Resources Compact. The President's action marks the final step in the compact's approval process, thus enabling these historic protections to become law.

There has also been a push in Wisconsin to pass even stronger legislation – called the Strong Compact for a Strong Wisconsin – to provide greater protection at the state level to help sustain Wisconsin's economic well-being and quality of life. Lake Michigan faces growing pressures from Wisconsin communities outside its drainage basin that are looking to divert lake water to solve their water shortage problems. The Strong Compact for a Strong Wisconsin legislation calls for six points of enabling language:

- Standards for environmentally responsible return flow;
- Mechanisms for managing and regulating in-basin water use;
- Requirements for communities seeking a diversion to meet enforceable, demonstrable water conservation standards;
- Requirements for communities looking to extend or build new water supply systems as part of a diversion request to comply with current regional water supply and quality plans;
- Clarification of the compact's treatment of bottled water withdrawals; and
- Provisions for adequate citizen participation in a practical and protective manner.

WISCONSIN DEPARTMENT OF NATURAL RESOURCES WATER QUALITY PROGRAMS

The Wisconsin Nonpoint Source Water Pollution Abatement Program is administered through the DNR and intended to protect the state's watersheds from nonpoint source pollution. The DNR also administers the Outstanding and Exceptional Resource Waters and the Impaired Waters programs which are intended to maintain water quality in the state's cleanest surface waters and to identify waterbodies that are currently not meeting state water quality standards.

Wisconsin Nonpoint Source Water Pollution Abatement Program (Priority Watershed Program)

The Wisconsin Nonpoint Source Water Pollution Abatement Program – also called the Priority Watershed Program – was created in 1978 by the State Legislature as a way to protect the state's watersheds from nonpoint source pollution.

Managed by the DNR, and administered in Door County through the SWCD, the Priority Watershed Program provides financial and technical assistance to landowners and local governments in priority areas to reduce nonpoint source pollution through addressing land

management activities that contribute to runoff. The program identifies priority watersheds based on numerous factors as listed below.

- Potential to respond positively and/or be protected by nonpoint source controls;
- Unique environment for endangered or threatened species;
- Water quality and habitat degradation impacts on fish populations and biodiversity;
- Water chemistry criteria;
- Macro invertebrate biotic index rating;
- Negative changes in stream morphology and vegetation;
- Classification as a threatened stream;
- Classification as an outstanding or exceptional resource waterbody;
- Sensitivity of a lake to phosphorus loading;
- Classification of a lake as a high resource or high recreation use lake; and
- Susceptibility of groundwater to contamination based on depth to bedrock, bedrock type, depth to water table, soil characteristics, and surface deposits.

Non-Point Source Pollution Stream and Groundwater Ranking

Wisconsin initiated a process to rank watersheds for nonpoint source pollution problems back in the mid-to-late 1980s to identify high priority areas under the Priority Watershed Program. The process also ranks individual waterbodies according to 1) impacts from nonpoint source pollution and 2) the waterbody's potential response to best management practices. The DNR uses these watershed and waterbody rankings for several purposes:

- 1) to identify priority areas for best management practice implementation;
- 2) to help guide funding decisions under nonpoint source related programs; and
- 3) to convey nonpoint source priority areas to counties for county land and water planning, specifically work tasks and other activities related to best management practices and performance standards implementation.

Watershed rankings are conducted annually by the DNR and will list a high, medium, low, or not ranked for streams, lakes, and groundwater, as well as an "overall" ranking. These watershed rankings are used in Runoff Management Grant applications. Groundwater rankings were developed using available data on the presence of contaminants and the evaluation of different land uses and the susceptibility of groundwater contamination associated with those land uses. The ranking of streams is based on existing degradation or threats from nonpoint sources. The lakes ranking is based on sensitivity to phosphorus loading.

All four watersheds in Door County have been designated through the Priority Watershed program as having "high" overall potential for nonpoint source problems. All four watersheds have a "high" potential for groundwater contamination and a "high" potential for stream nonpoint source pollution, except for the Red River and Sturgeon Bay Watersheds which have "medium" rankings for streams. None of the watersheds were ranked for lake nonpoint source problems.

Ahnapee River Watershed

Year Designated: 1998

Watershed Size: 136 square miles

Location: Southern Door County; 8.5 miles of the Ahnapee River in Door County

General Uses: Drains a primarily agricultural landscape; a dam creates Forestville Millpond

Nonpoint Pollutants: PCBs, sedimentation, and nutrient enrichment

Ranking: Overall – high potential risk; high risk for contamination of streams and groundwater.

Covering northern Kewaunee County and southern Door County, this 136-square-mile watershed contains the Ahnapee River, which flows through predominantly agricultural lands and wetlands. The watershed is particularly susceptible to groundwater degradation due to its shallow soils and exposed, fractured dolostone bedrock. Sources of nonpoint pollutants include sediment deposition and nutrient enrichment from agricultural land erosion.

Stony Creek Watershed

Year Designated: 1998

Watershed Size: 54 square miles

Location: Southeastern Door County; 14 miles of Stony Creek

General Uses: Mainly agricultural with limited residential use

Nonpoint Pollutants: Sedimentation and nutrient enrichment

Ranking: Overall – high potential risk; high risk for contamination of streams and groundwater.

A small watershed located primarily in southeastern Door County and extending into northeastern Kewaunee County, it includes 14-mile long Stony Creek, which has been ditched for agricultural use in some sections. This watershed is particularly susceptible to groundwater quality problems due to prevalent shallow soils and the exposed, fractured dolostone bedrock. Land use in the area is mainly agricultural, with limited residential development. Sources of nonpoint pollutants include sediment deposition and nutrient enrichment from agricultural land erosion.

Red River and Sturgeon Bay Watershed

Year Designated: 1992

Watershed Size: 139 square miles

Location: Southern Door County

General Uses: Agricultural and residential in and around City of Sturgeon Bay

Nonpoint Pollutants: Animal lot runoff, winter-spread manure, cropland erosion, improperly sited manure storage, stream bank erosion, and urban runoff

Ranking: Overall – high potential risk; medium potential risk for contamination of streams and high potential risk for contamination of groundwater.

This 139-square-mile drainage area is located within southern Door County and northern Kewaunee and Brown Counties. The only incorporated area in the watershed is the City of Sturgeon Bay, where the majority of the watershed's population lives. Sources of nonpoint pollutants in this watershed come from animal lot runoff, winter-spread manure, cropland erosion, improperly sited manure storage, stream bank erosion, and urban runoff. In addition, urban runoff may contain heavy metals and a large number of toxic organic chemicals such as PCBs. Karst features, such as sinkholes, caves, swales, exposed bedrock, and fracture traces, are prevalent in many areas of the watershed. The watershed was designated a Priority Watershed in 1992.

Upper Door Peninsula Watershed

Year Designated: 1984

Watershed Size: 287 square miles

Location: Northern Door County, including Washington Islands and Chambers Island.

General Uses: Mix of agricultural, residential, and tourist-associated land uses.

Nonpoint Pollutants: Eroding agricultural lands, stream banks, and roadsides; livestock wastes; erosion from both established and recently developed urban areas; and stormwater runoff from urban areas.

Ranking: Overall – high potential risk; high risk for contamination of streams and groundwater.

Designated a Priority Watershed in 1984, this watershed includes the northern portion of Door County, from the Sturgeon Bay Ship Canal to the northern tip of the county, including Washington Island and Chambers Island. The Upper Door Peninsula watershed area has a mix of rural agricultural land use, residential development, and tourist-associated land uses. Sources of nonpoint pollutants included eroding agricultural lands, stream banks, and roadsides; livestock wastes; erosion from both established and recently developed urban areas; and stormwater runoff from developed areas.

Outstanding and Exceptional Resource Waters Program

DNR Wisconsin Administrative Code NR 102 was created in 1973 and established the “Outstanding and Exceptional Resource Waters Program” to maintain water quality in Wisconsin's cleanest surface waters in accordance with the Federal Clean Water Act. The initial listing of outstanding and exceptional resource water segments was established in 1988, and updates to the list were made in 1989, 1993, 1998, and 2006.

An Outstanding Resource Water is a lake or stream having excellent water quality, high recreational and aesthetic value, high quality fishing, and is free from point and nonpoint source pollution. An Exceptional Resource Water is a lake or stream exhibiting the same high quality resource values as an Outstanding Resource Water, but may be impacted by point or nonpoint sources of pollution or has the potential for receiving a wastewater discharge from a non-sewered community in the future.

Door County has two Outstanding Resource Waters, Logan Creek and the Mink River.

- Logan Creek is a 5.4-mile stream that originates at Lost Lake and flows southeast to Clark Lake. Its corridor is largely flanked by wetlands surrounded by land uses that include cropland, stump pasture, pasture, and orchards. Most of the stream only rates as fair in terms of water quality, but .65 miles has high water quality. The entire length of Logan Creek has a high nonpoint source ranking for potential pollution impacts to habitat.
- Mink River is a fresh water estuary that drains extensive wetlands and discharges to Rowleys Bay in Lake Michigan. It is thought to be the last pristine estuary on the Upper Great Lakes and one of the few high-quality estuaries remaining in the United States. The estuary wetlands provide breeding habitat for the Hine’s emerald dragonfly, an endangered insect.

Door County has two waterbodies designated as Exceptional Resource Waters, Hidden Springs Creek and Kayes Creek.

- Hidden Springs Creek is a one-mile long, spring-fed creek that originates in the Ephraim Swamp and empties in Green Bay in the Village of Ephraim. It has a high nonpoint source ranking.
- Kayes Creek is a 7-mile long stream that originates in the Gardner Swamp Wildlife Area and discharges into Little Sturgeon Bay in the Bay of Green Bay. It has a high nonpoint source ranking.

More Door County waterbodies cannot be designated as outstanding or exceptional resource waters due to various sources of point and nonpoint pollution, as listed previously.

Impaired Waters

Impaired waters are those waters that are not meeting state water quality standards – both water quality criteria for specific substances or designated uses – as defined by Section 303(d) of the federal Clean Water Act. Every two years, states are required to submit a list of impaired waters to the EPA for approval. The EPA requires that each state document the methodology used to add or delete waters from the existing “303(d) List.” A waterbody or segment of a waterbody may be added to the list because it is not meeting water quality standards or because water quality is threatened. Waters removed from the list must have data to support the fact that they are now meeting water quality standards. Door County’s 303(d) Impaired Waters are listed in Table 4.17.

Table 4.17: 303(d) State-Designated Impaired Waters

Waterbody	Pollutant	Impairment	Year Listed
Ahnapee River	polychlorobiphenyls (PCBs)	fish consumption advisory*	1998
Clark Lake	polychlorobiphenyls (PCBs)	fish consumption advisory*	1998
Green Bay - south of Marinette and its tributaries, including the Menominee, Oconto, Fox & Peshtigo Rivers from their mouths to the first dam	mercury	fish consumption advisory*	1998
Mackaysee Lake	mercury	fish consumption advisory*	1998
Stony Creek	sedimentation	degraded habitat	1998
Sunset Beach – Sturgeon Bay	bacteria	bacteria	2006

Source: Wisconsin Department of Natural Resources, 2008.

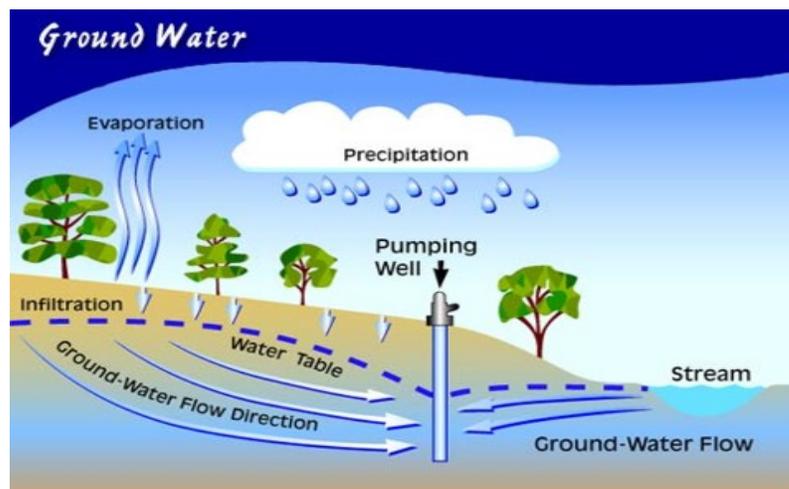
* Note that both the DNR and EPA have a variety of fish consumption advisories. See the Resources and Further Information section at the end of this chapter.

Note that the list of 303(d) Impaired Waters are often given priority over other surface waters in protective efforts, but this does not minimize the importance of the protection of non-listed waters. Door County’s changing landscape greatly affects surface waters in all parts of the county. In 2000, SWCD published *The Surface Water Inventory of Door County*, a report that inventories known surface waters and also addresses their geographical, geological, and ecological components. Overviews of wetlands, ridge-swale complexes, and the geology of the county are also discussed. The report does not attempt to classify waterbodies beyond the formally recognized 303(d) Impaired Waters, but does describe specific negative impacts and threats to water quality.

GROUNDWATER

Groundwater is defined as the useable quantity of water in the ground, contained in interconnected pores located below the water table. Groundwater resources supply the drinking water needs for both municipal and private uses in Door County; it is the source of all potable water for residents.

Door County is considered to have an ample supply of groundwater. On the other hand,



Source: www.norcalblogs.com/commission/images/ground-water.jpg.

because the county's groundwater resources are recharged from water that infiltrates through the land surface – not, as commonly assumed, from the waters of Lake Michigan or Green Bay – and because of the county's thin soils and bedrock formations, Door County has one of the highest risks of surface water pollution to groundwater of any county in Wisconsin.

The dominant source of groundwater in Door County is the Silurian dolostone bedrock. The Silurian dolostone bedrock has many karst features, which, while providing for large water-holding capacity and lateral flow, also allow quick, direct routes for water, and accompanying contaminants, falling on the surface to enter the dolostone aquifer.

The second source of groundwater in Door County is the Ordovician aquifer, which lies beneath the Silurian aquifer in Maquoketa Shale bedrock. Some residents in the southwestern portion of the county draw water from the Ordovician aquifer due to limited access to the Silurian aquifer; such wells are deeper and therefore more expensive than those accessing the Silurian aquifer.

Municipal wells serve approximately one-third of the county's households. The City of Sturgeon Bay and the Village of Sister Bay have mapped for their wells the "zones of contribution," the surface area on the land that contributes rain and snow fall to the groundwater for a particular well site. A map of the City of Sturgeon Bay's zones of contribution is available through the City or the Door County Planning Department. The Village of Sister Bay mapped zones of contribution are available through the village administrative offices.

Roughly two-thirds of Door County households rely on private drinking water resources, primarily private wells, where proper monitoring for contaminants often does not occur. As stated previously, the biggest issue facing groundwater quality in Door County is the fact that the Silurian aquifer is very vulnerable to groundwater contamination due to numerous fractures in the bedrock, allowing for surface water runoff and whatever pollutants or sediment it carries to enter the groundwater system. Some of the main pollutants to groundwater in the county include bacteria, copper, and lead. Leaking private septic system tanks, usually made out of steel, or other malfunctioning portions of private septic systems, are the primary contributors of bacteria such as fecal coliform and *E. coli* to groundwater.

Copper and lead can be present in groundwater, but usually comes from plumbing/piping. Copper sometimes comes from pesticides or herbicides. Lead can also be present in groundwater because of the county's past agricultural practice of using lead arsenic for controlling diseases in orchards. Starting in the early 1900s and continuing through the 1940s – at which time the county contained approximately 10,000 acres of cherry orchards and 2,000 acres of apple orchards – lead arsenic was the primary insecticide used. (Note that it was also used on potato crops on Washington Island.) The lead arsenic was brought to mixing stations in powder form and mixed with water to produce a solution for spray application on the fruit trees in the orchard. Starting in the 1940s, it was alternated with the use of DDT. Widespread use of lead arsenic ended by 1960, but it was still sporadically applied in parts of the county until the early 1970s.

Elevated levels of lead arsenic in soils at abandoned mixing sites, orchards, and fruit processing plant wastewater discharge points are still of concern today as it poses a threat to drinking water supplies and to anyone coming into direct contact with it. Lead arsenic levels are highest at the mixing sites and the processing plant wastewater discharge points, due to either spillage or the concentrated presence of the pesticide or fruit to which it was applied. Concentrations are lower in former orchards where the pesticide was applied, but the larger area creates a potentially more widespread contamination problem.

Finally, nitrates can also impact groundwater quality in Door County. Low levels of nitrates do occur naturally in some areas of the county due to geologic formations and direction of ground water flow. Primary sources contributing to high levels of nitrates, though, are runoff or seepage from the over-application of fertilizer on agricultural and residential lands, municipal and industrial waste water, refuse dumps, animal feedlots, septic tanks and private sewage disposal systems, urban drainage, and decaying plant debris. High levels of nitrates can affect the ability of blood to carry oxygen, potentially leading to a serious condition in infants and young children known as “blue baby syndrome.”

GROUNDWATER PROTECTION EFFORTS

Groundwater protection efforts in place in Door County include various state regulations, Door County Soil and Water Conservation Department programs, and Door County Sanitarian Department programs.

State Regulations

The DNR Drinking Water Program implements the Federal Safe Drinking Water Act (SDWA). The SDWA sets maximum contaminant level standards for drinking water and sampling, reporting, and inspection requirements which apply to all public water supplies in the state and are outlined in Wis. Admin. Code Natural Resources 809 (NR 809). DNR staff members enforce NR 809 requirements by tracking and inspecting water systems. Water system sampling and inspection requirements are based on the type of system and population the system serves. Water system owners are responsible for collecting water samples and reporting to the DNR requirements specified in NR 809.

There are four types of public water systems defined in the SDWA:

- 1) Community Systems, Municipal: City of Sturgeon Bay, Village of Sister Bay (including part of the Town of Liberty Grove), and Maplewood Sanitary District #1 (part of the Town of Forestville).
- 2) Community Systems, Other than Municipal: Trailer parks and non-municipal systems that serve more than 25 year-round residents; e.g., apartment building with 1 well serving more than 25 people year-round. (Currently there are none of the latter in Door County.)
- 3) Non-Transient, Non-Community systems: Schools, businesses, government buildings that serve 25 or more people more than 6 months of the year.
- 4) Transient Non-Community systems: Restaurants, bakeries, motels, gas stations, churches, parks, campgrounds, buildings that serve 25 or more people for at least 60 days.

Community water systems – both municipal and “other than municipal” – are regulated under chapters NR 809 and NR 811, Wis. Adm. Code. Chapter NR 809 includes the water monitoring, system reporting, and inspection requirements. Chapter NR 811 includes construction, treatment, operation and maintenance requirements for the water supply sources, storage, and distribution systems.

The DNR also has wellhead protection goals, designed to protect public water supply wells from contamination by managing the land that contributes water to the wells. Wis. Adm. Code Section 811.16(5) specifies requirements for wellhead protection plans (WHPP), which are required for the construction of new wells serving municipal water supplies. Sec. 160.001, Wis. Stats., establishes the goals that form the base requirements of the WHPP, which is administered by the DNR and enforced by the local unit of government. No new public well may be placed into service until the DNR has approved the WHPP. Adoption of an ordinance referencing the WHPP is not

required but communities are encouraged to adopt one prior to putting the well on line. The DNR also strongly encourages but does not require the development of WHPPs for older wells.

The City of Sturgeon Bay and the Village of Sister Bay have adopted wellhead protection plans and ordinances.

The DNR also administers Wis. Adm. Code NR 812, which applies to private wells and also includes smaller non-community (less than 25 people) public water systems. NR 812 specifies well construction, pump installation, well water quality, treatment, and well sealing/filling standards. DNR staff review reports of these activities and may inspect wells, pump installations, and conduct surveillance of well drilling/pump installing activities to determine compliance.

Finally, the DNR enforces Wis. Adm. Code NR 140, which specifies health standards for compound levels at which the compound in groundwater is considered a health risk and sets preventive action limits to trigger implementation of regulations in order to prevent groundwater contamination from specific land uses. The health standard contaminant concentrations are usually the same as in Wis. Adm. Code NR 809, which outline the sampling requirements for public drinking water systems; however, NR 140 may include additional compounds that are known to be health concerns. Wis. Adm. Code NR 140 standards are referenced in treatment and sealing/filling regulations in the Wis. Adm. Code NR 812 to provide additional protection standards for non-community water systems and private well owners.

The NR 140 standards are also used by the DNR to implement programs that regulate different land uses and to determine if remediation actions are needed to protect the groundwater. These programs specify what land uses are to be regulated and monitored by DNR staff members. The following DNR programs use the NR 140 standards:

- Landfill/Solid Waste
- Hazardous Waste
- Agricultural Runoff
- Wastewater
- Remediation and Redevelopment

Door County Soil and Water Conservation Department Programs

As development in an area increases, so does the impervious surface area, such as roofs and parking lots, which affects the amount and quality of water that infiltrates to the groundwater due to changes to vegetative cover, slope, soil composition, and depth to the water table.

Groundwater may also be affected by construction and agricultural runoff events. These events can lead to contamination of private wells, fish kills, and an influx of nutrients into surface waters, causing algal blooms.

The SWCD engaged in an effort to remediate contaminated lead and arsenic sites on some of the more significant abandoned lead and arsenic mixing sites in the late 1980s and early 1990s. This remediation was a cooperative effort between the state and Door County. Relative to the total number of contaminated sites, the areas remediated were only a small percentage. The current role of the SWCD is to advise property sellers and buyers, real estate agents, and financial institutions on the location of contaminated sites and provide technical assistance with respect to remediation and potential health concerns. The state generally does not provide funds for the clean-up of historic spills, but recently the Department of Agriculture and Trade Consumer Protection has indicated some willingness to consider the use of funds for eligible lead and arsenic remediation projects.

The SWCD implements a variety of runoff management programs that help protect groundwater: Agricultural Nonpoint Performance Standards and Prohibitions, Animal Waste Storage Ordinance, Nonmetallic Mine Reclamation Ordinance, Nutrient Management Program, and the Targeted Runoff Management Program. More information on these runoff management programs and others can be found earlier in this chapter in the Runoff Management section.

Door County Sanitarian Programs

- *County Sanitarian Transfer of Property Ownership* – The Door County Sanitarian Department has a “Time of Sale” ordinance that requires private on-site wastewater treatment systems (POWTS) one year or older to be tested at least 15 days prior to closing. Systems deemed to be in non-compliance (“failing”) must be replaced generally within one year. All evaluations are conducted by a private contractor and verified by the county. In addition to the sale of a property, other conveyances, sales, or transfers of any interest in real property or improvements may also require an inspection.
- *County Sanitarian POWTS Inspection Requirement* – All POWTS septic tanks must be inspected at least once every 3 years and pumped if more than 1/3 full of solids. The owner of a POWTS must certify to the county Sanitarian, through hiring a private inspector, that their septic tank has either been pumped or is less than 1/3 full of solids.
- *Door County Comprehensive Sanitary Survey* – The Sanitarian Department is in the process of evaluating every POWTS in the county in order to assess the condition of each system, including the septic tank, pump tank, and drainfield. This survey was initiated in 2002 and will take approximately 10 – 15 years to complete. More about the survey may be found in Chapter 8, Utilities and Community Facilities.

WETLANDS

Wetlands act as natural pollution filters for lakes, streams, and drinking water; act as groundwater recharge and discharge areas; retain floodwaters; provide habitat for many plants and animals; and provide scenic open spaces. Other common names for wetlands are swamps, bogs, and marshes.

Wetlands store flood waters and filter water from precipitation before it enters lakes and streams. Some wetlands also recharge local groundwater aquifers. By slowing water movement, wetlands reduce the likelihood that heavy rainfall or spring snowmelt will cause erosion and flooding. Wetlands also retain soil and hold nutrients that would otherwise promote excessive weed growth and algae blooms in lakes and streams. These nutrients, when held in the wetlands, produce a heavy growth of vegetation that provides nesting sites, food, and cover for waterfowl, small mammals, and many other types of wildlife. Wetlands also provide recreational opportunities for humans such as wildlife observation, hiking, hunting, etc.

WETLAND REGULATIONS

Because wetlands provide many benefits to the environment, there are federal, state, and municipal regulations to protect wetland areas. The three main levels of jurisdiction concerning wetlands in Door County are the United States Army Corps of Engineers (federal), the Wisconsin Department of Natural Resources (state), and the Door County municipal zoning agencies. All of these agencies are involved with wetland regulation and management, with often overlapping jurisdiction. The basic concept behind all types of wetland regulations is that these areas cannot be disturbed without a permit.

Each agency uses slightly different definitions, but all agree there are three basic factors in determining whether or not a property is a wetland: the presence of water at, near, or above the

surface (hydrology); sustained aquatic plant life (hydrophytic vegetation); and soils indicative of wet conditions (hydric soils). The presence of standing water may or may not indicate the presence of a wetland; a property could have standing water for a portion of the year and still not be a wetland due to lack of hydrophytic vegetation or hydric soils. It is also possible that a true wetland, with all three of the above characteristics, may never have standing water present.

United States Army Corps of Engineers

The federal Clean Water Act (CWA) regulates the discharge of dredge and fill material into "waters of the United States," including wetlands adjacent to, or with a hydrologic connection, to "navigable waters." In the most general of terms, federal law requires permits for construction activities in wetlands associated with lakes, rivers, and streams that have enough flowing water to float a canoe. Discharges of dredged and fill material into isolated wetlands are not regulated under the Clean Water Act because these types of wetlands fall outside of the definition of "waters of the United States." The State of Wisconsin does, however, regulate construction activities in isolated wetlands.

The St. Paul District of the U.S. Army Corps of Engineers (COE) administers the federal wetland regulatory permit program in Wisconsin, with oversight by the Region 5 of the U.S. Environmental Protection Agency. COE District Engineers handle the review and approval of wetland development proposals in federally regulated wetlands.

Wisconsin Department of Natural Resources

The DNR regulates construction activities in all wetlands, regardless of wetland type, size, or location. State law requires the review of all wetland development proposals to ensure the proposed activity complies with state water quality standards for wetlands. Wetland development activities authorized by federal permits must also acquire state approval.

Regional Water Management Specialists (WMS) at the DNR review permit applications on behalf of the state. WMS also monitor approved projects for compliance with permit conditions and assist with investigations and enforcement proceedings for unauthorized wetland fill.

Map 4.5, located at the end of this document, depicts wetlands of two acres or more in size as mapped by the DNR through interpretation of soil maps and aerial photography. Note that these boundaries should be considered approximate guidelines and also that there are many wetlands less than two acres in size not shown on this map. Also be aware that some DNR delineations have been modified through field verification via the Door County Board of Supervisors/Planning Department rezoning procedures.

Door County Zoning

The Door County Planning Department has jurisdiction over wetlands in the areas where it has zoning jurisdiction: the nine towns under county comprehensive zoning and the shoreland areas of the other five towns. Note that wetlands within city or village boundaries are subject to the appropriate municipality's zoning or other regulations, in addition to applicable federal and state regulations. County regulations are not in effect in any incorporated municipalities.

The Door County wetland zoning district map is based on the Wisconsin Wetland Inventory (WWI) that was completed by the DNR in 1984. Some wetlands do not appear on the map because they were too small to be identified by the WWI; per the language of the county zoning ordinance, however, the county still has jurisdiction over many activities occurring in or near these wetlands. Note that both the WWI and the Door County zoning maps are to be used as guides regarding wetland location, not maps that precisely locate wetland boundaries.

Table 4.18 illustrates federal, state, and county wetland regulatory jurisdiction.

Note: Explanations of comprehensive and shoreland zoning may be found in Chapter 9, Land Use.

Table 4.18: Federal, State, and County Wetland Regulatory Jurisdiction

Municipality	Federal	State	County Zoning	
	COE	DNR	Comprehensive	Shoreland Only
Town of Baileys Harbor	X	X	X	--
Town of Brussels	X	X	--	X
Town of Clay Banks	X	X	X	--
Town of Egg Harbor	X	X	--	X
Town of Forestville	X	X	X	--
Town of Gardner	X	X	--	X
Town of Gibraltar	X	X	X	--
Town of Jacksonport	X	X	X	--
Town of Liberty Grove	X	X	X	--
Town of Nasewaupée	X	X	--	X
Town of Sevastopol	X	X	X	--
Town of Sturgeon Bay	X	X	X	--
Town of Union	X	X	--	X
Town of Washington	X	X	X	--
Village of Egg Harbor	X	X	--	--
Village of Ephraim	X	X	--	--
Village of Forestville	X	X	--	--
Village of Sister Bay	X	X	--	--
City of Sturgeon Bay	X	X	--	--

Source: Door County Planning Department, 2008.

STATE-DESIGNATED SIGNIFICANT COASTAL WETLANDS

Due to the role wetlands play in improving and maintaining the health of Green Bay, Lake Michigan, and the entire Great Lakes ecosystem, the DNR has identified ecologically Significant Coastal Wetlands along Lake Michigan as a way to inform planning efforts. Wetlands located within close proximity to the coast provide rich habitat for plants and animals and greatly influence the larger processes of the Great Lakes ecosystem. As transition zones between land and water, coastal wetlands are often rich in species diversity and provide critical habitat for migratory and nesting birds, spawning fish, and rare plants.

Door County has a number of extensive coastal wetland complexes, the majority of which are located on the shoreline of Lake Michigan. Those identified as Significant Coastal Wetlands by the DNR are listed in Table 4.20 at the end of this chapter.

SHORELANDS

Shorelands are valuable environmental resources for humans as well as plants and animals, both aquatic and terrestrial. Since 1968, the State of Wisconsin has required counties and incorporated communities to adopt shoreland zoning regulations to help protect shorelands from problems that can be associated with development in these areas. For more information on shoreland and floodplain zoning ordinances in effect in Door County, see Chapter 9, Land Use. For the purposes of shoreland and floodplain zoning regulations, shorelands are defined by the state as land areas within a specified distance from the ordinary high water mark of navigable waters as follows:

- 1,000 feet from a lake, pond or flowage; and
- 300 feet from a river or stream or to the landward side of the floodplain, whichever distance is greater.

Door County contains approximately 300 miles of Lake Michigan and Green Bay coastal shoreline, as well as over 350 miles of other shorelines along inland lakes, ponds, and streams. Shoreland areas are illustrated on Map 4.6, found at the end of this document.

FLOODPLAINS

Floodplains are defined by the DNR as the land calculated to be covered by floodwater during the regional 100-year flood. The floodplain includes the floodway and the flood fringe. The floodway is the channel of the river or stream and those portions of the floodplain adjoining the channel required to carry and discharge the flood waters or flood flows associated with the regional flood (NR 116.03, Wis Adm. Code). A 100-year flood has a one percent chance of occurring in any given year.

Floodplains, as identified by the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRM), provide for stormwater retention, groundwater recharge, habitat for various types of waterfowl and wildlife, and recreational uses. Furthermore, floodplains serve to provide flood and erosion control by storing floodwaters, reducing flood velocities, diminishing flood peaks, and reducing sedimentation.

Buildings constructed in the floodplain reduce the floodplain's storage capacity. A reduction in the floodplain's storage capacity can cause future flood events to be of higher intensity, allowing flooding outside of the historic floodplain. As a way to help protect floodplains, Section 87.30(1) of the Wisconsin Statutes and Wisconsin Administrative Code NR 116, adopted in 1986, requires counties, cities, and villages to adopt floodplain zoning ordinances that address problems associated with development in floodplain areas.

Map 4.6 illustrates Door County areas mapped by FEMA as being potentially located in the floodplain. For more information on floodplain ordinances in effect in Door County, see Chapter 9, Land Use.

WOODLANDS

Historic woodlands in Door County included maple-basswood-beech forest, hemlock-hardwood forest, northern white cedar swamp, and hardwood-conifer swamp. Subsequent logging, farming, and development have changed the landscape significantly. Door County currently includes approximately 113,900 acres of woodland, covering about 37 percent of the landmass. Current woodlands consist of predominantly maple-basswood, with smaller amounts of lowland hardwoods, oak, aspen-birch, and lowland conifers. All types of woodlands provide aesthetic views, wildlife habitat, and recreation. Woodlands can also maintain watershed cover, provide shade, serve as a windbreak, help reduce soil erosion, act as a noise barrier, and screen development from view. Map 4.7, at the end of this document, illustrates the county's woodlands, including naturally grown areas and planted areas.

Woodlands are managed in Door County through a variety of plans and programs including the Door County Comprehensive Forestry Plan, the Managed Forest Law Program, and the State Nursery Program.

DOOR COUNTY COMPREHENSIVE FORESTRY PLAN

A Comprehensive Forest Plan (CFP) is a guide to the ecology, management, and conservation of forests. The *Door County Comprehensive Forest Plan* was developed as one of two pilot projects in the state as part of a program sponsored by the DNR. This plan provides a broad overview of the county's history and the landscape and ecology of the area, as well as detail on forestry topics and issues relevant to the county. The plan also provides further background information on forest descriptions and management recommendations. The ultimate goal of the plan is to provide an understanding of sustainable forestry and help landowners meet their land stewardship goals. The Door County CFP may be found on the Web at http://www.wisaf.org/file_transfer.htm.

MANAGED FOREST LAW PROGRAM

Administered by the DNR, the Managed Forest Law (MFL) is a landowner incentive program that encourages sustainable forestry on private in woodlands in Wisconsin. Working with landowner objectives, the law incorporates timber harvesting, wildlife management, water quality, and recreation to maintain a healthy and productive forest. Conditions that must be met for a property to be enrolled in the MFL program include:

- at least 10 acres of contiguous forest land;
- at least 80 percent of the land must have a minimum productive capacity of 20 cubic feet of timber per acre in a year;
- a minimum forest cover of 80 percent; and
- a minimum average lot width of 120 feet.

Of the approximately 113,900 acres of woodland in Door County, 22,282 acres (19.6%) was enrolled in the MFL program as of January 1, 2008. Of that, 5,906 acres are open to the public for hunting, fishing, hiking, and cross-country skiing. There also is an additional 945 acres in the Forest Crop Law program. This is the precursory program to the Managed Forest Law program; its acreage is shrinking each year as contracts expire. This land is also open to the public for the same activities.

Additional information about the Managed Forest Law program as well as a link to its "open" lands in Door County can be found at: <http://dnr.wi.gov/forestry/ftax/> or by contacting the DNR, listed in the Resources and Further Information section at the end of this chapter.

STATE NURSERY PROGRAM

Under the direction of the DNR, the mission of the State Nursery Program (SNP) is to ensure "a consistent supply of high quality seedlings, of desirable forest species, at an economical price, to encourage reforestation in Wisconsin." Each spring, the SNP makes seedlings available at discounted prices through the SWCD. Since 1937, over 16 million trees have been planted in the county. Average years see between 200,000 and 300,000 seedlings ordered by private landowners, school districts, and non-profit organizations. With the assistance of DNR foresters, landowners can have reforestation plans prepared for their property as well as determine eligibility – and potentially secure cost-sharing dollars – for reforestation project costs. Landowners planting more than 2,000 seedlings in a given year also are eligible to rent one of five tree-planting machines owned by the SWCD.

Additional information on reforestation can be found at <http://dnr.wi.gov/forestry/Nursery/>.

TRENDS IN FORESTRY

According to DNR Foresters, increasing land values and property taxes have persuaded many landowners in Door County to divide and sell off blocks of their woodlands. Still others are increasing timber harvesting in order to offset rising taxes, with such harvesting often occurring

without addressing long-term sustainable forestry practices and other related environmental issues. Private property owners wishing to preserve the health of the county's remaining woodlands should seek professional forestry advice in order to practice sustainable forestry on all forested properties. For more information on sustainable forestry practices, contact the DNR Forester listed in the Resources and Further Information section at the end of this chapter.

WILDLIFE HABITATS

WILDLIFE ACTION PLAN

In 2001, Congress authorized the U.S. Fish & Wildlife Service to implement and fund a new program to help states proactively address the needs of declining wildlife species before they require official listing as "endangered" or "threatened." The State Wildlife Grants program provides federal funding to every state and territory to conserve its wildlife resources of greatest conservation need. Each state is required to prepare a Wildlife Action Plan (WAP) to remain eligible for funding and the WAP must focus on "Species of Greatest Conservation Need." Wisconsin's *Strategy for Wildlife Species of Greatest Conservation Need* was approved by both the DNR and U.S. Fish & Wildlife Service in 2005. This plan identifies low and/or declining populations that are in need of conservation action, including various birds, fish, mammals, reptiles, amphibians, and invertebrates (e.g. dragonflies, butterflies, and freshwater mussels). The plan also addresses the following:

- which native wildlife species with low or declining populations are most at risk of no longer being a viable part of Wisconsin's fauna;
- what habitats they are associated with;
- where they occur across the state; and
- a menu of conservation actions to be developed into specific on-the-ground projects to "get them off and keep them off" any endangered or threatened lists in the future.

Wisconsin's WAP identifies 16 Ecological Landscapes, which are areas of Wisconsin that differ from each other in ecological attributes and management opportunities. They have unique combinations of physical and biological characteristics that make up the ecosystem, such as climate, geology, soils, water, or vegetation. They differ in levels of biological productivity, habitat suitability for wildlife, presence of rare species and natural communities, and in many other ways that affect land use and management.

Door County lies mostly in the Northern Lake Michigan Coastal Landscape. A small portion of southwest Door County lies in the Central Lake Michigan Coastal Landscape. The WAP identifies species of greatest conservation need, management opportunities for natural communities, threats and conservation actions, and additional considerations for both of these landscapes. Some of the WAP's management opportunities specific to Door County include protection and management of: key stretches of the Niagara Escarpment; coastal ridge and swale forest, and the beaches, dunes, and boreal forest; alkaline rock shores, coastal estuaries, boreal forests, and alvar, beach and dune communities; and significant spawning areas. More information about the WAP and Door County's ecological landscapes may be found at the DNR Web site listed in the Resources and Further Information section at the end of this chapter.

RARE NATURAL COMMUNITIES AND SPECIES

The location and abundance of ecological communities in Wisconsin are determined by environmental factors, such as climate, geology, landform, soils, and hydrology, which interact with natural disturbance events, including windstorms, fires, droughts, floods, and insect infestations. Human activities, beginning with Native Americans and continuing today with our pervasive and intensive uses of land and water, have also had profound impacts on Wisconsin's landscape and biological communities.

Wisconsin's Natural Heritage Inventory (NHI), established in 1985 by the Wisconsin Legislature, is maintained by the DNR Bureau of Endangered Resources. The NHI program is responsible for maintaining data on the locations and status of rare species, natural communities, and natural features in Wisconsin.

The NHI defines wildlife as any species of wild, free-ranging fauna including fish, mussels, and invertebrates. A natural community, or wildlife habitat, is defined as an assemblage of different plant and animal species living together in a particular area, at a particular time, in a specific habitat. Communities may be named for their dominant plant species (for example, pine barrens, sedge meadows, and oak savannas), a prominent environmental feature (Great Lakes Dune, Dry Cliff), or some combination of these factors. Communities range in size from less than an acre to thousands of acres. Communities are also dynamic and always changing. Of the 108 natural communities identified by the NHI as significant in the state, 31, or 29%, are found in Door County. (See Tables 4.19(A) and (B) at the end of this chapter for lists of natural communities located in the county.)

In addition to the 31 significant natural communities identified in Door County, the NHI has also inventoried 145 rare aquatic and terrestrial animals and plants in the county. The NHI list contains species known or suspected to be rare in the state and natural communities native to Wisconsin. It includes species legally designated as endangered or threatened as well as species in the advisory "special concern" category. The list is dynamic and updated as often as new information regarding the biological status of species becomes available. (See Tables 4.19 (A) and (B) at the end of this chapter for lists of rare aquatic and terrestrial plants and animals in Door County.)

There are two plant species in Door County that are on both the state and federal endangered species lists: the Dwarf Lake Iris and the Pitcher's Thistle (also referred to as dune thistle). The Dwarf Lake Iris is found on partially shaded sandy-gravelly soils along lake shores and the Pitcher's Thistle is found on stabilized dunes and blowout areas along the Lake Michigan shoreline.

One animal species found in Door County, the Hine's emerald dragonfly, is found on both the state and federal lists of endangered species. In 2007, the U.S. Fish and Wildlife Service designated critical habitat for the Hine's emerald dragonfly in Wisconsin, Illinois, and Michigan. There are eleven Hine's emerald dragonfly critical habitat units in Wisconsin; ten of them are in Door County, where the county's coastal springs and wetlands provide rich habitat. Groundwater must remain clean and abundant in order to protect the dragonfly's habitat; note that groundwater discharge to a wetland can originate from nearby or from several miles away. The UW-Extension's Wisconsin Geological and Natural History Survey has recently mapped the groundwater recharge areas that feed the wetlands where the dragonfly larvae live. Information and maps pertaining to the Hine's emerald dragonfly critical habitat and the groundwater recharge area study can be found at the Web sites listed under U.S. Fish and Wildlife Service and the SWCD in the Resources and Further Information at the end of this chapter.

Note that both the DNR and the U.S. Fish and Wildlife Service manage and regulate activities pertaining to federally- and state-listed threatened and endangered species. Under the Federal Endangered Species Act, all federally-listed animals (including insects) are protected from direct killing, taking, or other activities that may be detrimental to the species on any land, public or private. Federally listed plants have similar protection, but the direct killing or taking prohibitions are limited to federal lands. Under Wisconsin's endangered species law, it is illegal to take (includes killing), transport, possess, process, or sell any animal (including insects) that are on Wisconsin's endangered and threatened species list on any land, public or private, without a valid threatened or endangered species permit. State-listed plants have similar protection, but the

direct killing or taking prohibitions are limited to any public lands or land that is not owned. No one may process or sell any wild plant on any land public or private that is a listed species without a valid endangered or threatened species permit. A federal and/or state permit may be needed when conducting activities on any lands that may affect threatened and endangered species. See the Resources and Further Information section for DNR and U.S. Fish & Wildlife Service contact information.

Aggressive and Invasive Non-Indigenous Species Control

Door County has over 300 miles of coastline, containing coastal wetlands and habitats of high eco-regional significance. An analysis by the DNR on the distribution of state endangered and threatened species across the state indicates that Door County contains the richest rare species composition per square mile. The DNR defines an invasive species as one that has been introduced by human action to a location, area, or region where it did not previously occur naturally (i.e., is not native), becomes capable of establishing a breeding population in the new location without further intervention by humans, and spreads widely throughout the new location. One of the reasons that invasive species are able to succeed is that they often leave their predators and competitors behind in their native ecosystems. Without these natural checks and balances they are able to reproduce rapidly and out-compete native species, altering the ecological relationships among native species, ecosystem functions, economic value of ecosystems, and human health. Ways in which the encroachment and invasion of aggressive and non-indigenous terrestrial and aquatic plant species threaten native species and ecological diversity can include:

- Reduction in water and nutrients levels important to the survival and health of native species, resulting in monotypic vegetation (i.e., purple loosestrife) that lowers the ecological and aesthetic value of coastal areas;
- Invasive aquatic plants modify water chemistry, which in turn damages fish habitat;
- Dense vegetation growth within navigable waterways, typical of aggressive and invasive species, impedes fish migration and recreational opportunities;
- Plant community alterations resulting in dense vegetation (i.e., buckthorn) that shades out wildflowers;
- Increase in plant-to-plant competition lowers species diversity generally and limits crucial habitat for threatened/endangered species specifically.

Controlling invasive species is especially important due to the numerous endangered, threatened, and special concern plant species in the county. The Door County Invasive Species Team (DCIST), overseen and partially funded by SWCD, is a voluntary alliance of businesses, non-profit groups, public agencies, educational institutions, organizations, private landowners, and other interested parties working towards controlling invasive species. DCIST's activities include the following:

- Identifying non-native, aggressive plant species in Door County.
- Controlling the spread of and/or eradicating when possible the identified plant species.
- Offering public assistance and acting as an information and education resource in the above.

SIGNIFICANT NATURAL AREAS AND ENVIRONMENTAL CORRIDORS

Door County has many natural areas protected by federal, state, and local agencies, but many other ecologically important areas have also been identified as being in need of protection. Two National Wildlife Refuges exist in the county, maintained by the U.S. Fish & Wildlife Service. The DNR has designated a number of areas in the county as significant natural areas; those designations include State Natural Areas, State Wildlife and Fishery Areas, Significant Coastal

Wetlands (discussed previously), Land Legacy Places, and Wisconsin Coastal and Estuarine Land Conservation Plan (WCELCP) Areas. Bay-Lake Regional Planning Commission (BLRPC) also identified environmental corridors throughout the county based on a variety of scientific data layers analyzed within a Geographic Information System (GIS). Finally, a study conducted by local natural resource experts has resulted in the identification of significant wildlife habitat and natural areas.

NATIONAL WILDLIFE REFUGE SYSTEM

The U.S. Fish & Wildlife Service administers the National Wildlife Refuge System which is a network of habitats across the nation that provide habitat for wildlife and protect healthy environments, most of which are open to the public. Door County has two National Wildlife Refuges located off the tip of the peninsula, near Washington Island: the Green Bay and the Gravel Island refuges.

The Green Bay National Wildlife Refuge consists of Hog Island (2 acres), Plum Island (325 acres), and Pilot Island (3.7 acres). Hog Island was set aside by Executive Order in 1913 as a preserve and breeding ground for native birds. Portions of Plum and Pilot Islands were developed to serve as lighthouse facilities or life-saving stations during the late 19th century. These islands were transferred from the U.S. Coast Guard to the Fish and Wildlife Service in 2007. All public use is prohibited on Hog and Pilot Islands due to ground nesting by migratory birds and the limited and treacherous access. Plum Island essentially functions as a small ecosystem and retains natural qualities absent on the nearby mainland. Public use opportunities may be offered in the future provided they are compatible with the refuge's purpose and mission. Working in partnership with the National Wildlife Refuge, the local organization Friends of Plum and Pilot Islands have been working to restore the lighthouse facilities and other buildings found on these islands.

The Gravel Island National Wildlife Refuge consists of Gravel (4 acres) and Spider (23 acres) Islands. These islands are located in Lake Michigan, approximately one mile east of the northern tip of Door County, and were set aside by Executive Order in 1915 as a preserve and breeding ground for native birds. Public use is not allowed due to ground nesting by migratory birds. Together, Gravel and Spider Islands support large colonies of herring gulls and double-crested cormorants. Spider Island had a birch-cedar-tamarack forest until the 1970s, but it has since been destroyed due to the activities of thousands of cormorants that breed there. All of the trees have now fallen over or been washed away. Waterfowl use is limited since there is very sparse vegetation, but the fallen trees of Spider Island do provide some cover for scattered nesting of species like mallards, black ducks, and Canada geese. Gravel Island has no permanent vegetation due to periodic overwashing by waves and ice during high water years.

STATE NATURAL AREAS

The Wisconsin State Natural Areas program was established by the state legislature in 1951 to protect outstanding examples of Wisconsin's native landscape of natural communities, significant geologic formations, and archeological sites. Wisconsin's 560 State Natural Areas (SNA), encompassing 323,000 acres, are valuable for research and educational use, the preservation of genetic and biological diversity, and for providing benchmarks for determining impact of use on managed lands. They also provide some of the last refuges for rare plants and animals. In fact, more than 90% of the plants and 75% of the animals on Wisconsin's list of endangered and threatened species are protected on SNAs.

SNAs are protected by several means, including land acquisition from willing sellers, donations, conservation easements, and cooperative agreements. Areas owned by other government agencies, educational institutions, and private conservation organizations are also brought into the natural area system by formal agreements between the DNR and the landowner. Natural

areas are not appropriate for intensive recreation such as camping or mountain biking, but they can accommodate low-impact activities such as hiking, bird watching, and nature study. As such, many SNAs contain few or no amenities such as parking areas, restrooms, or maintained trails.

Door County has 28 State Natural Areas, as identified in Table 4.20 at the end of this chapter.

STATE WILDLIFE AND FISHERY AREAS

State Wildlife and Fishery Areas are lands that have been acquired by the DNR in order to preserve land and game for outdoor enthusiasts. It is the intent of the DNR to protect these important habitats for wildlife while keeping them open for public use. Door County has three state wildlife and fishery areas, as listed below and identified in Table 4.20 at the end of this chapter.

All Wildlife Areas are open to a full range of traditional outdoor recreational uses. These include hunting, fishing, trapping, hiking, nature study, and berry picking.

- **Gardner Swamp Wildlife Area** - Gardner Swamp Wildlife Area is 1,112 acres in size, and consists of marsh, forested lowland, and Keyes Creek. Principal wildlife includes deer, waterfowl, ruffed grouse, rabbits, and raccoons.
- **Mud Lake Wildlife Area** - Mud Lake Wildlife Area, located in the Towns of Baileys Harbor and Liberty Grove, is 1,941 acres in size and consists of a lake, marshland, and farmland. Principal wildlife includes deer, waterfowl, ruffed grouse, rabbits, squirrels, black bear, and raccoons. Part of a county snowmobile trail also runs through this area.
- **Reibolts Creek Public Access** - Reibolts Creek Public Access is 121 acres and essentially the outlet of Mud Lake, located in the Town of Baileys Harbor. Its primary focus is stream access for fishing.

LAND LEGACY PLACES

The DNR has identified “Land Legacy Places” that will likely play a critical role in meeting Wisconsin's conservation and outdoor recreation needs over the next 50 years. Over a three-year period, from 1999 to 2002, the DNR hosted numerous public and staff meetings to gather information, local knowledge, and opinions about Wisconsin's land and water to develop criteria regarding the types or characteristics of places believed to be most important. These criteria were then used in conjunction with data on the distribution of various ecological attributes, human population trends, geographical features and other factors, as well as the professional judgment of DNR staff and the local knowledge of citizens, to identify the “Land Legacy Places.”

By designating an area as a “Land Legacy Place,” the DNR intends to guide future land use decisions about the area, but it is not a legal designation and does not supersede any existing state or local regulations. The report does not identify how or when these places should be protected or who should help protect them – it is not a list of places the DNR wants to buy. Many partners and stakeholders will need to be involved in evaluating more precisely where protection efforts may best be focused and which protection strategies are most appropriate.

There are 12 identified Land Legacy Places within Door County, including Chambers Island, the Niagara Escarpment, the Mink River Estuary, and the Grand Traverse Islands, which include Plum, Detroit, Rock, and Washington Islands (the remaining Grand Traverse Islands are part of Delta County, Michigan). See Table 4.20 at the end of this chapter for a complete list.

WISCONSIN COASTAL AND ESTUARINE LAND CONSERVATION PLAN AREAS

The Wisconsin Department of Administration - Coastal Management Program, in partnership with the DNR, published in 2007 a Draft Coastal and Estuarine Land Conservation (CELC) Plan. The CELC Plan will enable Wisconsin to participate in the Coastal and Estuarine Land Conservation Program, which is a land acquisition grant program administered by the U.S. Department of Commerce and the National Oceanic and Atmospheric Administration (NOAA). The CELC Plan provides an assessment of priority land conservation needs and guidance for nominating and selecting Wisconsin land conservation projects to compete nationally for CELC grants.

The CELC Plan is complementary to and compatible with conservation efforts outlined in the Land Legacy Report. Its purpose is that of protecting important coastal and estuarine areas that have significant conservation, recreation, ecological, historical, or aesthetic values, or that are threatened by conversion from their natural or recreational state to other uses. The plan gives priority to lands which can be effectively managed and protected and that have significant ecological value. The WCELCP Priority Project Areas in Door County are:

- Chambers Island
- Eagle Harbor to Toft Point Corridor
- Mink River Estuary - Newport State Park - Europe Lake
- North Bay to Baileys Harbor
- Peninsula State Park
- Peninsula State Park to Jacksonport Corridor

Note that the CELC Plan project areas listed above are also encompassed by the Significant Wildlife Habitat and Natural Areas of Door County, as described below.

ENVIRONMENTAL CORRIDORS MAPPED BY BAY-LAKE REGIONAL PLANNING COMMISSION

Habitat connectivity – consisting of natural landscape features such as stream corridors – is essential for the survival of numerous wildlife species. In addition to wildlife population survival, countless ecological processes, such as maintenance of water quality, will not function if natural connections are severed.

Identification of environmental corridors – areas containing and connecting natural areas, green space, and other natural resources – is an advisory process utilized in various community planning efforts as a way to promote preservation of areas with environmental significance. Environmental corridors may also contain scenic, historic, scientific, recreational, and cultural resources. They often lie along waterways and other natural features, serving many purposes, such as: protecting water quality; acting as buffers between different land uses; controlling, moderating, and storing floodwaters while providing nutrient and sediment filtration; providing fish and wildlife habitat; and providing recreational opportunities.

In 2005, Bay-Lake Regional Planning Commission (BLRPC) published the “Door Peninsula Environmental Corridors – A Coastal Resource Identification Project.” BLRPC had identified a need to define environmental corridors in a consistent manner using digital data and geographic information system (GIS) software. Environmental corridors for Door County were defined using the following data layers:

- Navigable waters with a 75' setback
- DNR wetlands of two acres or greater, with a 75' setback
- Floodplains
- Steep slopes
- Public parks and recreation sites
- Historical/archaeological sites
- State Natural Areas

- State Wildlife Areas
- DNR Natural Areas Inventory sites
- DNR Land Legacy Places
- Significant coastal wetlands
- Significant Wildlife Habitat and Natural Areas
- Niagara Escarpment
- Other features of significance

A copy of the Environmental Corridor document, which includes a map of the environmental corridors in Door County, may be found by visiting BLRPC's Web site, listed in the Resources and Further Information section at the end of this chapter.

SIGNIFICANT WILDLIFE HABITAT AND NATURAL AREAS OF DOOR COUNTY

A group of local natural resource protection experts and individuals interested in helping to preserve Door County's communities of plants and animals and their habitats published in 2002 "A Guide to Significant Wildlife Habitat and Natural Areas of Door County, Wisconsin." Eighteen areas – most of which qualify as "corridors" per the above discussion – were identified as the most critical in maintaining the ecological integrity and diversity of the county. Each area contains significant value for recreation, aesthetics, clean air and water, and biodiversity. The guide, containing both maps and text describing these eighteen areas, was designed for use by all levels of local government, natural resource professionals, and interested citizens. Its purpose is to provide practical information that might assist people in supporting natural area preservation and in implementing protection activities in and around their communities. Information on how to obtain a copy of the guide may be found under the SWCD listing in the Resources and Further Information section at the end of this chapter.

PRESERVED LANDS

At the end of the year 2007, Door County contained over 40,000 individual tax parcels, nearly 24,000 of which contained assessed "improvements." As of January 2009, roughly 27,894 acres, or about 9% of the county's total land area of 308,427 acres, was considered permanently protected for conservation or recreation purposes. (Note that the county's total area of 312,015 acres, as shown in Chapter 9, Land Use, includes water features.) Permanently protected areas include federal, state, county, and municipal parks, natural areas, and wildlife refuges; non-governmental preserves; school-owned lands; and privately-owned lands bound by conservation easements.

Conservation easements are contracts property owners volunteer to enter into with private land trusts or public agencies that limit, or in some cases prohibit, the future development of designated properties. With the establishment of a conservation easement, the property owner sells or makes a tax-deductible donation of the development rights for the property to the land trust but retains ownership of the property. The owner is not prohibited from selling the property or leaving it to heirs, but future owners must also abide by the terms of the conservation easement. The designated land trust is permanently responsible for monitoring and enforcing the easement, through legal action if necessary. A conservation easement never requires, although may allow if the owner wishes, public access to the property.

Individual property owners also employ a wide variety of land protection measures in addition to conservation easements. Many Door County property owners have added restrictions on the deeds to their property that limit future development. (Note that if a specific group or agency is not designated to permanently enforce the deed restriction, the restrictions may later be ignored.) Property owners have enrolled in managed forest programs, as well as programs available to help (re)establish wildlife habitats, wetlands, ponds, and other natural areas. Agricultural landowners also have the option of entering into a variety of temporary agreements regarding farmland preservation or operational practices.

Map 4.8, Preserved Lands, found at the end of this document, depicts those lands in the county considered permanently protected. Properties included in each map legend category are as follows:

- Federal Preserve. These lands are owned and designated by the federal government as nature or wildlife preserves. There are approximately 563 acres in Door County considered federal preserves.
- State Preserve. These lands are owned and designated by the State of Wisconsin as state nature or wildlife preserves. There are roughly 5,059 acres of state preserve in the county.
- Non-Government Preserve. These lands are owned for conservation and/or recreation purposes by private non-profits such as The Nature Conservancy, the Door County Land Trust, The Ridges Sanctuary, Crossroads at Big Creek, Boy and Girl Scouts, the YMCA, The Clearing, etc. There are approximately 7,736 acres of non-governmental preserves in the county.
- Owners in Common. These are privately owned properties held for conservation and/or recreation purposes by homeowner, neighborhood, or condominium associations. There are at least 747 acres of such lands in the county.
- State Park. These lands are owned and operated by the State of Wisconsin as public parks. There are roughly 8,862 acres within the five state parks in Door County.
- County Park. These properties are owned and operated by the County of Door as public parks, although some allow limited access and use. County parks comprise a total of approximately 1,029 acres.
- Municipal Park. These properties are owned and designated as public parks by municipalities within Door County (the city, the four villages, or one of the 14 towns). Acreage of municipal parks in Door County totals roughly 630 acres.
- School-Owned. These lands are owned for conservation, recreation, or education purposes by schools, including University of Wisconsin branches, Lawrence University, and local K-12 districts. School-owned lands total approximately 1,391 acres.
- Conservation Easement – DNR. These properties are privately owned but subject to a conservation easement with the Wisconsin Department of Natural Resources. There are approximately 611 such acres in the county.
- Conservation Easement – Non-Government. These properties are privately owned but subject to a conservation easement with either the Door County Land Trust or the Door County Chapter of The Nature Conservancy. Such lands comprise approximately 2,490 acres.

KNOWLES-NELSON STEWARDSHIP PROGRAM

The Wisconsin Legislature created the Knowles-Nelson Stewardship Program (Stewardship) in 1989 to preserve valuable natural areas and wildlife habitat, protect water quality and fisheries, and expand opportunities for outdoor recreation. The conservation and recreation goals of the Stewardship Program are achieved through the acquisition of land and easements, development of recreational facilities, and restoration of wildlife habitat. An important component of the program is cooperation and partnership between the DNR, local governments, and private non-profit organizations (NGOs). To foster this partnership, Stewardship provides 50% match grants to local governments and NGOs for eligible projects. These grants enable the state to stretch its dollars by leveraging those dollars with other funding sources. More than 7,000 acres have been purchased in Door County through this program, in partnership with non-profit organizations and local government.

PARKS AND OPEN SPACE

State, county, and local governments have acquired and developed many parks for recreational and conservation purposes in Door County. Map 4.9, Preserved Lands, found at the end of this document, depicts the location of state, county, and local parks. Note that Chapter 8, Utilities and Community Facilities, provides a detailed description of the state and county parks.

NON-METALLIC MINERAL RESOURCES

Door County's nonmetallic mines provide topsoil, clay, sand, gravel, and aggregate for concrete, asphalt, construction, and road building. They also provide dimensional stone for shoreland protection, landscaping, building, and decorative use. The county has significant quantities of sand, gravel, and crushed stone that are used for constructing the sub-base layer for roads and are also the primary components in concrete used in building foundations, basement walls, and sidewalks. In recent years, demand for sand, gravel, and crushed stone has increased slightly due to the Highway 57 expansion but has dropped for home construction due to a decrease in the number of homes being built.

Door County has active and inactive nonmetallic mines found scattered countywide. Prior to laws and zoning that implemented requirements for mining operations – location and reclamation plans to prevent surface and groundwater contamination and to ensure proper reclamation – mines were developed without regard to their potential adverse impacts and final restoration of the site upon cessation of the mining. Abandoned rock, gravel, and sand quarries were left without reclamation and void of topsoil and vegetation.

NONMETALLIC MINING RECLAMATION

Chapter 295, Wisconsin Statutes, enabled the DNR to establish rules, Chapter NR 135, Wis. Adm. Code, to implement a nonmetallic mining reclamation program. The overall goal of NR 135 is to provide a framework for statewide regulation of nonmetallic mining reclamation. The rule does this by establishing uniform reclamation standards and setting up a locally administered reclamation permit program. Reclamation standards address environmental protection measures including topsoil salvage and storage, surface and groundwater protection, and contemporaneous reclamation to minimize the acreage exposed to wind and water erosion.

Any new nonmetallic mines need to obtain a permit from the DNR and are subject to the requirements of NR 135, including measures for surface water and wetlands protection, groundwater protection, final grading and slopes, topsoil redistribution, and revegetation and site stabilization.

Depleted mining sites may be reclaimed as parkland, wildlife habitat, recreational land, or other uses. NR 135 also allows landowners to register marketable nonmetallic mineral deposits as a way to prevent future on-site development that would interfere with the extraction of those deposits; registered sites are protected from local zoning or other decisions that permanently interfere with mining on the site for at least 20 years after the date of registration with the DNR. For unincorporated areas under county zoning (see Chapter 9, Land Use), the establishment of new non-metallic mine sites is approved by the county. For reclamation only (not active mining operations or site approval), the Door County SWCD administers a Nonmetallic Mine Reclamation Ordinance, in effect in all incorporated and unincorporated areas of the county. The Towns of Brussels and Nasewaupée both have their own non-metallic mining ordinances that also regulate mining (operations only, not reclamation).

Door County currently has approximately 50 active mines regulated by the county, which are inspected annually by SWCD staff. The DNR regulates several additional mines located in shoreland areas.

RESOURCES AND FURTHER INFORMATION

LOCAL ORGANIZATIONS AND INITIATIVES

Crossroads at Big Creek (<http://www.crossroadsatbigcreek.org/>)

Email: info@crossroadsatbigcreek.org

P.O. Box 608

Sturgeon Bay, WI 54235

Phone: (920) 746-5895

Crossroads at Big Creek is a private non-profit organization that has to date preserved 115 acres of land for experiential life-long learning focusing on science, history and the environment. Crossroads offers environmental education, history, astronomy, and recreational activities.

Door County Environmental Council (<http://dcec-wi.org/>)

Email: info@dcec-wi.org

P. O. Box 114

Fish Creek WI 54212

Phone: (920) 743-6003

Door County Environmental Council seeks to protect Door County's natural area through effective land use measures, including zoning, other regulations, and private stewardship.

Door County Green Fund (<http://www.greenfund.com/>)

P.O. Box 622

Sturgeon Bay WI

54235-0622

Phone: (920) 746-6663 x115

The Green Fund provides a specialized avenue for local businesses and others concerned about the protection of Door County's economy and the environment upon which it relies to contribute to local land protection efforts. Grants are awarded annually to local non-profits and municipalities for conservation efforts.

Door County Land Trust (<http://www.doorcountylandtrust.org/>)

Email: info@doorcountylandtrust.org

P.O. Box 65

Sturgeon Bay, WI 54235

Phone: (920) 746-1359

The Door County Land Trust is a private non-profit organization established in 1986 to protect lands that contribute significantly to the scenic beauty, open space and ecological integrity of Door County. The Land Trust protects land by working with private landowners who donate some or all of their development rights through conservation easement agreements, by accepting donations of land, and through selectively purchasing properties.

Door County Parks Department (<http://map.co.door.wi.us/parks/>)

3538 Park Drive

Sturgeon Bay, WI 54235

Phone: (920) 746-9959

The Door County Parks Department oversees the development and operation of 19 county parks including the Door County Fair Park. The Parks Department is responsible for the design and construction of parks projects and is also responsible for the administration and enforcement of Chapter 12 of the Door County Code. See Chapter 8, Utilities and Community Facilities for a complete description of the Parks Department and the Door County Parks and Open Space Plan 2006-2010.

Door County Planning Department (<http://map.co.door.wi.us/planning/>)

421 Nebraska Street

Sturgeon Bay, WI 54235

Phone: (920) 746-2323

The department's primary functions are: administration and enforcement of the county's zoning and land division ordinances and other land use management ordinances; preparation and updating of the county comprehensive plan; and giving advice to local public officials on a variety of community development plans or projects. See Chapter 9, Land Use, for a complete description of all plans and ordinances.

Door County Real Property Listing Department (<http://www.co.door.wi.gov>)

421 Nebraska Street

Sturgeon Bay, WI 54235

Phone: (920) 746-2287

Real Property Listing processes all information recorded in the Register of Deeds Office, pertinent to the transfer of land. Real Property assimilates information received from local assessors, clerks, treasurers, Department of Revenue, Department of Transportation, Department of Natural Resources, and various other sources. The office also oversees the Monumentation Program for the county as well as catalogues all platted surveys done in the county. This office maintains all of the computerized maps of each municipality in the county and maintains current computer records of:

- Property owners, legal descriptions
- Parcel numbers
- Addresses
- Volume and page
- Land codes
- District codes
- Parcel history
- Acres
- Fire numbers
- Map page numbers
- Assessed and equalized values on all parcels of land in the county

Door County Sanitarian Department (<http://www.co.door.wi.gov/county>)

421 Nebraska Street

Sturgeon Bay, WI 54235

Phone: (920) 746-2309

The Door County Sanitarian's Department was created in the mid-1960s by the Door County Board of Supervisors in order to address concern over failing private sewage disposal systems within the county. The department administers the following programs:

- Time of Sale Ordinance

- POWTS Inspection Requirement
- Door County Comprehensive Sanitary Survey

Door County Soil and Water Conservation Department (<http://map.co.door.wi.us/swcd/>)

421 Nebraska Street
 Sturgeon Bay, WI 54235
 Phone: (920) 746-2214

The Door County Soil and Water Conservation Department (SWCD) was created under the authority of Chapter 92, Wisconsin Statutes, enacted to halt and reverse depletion of the state's soil resources and pollution of its waters. Per Chapter 92, the SWCD has the responsibility for the administration of the county soil and water conservation program and the authority to exercise the powers granted to the county's Land Conservation Committee, the county board oversight committee for the department.

A Guide to Significant Wildlife Habitat and Natural Areas of Door County, Wisconsin" may be purchased for \$20.00 from SWCD or can be found at <http://map.co.door.wi.us/swcd/>.

The SWCD's programs and services include the following:

- Aggressive Invasive Non-Indigenous Species Initiative
- Agricultural Performance Standards And Prohibitions
- Animal Waste Storage Facility Ordinance
- Assistance to Municipalities
- Beach Contamination Source Identification Program
- Conservation Reserve Enhancement Program
- County Buffer Program
- County Water Pollution Abatement Cost-Share Program
- Farmland Preservation Program
- General Resource Management Assistance to the Public
- Gypsy Moth Suppression Program
- Information and Education
- Invasive Species Team
- Nonmetallic Mining Controls and Reclamation
- Nutrient Management Program
- Research Assistance to Universities and Other Agencies Pertaining to Door County's Resources
- Stormwater Runoff Management and Construction Site Erosion Control
- Targeted Runoff Management Program
- Tree Planting
- Village Of Ephraim Stormwater/Construction Site Erosion Control Ordinance
- Water Pollution Abatement Cost-Share Program
- Well Abandonment Program
- Wellhead Zone of Contribution Protection Programs

Door Peninsula Astronomical Society (<http://doorastronomy.org/>)

Email: president@doorastronomy.org
 Sturgeon Bay, WI 54235
 Phone: (920) 746-5896

Located in Sturgeon Bay, Wisconsin, DPAS is a local club and a chapter of the Astronomical League. They are also members of the International Dark Sky Association, as well as the Night Sky Network, a teaching arm of the Astronomical Society of the Pacific.

Door Property Owners

P.O. Box 429

Sturgeon Bay, WI 54235

Phone: (920) 746-4450

Door Property Owners mission is to provide a forum for the discussion of land use issues and to support the conservation of Door County's natural, scenic, cultural, and aesthetic resources and to advocate for reasoned development that respects and enhances these irreplaceable resources.

Friends of Plum and Pilot Islands (<http://www.plumandpilot.org/>)

126 Country Club Drive

Clintonville, WI 54929

Phone: (715) 823-6873

The Friends of Plum and Pilot Islands (FOPPI) are working to restore the historic 19th-century maritime structures found on these remote outposts.

Natural Resource Partnership, Inc. (<http://www.lnrp.org/index.php>)

Email: inquiry@LNRP.org

P.O. Box 62

Sturgeon Bay, WI 54235

Phone: (920) 304-1919

The Lakeshore Natural Resource Partnership, Inc. (LNRP) works within northeast Wisconsin in the geographic area described as the Lakeshore Basin, comprised of Manitowoc, Kewaunee, Door, and portions of Brown and Calumet counties. LNRP's main goal is to promote community solutions to problems that affect the overall health and welfare of the Lakeshore Basin ecosystem.

The Nature Conservancy (<http://www.tnc.org/wisconsin>)

Door Peninsula Office

242 Michigan Street, Suite B103

Sturgeon Bay, WI 54235

Phone: (920) 743-8695

The Nature Conservancy is an international non-profit conservation organization dedicated to preserving the plants, animals, and natural communities that represent the diversity of life on earth by protecting the lands and waters they need to survive. The Nature Conservancy has been working to protect wild places and wildlife on the Door Peninsula since 1962.

Partnership for Phosphate Reduction (<http://www.dcpfosphatefree.org/>)

P.O. Box 429

Sturgeon Bay, WI 54235

Phone: (920) 746-4450

Email: Info@DCPhosphateFree.org

The Partnership for Phosphate Reduction is a coalition of citizen-based organizations fighting the problem of overabundant cladophora algae in Door County's waters. Goals will be accomplished through public awareness, by partnering with local retail businesses, and by water-quality monitoring throughout the Door Peninsula.

The Ridges Sanctuary (<http://www.ridgesanctuary.org/>)

Email: info@ridgesanctuary.org

P.O. Box 152

Baileys Harbor WI 54202-0152

Phone: (920) 839-2802

The Ridges Sanctuary, Inc. is a non-profit organization formed in 1937 and originally encompassing a 40-acre parcel of land in the Town of Baileys Harbor. The sanctuary has since grown to encompass over 1,400 acres of forests, wetlands, and the unique wildlife and plants within.

Sustain Door (<http://sustaindoor.org>)

Email: sustaindoor@gmail.com

9786 Fox Lane

Brussels, WI 54204

Phone: (920) 743-3337

Sustain Door of Door County, Wisconsin, is part of the international movement of The Natural Step, a non-profit, research, education and advisory organization that uses a science-based framework to help organizations, schools, businesses, individuals and communities move toward sustainability.

University of Wisconsin – Extension, Door County (<http://www.uwex.edu/ces/cty/door/>)

Agriculture Agent

421 Nebraska Street

Sturgeon Bay, WI 54235

Phone: (920) 746-2260

The UW-Extension Agricultural Agent can provide information on:

- Farm and financial management.
- Livestock manure and nutrient management and water quality.
- Using information systems to make management decisions.
- Crops and soils.
- Dairy and livestock production management.
- Lowering production inputs to maintain profitability.

REGIONAL AND STATE ORGANIZATIONS AND INITIATIVES

Bay-Lake Regional Planning Commission (<http://www.baylakerpc.org/>)

441 South Jackson Street

Green Bay, WI 54301

Phone: (920) 448-2820

The Bay-Lake Regional Planning Commission (BLRPC) was created in 1972 by Governor Lucey under Wisconsin Statutes s. 66.945 as the official area-wide planning agency for northeastern Wisconsin and currently serves eight counties: Brown, Door, Florence, Kewaunee, Manitowoc, Marinette, Oconto, and Sheboygan. BLRPC provides planning services on area-wide issues, represents local interests on state and federal planning program activities, and provides local planning assistance to communities in the Bay-Lake Region.

University of Wisconsin – Green Bay

Cofrin Center for Biodiversity (<http://www.uwgb.edu/biodiversity/index.htm>)

Department of Natural and Applied Sciences

Green Bay, WI 54311-7001

Phone: (920) 465-5032

The primary purpose of the Cofrin Center for Biodiversity is to promote education, research, and community services that contribute to conservation of the western Great Lakes fauna and flora. The Cofrin Center for Biodiversity manages 5 natural areas in Wisconsin, including Toft Point and Peninsula Center, both located in the Town of Baileys Harbor.

Wisconsin Department of Agriculture, Trade, and Consumer Protection (DATCP)

[\(http://datcp.state.wi.us/\)](http://datcp.state.wi.us/)

P.O. Box 8911

Madison, WI 53708-8911

Phone: 608-224-5012

DATCP is the agency responsible for food safety, animal and plant health, protecting water and soil and monitoring fair and safe business practices.

Wisconsin Department of Natural Resources (<http://dnr.wi.gov/>)

Sturgeon Bay Office

110 South Neenah Avenue

Sturgeon Bay, WI 54235

Phone: (920) 746-2860

The Department of Natural Resources is dedicated to the preservation, protection, effective management, and maintenance of Wisconsin's natural resources. It is responsible for implementing the laws of the state and, where applicable, the laws of the federal government that protect and enhance the natural resources of our state.

Information on project review for potential impacts to state listed species:

<http://www.dnr.state.wi.us/org/land/er/review/>.

Fish Consumption Advisories: <http://dnr.wi.gov/fish/consumption/>

Office/Program Contact Information

Sturgeon Bay

Door County Forester

(920) 746-2876

Public Drinking Water Systems

(920) 746-2872

Green Bay

Aquatic Habitat Protection

(920) 662-5400

Waterway and Wetland Permits

(920) 662-5117

Natural Heritage Inventory Program

(920) 662-5194

Shoreland/Wetland Zoning

(920) 662-5472

Wetland Regulations

(920) 662-5453

Madison

Impaired Waters (303d) List

(608) 266-9277

FEDERAL ORGANIZATIONS AND INITIATIVES

American Farmland Trust (<http://www.farmland.org/>)

1200 18th Street, NW, Suite 800

Washington DC 20036

Phone: (202) 331-7300

Founded in 1980 by a group of farmers and conservationists concerned about the rapid loss of the nation's farmland to development, American Farmland Trust (AFT) is a non-profit membership organization dedicated to protecting our nation's strategic agricultural resources.

Environmental Protection Agency (EPA) (<http://www.epa.gov/>)

US EPA Region 5

77 West Jackson Boulevard

Chicago, IL 60604

Phone: (312) 353-2000 or (800) 621-8431

EPA leads the nation's environmental science, research, education and assessment efforts. The mission of the Environmental Protection Agency is to protect human health and the environment. Since 1970, EPA has been working for a cleaner, healthier environment for the American people.

Fish Consumption Advisories: <http://www.epa.gov/mercury/advisories.htm>

National Agricultural Statistics Service (NASS) (<http://www.nass.usda.gov/index.asp>)

The NASS provides timely, accurate, and useful statistics in service to U.S. agriculture.

National Wildlife Refuge System (<http://www.fws.gov/refuges/>)

Gravel Island National Wildlife Refuge and Green Bay National Wildlife Refuge

C/O Horicon National Wildlife Refuge

W4279 Headquarters Road

Mayville, WI 53050 1931

Phone: (920) 387-2658

The Trust for Public Land (<http://www.tpl.org/>)

Central Region Office

2610 University Avenue, Suite 300

St. Paul, MN 55114

Phone: (651) 917-2240

The Trust for Public Land (TPL) is a national, non-profit, land conservation organization that conserves land for people to enjoy as parks, community gardens, historic sites, rural lands, and other natural places, ensuring livable communities for generations to come.

United States Army Corp of Engineers

Suite 211 Old Fort Square

211 North Broadway

Green Bay, WI 54303

Phone: (920) 448-2824

Section 404 of the Clean Water Act requires that the depositing, dredging, or filling of material into "waters of the United States, **including wetlands,**" must receive authorization for such activities. The Corps has been assigned responsibility for administering the Section 404 permitting process. Activities in wetlands for which permits may be required include, but are not limited to:

- Placement of fill material.
- Ditching activities when the excavated material is sidecast.

- Levee and dike construction.
- Mechanized land clearing.
- Land leveling.
- Most road construction.
- Dam construction.

United States Department of Agriculture (USDA) (www.fsa.usda.gov/FSA/)

421 Nebraska Street

Sturgeon Bay, WI

Phone: (920) 743-3595

The Farm Service Agency (FSA) administers and manages farm commodity, credit, conservation, disaster and loan programs as laid out by Congress. These programs are designed to improve the economic stability of the agricultural industry and to help farmers adjust production to meet demand.

United States Fish & Wildlife Service (<http://www.fws.gov/midwest/>)

Green Bay Ecological Services and Law Enforcement Offices

(<http://www.fws.gov/midwest/GreenBay/>)

2661 Scott Tower Drive

New Franken, WI 54229

Phone: (920) 866-1717 or 866-1750 for the Law Enforcement office

The U.S. Fish & Wildlife Service is a bureau within the Department of the Interior. Their mission is to preserve, protect, and enhance fish, wildlife, and plants and their habitats for the continuing benefit of the American people.

- Information on federally-listed species: (<http://www.fws.gov/midwest/Endangered/>)
- Maps and information on the Hine's emerald dragonfly groundwater recharge areas that feed the wetlands where the larvae live and critical habitat areas can be found at the Web sites listed below:
- U.S. Fish & Wildlife Service
(<http://www.fws.gov/midwest/Endangered/insects/hed/index.html>)
- SWCD (<http://map.co.door.wi.us/swcd/HED-fly/Hines-Emerald-Dragonfly.htm>)

Wisconsin Rural Development (<http://www.rurdev.usda.gov/wi/index.htm>)

Shawano Area Office

603B Lakeland Road

Shawano, WI 54166

Phone: (715) 524-8522

The USDA Rural Development seeks to improve the economy and quality of life in all of rural America. Their financial programs support public facilities and services such as water and sewer systems, housing, health clinics, emergency service facilities and electric and telephone service. They also promote economic development by supporting loans to businesses through banks and community-managed lending pools.

**CHAPTER 4:
AGRICULTURAL AND NATURAL
RESOURCES
ADDITIONAL TABLES**

Table 4.19(A): Rare Aquatic Animals, Plants, and Natural Communities, Door County

Aquatic Occurrences			
Common Name	Date Listed	Common Name	Date Listed
Animal		Plants (continued)	
American Bittern	1998	Lesser Fringed Gentian	2000
Aurora Damselfly	1991	Livid Sedge	2000
Bald Eagle	2003	Marsh Horsetail	1983
Banded Killifish	1965	Marsh Ragwort	1935
Beach-dune Tiger Beetle	1999	Marsh Willow-herb	1983
Black-crowned Night-heron	1999	Northern Black Currant	1999
Blanchard's Cricket Frog	1983	Northern Bog Sedge	2000
Blanding's Turtle	1990	Northern Yellow Lady's-slipper	1999
Citrine Forktail	1991	Ohio Goldenrod	2000
Common Goldeneye	1997	Ram's-head Lady's-slipper	1998
Dorcas Copper	2000	Round-leaved Orchis	1985
Forcipate Emerald	1990	Sheathed Sedge	2000
Four-toed Salamander	2001	Showy Lady's-slipper	2000
Great Black-backed Gull	1995	Slender Bog Arrow-grass	2000
Hine's emerald dragonfly	2006	Slenderleaf Sundew	1995
Lake Huron Locust	1999	Slim-stem Small-reedgrass	2000
Lake Sturgeon	1914	Small Yellow Water Crowfoot	1938
Le Conte's Sparrow	1993	Small-flower Grass-of-parnassus	1985
Mottled Darner	1991	Sticky False-asphodel	1999
Northern Ribbon Snake	1963	Swamp-pink	1996
Osprey	2000	Tufted Bulrush	1999
An Owlet Moth	2002	Tufted Hairgrass	2000
Piping Plover	1948	Variiegated Horsetail	2000
A Predaceous Diving Beetle	1999	White Adder's-mouth	2000
Red-shouldered Hawk	1998	Natural Communities	
Striped Shiner	1962	Alder Thicket	1976
Swamp Darner	1993	Boreal Rich Fen	2000
Two-spotted Skipper	1982	Emergent Marsh	2000
A Water Scavenger Beetle	1999	Forested Seep	1998
Yellow Rail	1989	Great Lakes Alkaline Rockshore	--
Plants		Great Lakes Beach	1999
Adder's-tongue	1950	Great Lakes Dune	2001
Alpine Cotton-grass	1989	Great Lakes Ridge and Swale	2001
American Sea-rocket	2000	Hardwood Swamp	1999
Brown Beakrush	1999	Interdunal Wetland	1988
Coast Sedge	1998	Lake--Shallow, Hard, Drainage	2000
Common Bog Arrow-grass	2000	Lake--Shallow, Hard, Seepage	1998
Crawe Sedge	2000	Lake--Shallow, Very Hard, Drainage (Marl)	1988
Cuckooflower	2000	Northern Sedge Meadow	2000
Downy Willow-herb	1926	Northern Wet Forest	1976
Drooping Sedge	1999	Northern Wet-Mesic Forest	2001
Dwarf Lake Iris	2002	Open Bog	1976
Elk Sedge	2000	Shore Fen	2000
Fairy Slipper	1973	Shrub-carr	1999
Few-flower Spikerush	2000	Southern Hardwood Swamp	1999
Hair-like Sedge	2000	Southern Sedge Meadow	2000
Hidden-fruited Bladderwort	1972	Springs and Spring Runs, Hard	--
Leafy White Orchis	1999		

Source: Wisconsin Department of Natural Resources, 2007.

Table 4.19(B): Rare Terrestrial Animals, Plants, and Natural Communities, Door County

Terrestrial Occurrences			
Common Name	Date Listed	Common Name	Date Listed
Animal		Plants (continued)	
Appalachian Pillar	1997	Green Spleenwort	1999
Bat Hibernaculum	1986	Handsome Sedge	2000
Black Striate	1997	Heart-leaved Foam-flower	1994
Black-throated Blue Warbler	1995	Hooker Orchis	1998
Boreal Top	1997	Indian Cucumber-root	1931
Bright Glyph	1995	Lake Huron Tansy	1979
Brilliant Granule	1997	Lanceolate Whitlow-cress	1994
Cape May Warbler	1999	Large Roundleaf Orchid	2000
Cherrystone Drop	1998	Large-flowered Ground-cherry	2001
Deep-throated Vertigo	1997	Limestone Oak Fern	1979
Dentate Supercoil	1998	Long-spur Violet	2000
Dickcissel	1999	Low Calamint	2000
Henslow's Sparrow	1994	Low Spike-moss	1994
Hooded Warbler	1995	Maidenhair Spleenwort	2000
Iowa Pleistocene Vertigo	1998	Mingan's Moonwort	1998
Loggerhead Shrike	1999	Moonwort Grape-fern	1997
Midwest Pleistocene Vertigo	1998	Northern Comandra	1999
Mystery Vertigo	1997	One-flowered Broomrape	2001
Northern Goshawk	2004	Pale Green Orchid	1987
Northern Ringneck Snake	1991	Purple False Oats	1997
Phyllira Tiger Moth	1991	Putty Root	2001
Pleistocene Catinella	1995	Richardson Sedge	2000
Sculpted Glyph	1997	Rock Whitlow-grass	2000
Six-whorl Vertigo	1997	Rocky Mountain Sedge	1916
Tapered Vertigo	1997	Sand Reedgrass	2000
Transparent Vitrine Snail	1996	Seaside Spurge	2000
Upland Sandpiper	2001	Spoon-leaf Moonwort	1982
Western Meadowlark	2001	Spreading Woodfern	1997
Plants		Striped Maple	1998
Autumn Coral-root	1998	Thickspike	2000
Beautiful Sedge	1999	Western Fescue	2000
Bird's-eye Primrose	2000	White Mandarin	1929
Broad-leaf Sedge	2000	Natural Communities	
Canada Gooseberry	1926	Alvar	2000
Chilean Sweet Cicely	1999	Boreal Forest	2000
Christmas Fern	1975	Great Lakes Barrens	1998
Climbing Fumitory	2000	Moist Cliff	2000
Cooper's Milkvetch	2000	Northern Dry Forest	1998
Crinkled Hairgrass	2000	Northern Dry-mesic Forest	1999
Dune Goldenrod	2000	Northern Mesic Forest	2000
Dune Thistle	2004	Southern Mesic Forest	1998
Giant Pinedrops	1999	Talus Forest	1999

Source: Wisconsin Department of Natural Resources, 2007.

Table 4.20: State-Designated Significant Natural Areas, Door County

Significant Natural Area	State Natural Area	State Wildlife & Fishery Area	Significant Wetland	Land Legacy Place
Baileys Harbor Boreal Forest and Wetlands	X			
Bayshore Blufflands	X			
Big and Little Marsh	X			
Black Ash Swamp Area				
Chambers Island				X
Cave Point	X			
Coffey Swamp	X			
Colonial Waterbird Nesting Islands				X
Detroit Harbor	X			
Door Peninsula Hardwood Swamps				X
Duvall Swamp			X	
Eagle Harbor to Toft Point Corridor				X
Ellison Bluff County Park	X			
Europe Bay Woods	X			
Gardner Swamp (Au Grande Maret)		X		
Grand Traverse Islands				X
Jackson Harbor Ridges	X			
Kangaroo Lake	X			X
Little Lake	X			
Logan Creek	X			
Marshall's Point (Pine Ledges)	X			
Meridian County Park	X			
Mink River Estuary	X			X
Moon Light Bay Bedrock Beach	X			
Mud Lake	X			
Mud Lake Wildlife Area & Reibolts Creek		X		
Newport Conifer - Hardwoods	X			
Niagara Escarpment				X
North Bay	X			X
Northeast Coast Door Peninsula			X	
Peninsula Park Beech Forest	X			
Peninsula Park White Cedar Forest	X			
Peninsula State Park				X
Peninsula State Park to Jacksonport Corridor				X
Renard Swamp Area			X	
Rock Island Woods	X			
Shivering Sands			X	X
Sister Islands	X			
The Ridges Sanctuary	X			
Thorp Pond	X			
Toft Point	X			
Upper Door County Area			X	
Washington Island Wetlands			X	
White Cliff Fen and Forest	X			
Whitefish Dunes	X			

Source: Wisconsin Department of Natural Resources, 2007.