

CHAPTER 5 Agricultural, Natural and Cultural Resources Element

66.1001 (2)(e) Wis. Stat.:

Agricultural, Natural and Cultural Resources element. A compilation of objectives, policies, goals, maps, and programs of the conservation, and promotion of the effective management of natural resources such as groundwater, forests, productive agricultural area, environmentally sensitive areas, threatened and endangered species, stream corridors, surface water, floodplains, wetlands, wildlife habitat, metallic and non metallic mineral resources, parks, open spaces, historical and cultural resources, community design, recreational resources and other natural resources.

Section 5.1 Agricultural Resources

Portage County is home to a diversity of agricultural operations, from dairy to vegetables to cranberry bogs, which makes agriculture a vital part of the Portage County way of life and economy.

Farming in Portage County first began in response to the need for food in the local lumber camps. Many were originally attracted to the area by the logging industry, eventually settling here as farmers selling potatoes and other crops to the lumberman. In 1850 there were only 5 farms in Portage County. This number increased to nearly 600 farms by 1860 following the enactment of the homestead law, and expansion continued through the end of the century.

Crop farming in the sand plain closely followed the development of irrigation technologies. Large-scale irrigation of potatoes and other vegetable crops first began in the post-war 1940's. By the mid 1960's, most of the original irrigation pits had been replaced by wells. By the 1970's, larger yielding wells and self-propelled, center pivot irrigation equipment allowed larger fields to be irrigated.

Will Rogers, American humorist and writer from the early twentieth century said, "Buy land. They ain't making any more of the stuff." Land most certainly is a finite resource, especially when viewed within the context of Portage County's 824 square miles of land area. Agricultural land use is a significant component of the County's land base, accounting for over 50% of the total land use in 2005.

This section will review the significance of agriculture to Portage County, agricultural trends in the County, identify county-wide agricultural issues, and present general goals for the management of agricultural lands and the agricultural economy. The extent to which the people of Portage County heed the advice of Will Rogers, and buy land, or heed the wisdom of Will Rogers, "They ain't making any more of the stuff," will depend on the value residents place on farmland as an irreplaceable natural resource or merely a commodity.

A. Agricultural lands

Portage County can best be described as a "coming together" of farming systems. The County is located in two major farm regions in Wisconsin. First and most prominent is the dairy region. In Wisconsin, dairying is most concentrated in a belt that begins near Hudson (St. Croix County), heads east to Wausau and Green Bay (Brown County), then turns southwest through Fond du Lac, Madison, and ends near Dubuque (Iowa County). Wisconsin Department of Agriculture 2002 permit information listed 179 active Grade A dairy farms operating in Portage County. The second farming region that Portage County occupies is that of fresh vegetable production. The irrigated sands of the "golden sands" region of Wisconsin lay between and south of the Amherst

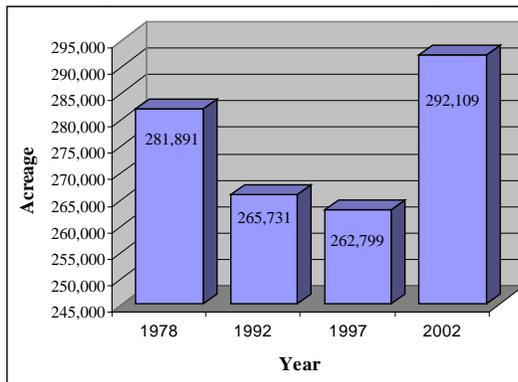
and Stevens Point areas of Portage County. While no exact acreage numbers are available, the presence of pivot irrigation rigs is one key indicator of vegetable production. Some of these fields may not be used for vegetable production, but odds are the majority have been used for this industry.

B. Farm numbers, types, and size

What is a farm? According to the 2002 Census of Agriculture, USDA, “the census definition of a farm is any place from which \$1,000 or more of agricultural products were produced or sold, during the census year”. This definition tends to be somewhat misleading regarding the extent of farming operations within Portage County. Census breakdowns for farm operations probably indicate a more accurate picture.

According to the 2002 Census of Agricultural Data, the land in farms had actually increased by 11% since 1997. This reverses a declining trend since 1992 in the County agricultural acreage.

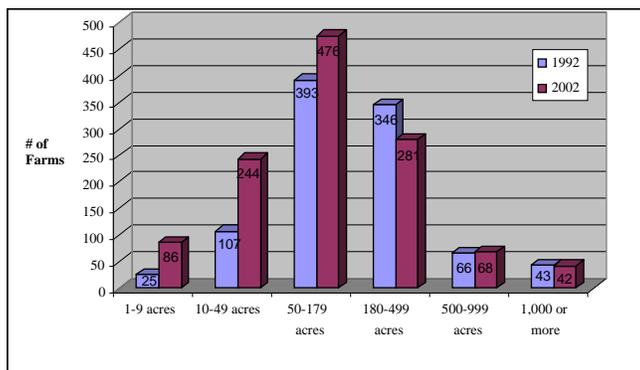
Figure 5.1: Land in Farms (Acreage)



Source: 1978, 1992, 1997, and 2002 Census of Agriculture

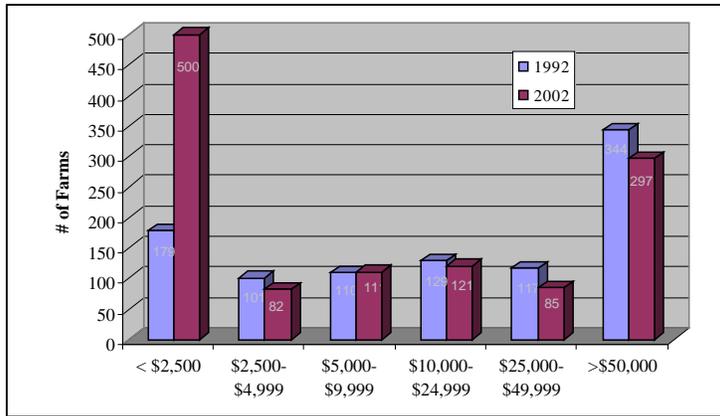
Figure 5.2 describes the number of County farms by their size. Figure 5.3 shows Portage County farms by the value of their gross sales.

Figure 5.2: Portage County Farms by Size



Source: 1992, 2002 Census of Agriculture

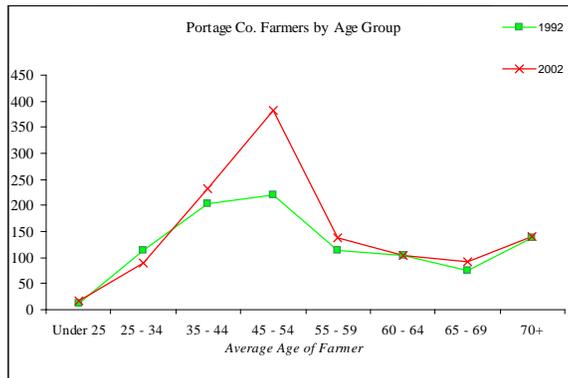
Figure 5.3: Portage County Farms by Value of Gross Sales



Source: 1992, 2002 Census of Agriculture

Portage County has seen an increasing trend in the age of farmers. This is similar to the trend in overall age of farmers in Wisconsin.

Figure 5.4: Age of Farmers in Portage County



Source: 1992, 2002 Census of Agriculture

Portage County’s agriculture reflects the natural landscape. Dairy and cash crop production are the dominant forms of agriculture on the rolling glacial moraines to the East, and on the gently rolling to level, somewhat poorly drained clay-enriched soils to the west. In the middle of Portage County lie the flat, sandy remnants of Glacial Lake Wisconsin – expansive, irrigated fields that produce an assortment of vegetables; predominantly potatoes, sweet corn, snap beans, and peas used for canning. To a much smaller degree, alternative forms of agriculture have become intertwined with traditional agriculture. These include organic dairy, live stock and vegetable production; apple orchards, herb production, nurseries and greenhouses, Christmas trees, poultry and egg production, and community supported agriculture. There is a growing preference by the consumer for locally and sustainable grown food, which is increasing farming trends in this direction. Table 5.1 below gives a general profile of agricultural products and livestock in Portage County, in relation to state and national rank.

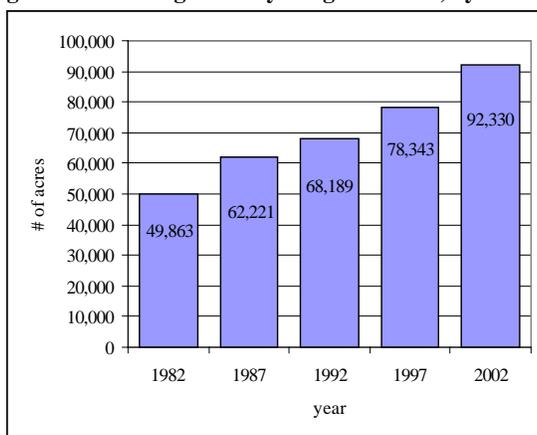
Table 5.1: 2002 Census of Agriculture County Profile, Portage County

Item	Quantity	State Rank	Universe ¹	U.S. Rank	Universe ¹
Market Value of Agricultural Products Sold (\$1,000)					
Total Value of agricultural products sold	138,949	11	72	290	3,075
Value of crops including nursery and greenhouse	99,097	1	72	133	3,070
Value of livestock, poultry, and their products	39,852	38	72	722	3,070
Value of Sales by Commodity Group (\$1,000)					
Grains, oilseeds, dry beans, and dry peas	8,050	42	72	1,068	2,871
Tobacco	~	~	13	~	560
Cotton and cottonseed	~	~	~	~	656
Vegetables, melons, potatoes, and sweet potatoes	83,114	1	71	26	2,747
Fruits, tree nuts, and berries	2,803	10	71	204	2,638
Nursery, greenhouse, floriculture, and sod	2,482	25	70	711	2,708
Cut Christmas trees and short rotation woody crops	(D)	(D)	68	(D)	1,774
Other crops and hay	(D)	(D)	72	(D)	3,046
Cattle and calves	65	44	71	1,408	2,918
Poultry and eggs	10,032	33	72	992	3,053
Milk and other dairy products from cows	27,545	39	69	167	2,493
Hogs and pigs	565	29	71	1,011	2,919
Sheep, goats, and their products	37	51	70	1,481	2,997
Horses, ponies, mules, burros, and donkeys	135	41	69	1,489	3,014
Aquaculture	(D)	(D)	56	(D)	1,520
Other animals and other animal products	(D)	(D)	68	(D)	2,727
Top Livestock Inventory Items (number)					
Cattle and calves	43,716	35	72	689	3,059
Hogs and pigs	4,687	27	72	910	2,926
Layers 20 weeks and older	3,237	30	72	867	2,983
Broilers and other meat-type chicken	1,743	25	71	782	2,599
Horses and ponies	1,695	22	72	625	3,065
To Crop Items (acres)					
Forage - land use for all hay a haylage, grass silage, and greenchop	55,539	25	72	234	3,059
All Vegetables harvested	44,888	1	69	12	2,710
Corn for grain	35,184	34	69	613	2,592
Potatoes	25,489	1	58	12	1,551
Sweet corn	23,963	1	69	4	2,279

(D) Cannot be disclosed. ¹ Universe is number of counties in state or U.S. within item.
 Source: 2002 Department of Agriculture Census

Portage County consistently ranks first in the State for potato, snap bean, and sweet corn production. The County continues to lead the state in the amount of land under irrigation, and the amount of irrigated acres has steadily increased over time. A majority of Portage County irrigated vegetable operations are located in the sand plain region. The abundance of readily accessible water in the groundwater aquifer, high-capacity well technology, and highly permeable soils in need of frequent watering combine to create an environment that supports certain agricultural activities. Care must be taken to balance irrigation, pesticide and fertilizer application with groundwater quality and quantity supplies to Portage County drinking water, lakes, rivers and wetlands.

Figure 5.5: Portage County Irrigated Land, by Acreage



Source: 1992, 2002 Census of Agriculture

C. Highly Productive Agricultural Soils

Highly productive agricultural soils in Portage County have been identified, with the assistance of the County Conservationist, based on highest productivity and lowest degree of limitations for farming (Map 5.1 Highly Productive Agricultural Soils). Slopes greater than 6% were excluded from the “highly productive” designation (due to severe hazard for water erosion), along with small parcels and stony, rough, and eroded sites. Highly Productive Soils in Portage County include:

Prime

- Bt - Billett sandy loam, 0 to 2 percent slopes
- DuB - Dunnville very fine sandy loam, 2 to 6 percent slopes
- MfB - Mecan loamy sand, 2 to 6 percent slopes
- MgB - Mecan sandy loam, 2 to 6 percent slopes
- MsB - Mosinee sandy loam, 2 to 6 percent slopes
- NoB - Norgo silt loam, moderately deep variant, 2 to 6 percent slopes
- RhA - Rockers loamy sand, 1 to 3 percent slopes
- RsB - Rosholt loam, 2 to 6 percent slopes
- Rt - Rosholt loam, loamy substratum, 0 to 2 percent slopes
- RzB - Rozellville loam, 2 to 6 percent slopes
- WyB - Wyocena sandy loam, 2 to 6 percent slopes

** Billet, Mecan, Mosinee, Rockers, and Wyocena series are highly susceptible to pesticide and nitrate leaching.

Prime if Drained

- Af - Altdorf silt loam
- DoA - Dolph silt loam, 1 to 3 percent slopes
- DxA - Dunnville very fine sandy loam, mottled subsoil variant, 1 to 3 percent slopes
- KeA - Kert silt loam, 1 to 3 percent slopes
- MeA - Meadland loam, 1 to 3 percent slopes
- Oe - Oesterle sandy loam
- Ov - Oesterle loam, silty subsoil variant
- PoA - Point sandy loam, 1 to 3 percent slopes
- Sh - Sherry silt loam
- Vs - Vesper silt loam

** Drainage may cause flooding, stream bank erosion and water quality degradation to down gradient receiving surface water.

Prime if Irrigated

- FrA - Friendship loamy sand, 0 to 3 percent slopes
- RfA - Richford loamy sand, 0 to 2 percent slopes
- RRfB - Richford loamy sand, 2 to 6 percent slopes

The Richford and Friendship series requires irrigation to maintain productivity and are highly susceptible to pesticide and nitrate leaching.

D. Agricultural Potential Based on Land Evaluation Rating (LESA)

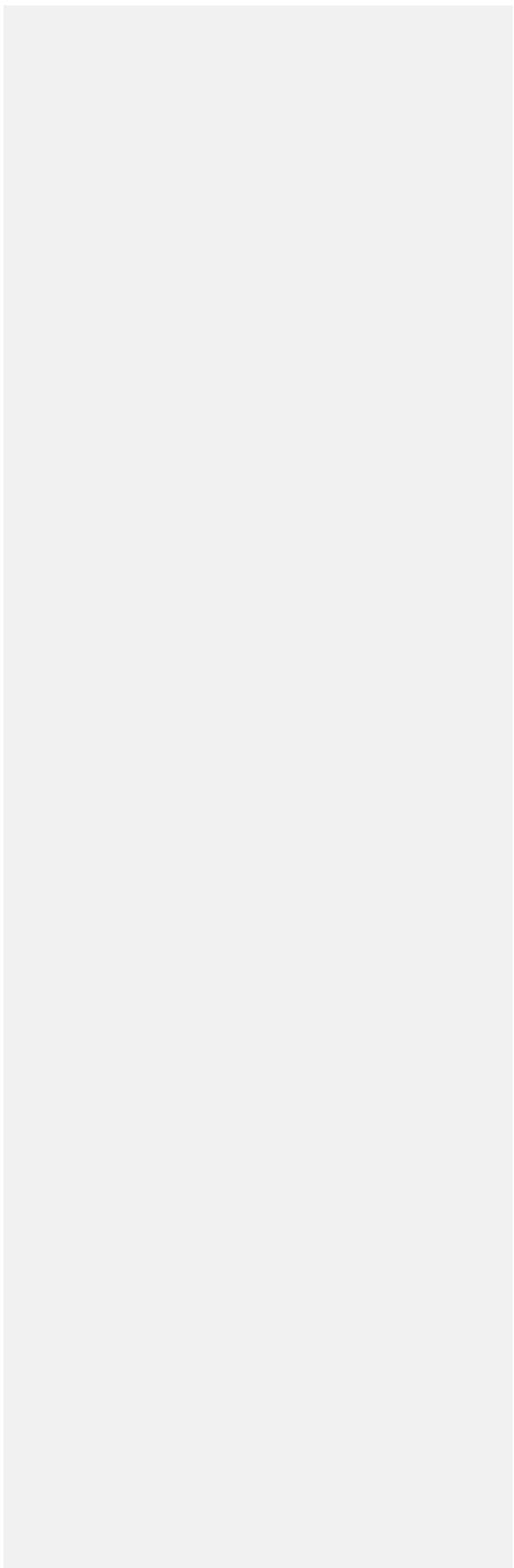
Land Evaluation and Site Assessment (LESA) is a tool that can be helpful in assisting Town and County leaders to identify land that has the highest value for agricultural use within the community. The LESAs system is a point-based approach that can be used for rating the relative value of agricultural land resources. It does so by defining and measuring two separate sets of factors.

The first set, **Land Evaluation**, includes factors that measure the inherent soil-based qualities of land as they relate to agricultural suitability. The second set, **Site Assessment**, includes factors that are intended to measure social, economic, and geographic attributes that also contribute to the overall value of agricultural land.

A Land Evaluation (LE) rating was developed for use across all of Portage County. Three soil property indexes, all published by the Natural Resources Conservation Service (NRCS), were combined to produce the LE rating: prime farmland classification, land capability class – natural condition, and productivity index. LE ratings reflect the productivity potential, as well as the economic and environmental costs of producing a crop. Possible LE ratings range from 0 to 100, with **higher numbers meaning greater value for agriculture**. Many physical and chemical soil properties are considered in the LE rating, either directly or indirectly, including soil texture and rock fragments, slope, wetness and flooding, soil erodibility, climate, available water capacity, pH (alkalinity versus acidity), and permeability.

A Site Assessment (SA) rating can then be developed for individual Towns across the County. As with the LE rating, SA ratings range from 0 to 100, with higher numbers meaning greater value for agriculture. The LE and SA scores are combined to yield a score for each two-acre block of land within the Town ranging between 0 and 200 points, with a score of 200 representing lands that are of the highest value for agriculture (excluding specialty crops such as cranberries). Communities will then determine an appropriate threshold for ranking lands recommended for protection (i.e. areas with a score higher than 150 and greater than 40 contiguous acres in size). Weighting factors can be changed by each community to reflect its own priorities. See Appendix D for a complete explanation of this system. As an outcome of local comprehensive planning, nine Towns intend to use the LESAs model as an advisory tool to help identify productive agricultural areas in the community to remain in agricultural use.

Map 5.1: Highly Productive Ag Soils



E. Farm Economy and Infrastructure

Agriculture is an important economic force in Portage County. It includes hundreds of family-owned farms, related businesses and industries that provide equipment, services and other products farmers need to process, market and deliver food and fiber to consumers. The production, sales and processing of Portage County’s farms products generates employment, economic activity, income and tax revenue.

According to the University of Wisconsin Extension (2004), Portage County agriculture provided 9,870 jobs. That was 23.2 percent of the Portage County workforce of 42,526 people. These jobs are diverse, from farm owners, to on-farm employees, veterinarians, crop and livestock consultants, feed and fuel suppliers, food processors, farm machinery dealers, barn builders and agricultural lenders, etc. Every new job in agriculture generates one additional job in Portage County.

Portage County agriculture generates \$1.26 billion in economic activity, accounting for 31% of Portage County’s total economic activity. Every dollar of sales from agricultural products generates and additional \$0.46 of economic activity in other parts of the Portage County economy. Here’s how agriculture’s \$1.26 billion economic impact breaks down.

- The direct effect of agriculture is \$862.2 million and includes the sale of all farm products and value-added products.
- Purchases of agricultural inputs and services create another \$298.2 million in economic activity; for example, business-to-business purchases such as fuel, fertilizer, feed, farm equipment, veterinary services and crop consultant.
- This business-to-business activity then generates another \$101.6 million in economic activity, because people who work in agriculture-related businesses spend their earnings.

Agriculture accounts for \$441.4 million (22.4%) of Portage County’s total income. This includes wages, salaries, benefits and profits of farmers and workers in agriculture-related businesses. Every dollar of agricultural income generates an additional \$0.93 of county income.

Agricultural processing is the largest part of Portage County’s agriculture. Portage County agricultural processors contribute \$1.1 billion to the County’s economy. The processing of vegetable accounts for \$1 billion. The processing of milk into dairy products accounts for another \$48.7 million. Every dollar of sales of produced products generates an additional \$0.49 of economic activity in other parts of the economy.

Vegetable production is a very important part of Portage County’s agriculture. In 2002, the market value of vegetable crops was \$83.1 million, or 60 % of the total market value of all agricultural products sold in the County. There are over 67,000 acres of vegetables, including potatoes, sweet corn, snap beans and peas, raised in Portage County.

**Table 5.2: Portage County’s Top Commodities
(sales by dollar value, 2002)**

Dollars (in millions)		Dollars (in millions)	
1. Vegetables	\$83.1	4. Grain	\$8.1
2. Milk	\$27.5	5. Cranberries	\$2.8
3. Cattle and calves	\$10.0	Total Sales	\$131.5

Source: UW Extension, 2004

- Processing accounts for \$389.7 million of income in the County
- Portage County’s agricultural processing accounts for 7,436 jobs. Vegetable processing accounts for 7,237 jobs and dairy processing accounts for another 199 jobs.
- Each dairy cow generates between \$15,000 to \$17,000 of economic activity.

F. Other local influences on Agriculture

Many areas to the east of the Portage County urban area (Stevens Point/Whiting/Plover/Park Ridge) have seen substantial amounts of pressure for the development of rural residential properties. This has brought more homes onto the agricultural landscape, increased the potential for conflicts, increased the assessed value of non-farm lands, and most importantly, has increased the sale price per acre of land beyond the point of being economically viable for purchase as farmland.

G. Agricultural Programs

A number of programs are available to agricultural landowners to help achieve desired outcomes ranging from enhancing wildlife habitat to minimizing soil erosion. The following is a partial list from the Natural Resources Conservation Service (NRCS). For more information about these and other programs contact the local NRCS office at 715-346-1325 or the Farm Service Agency at 715-346-1313.

Conservation Reserve Program (CRP)

The Conservation Reserve Program, administered through the Farm Service Agency (FSA), is a voluntary program for agricultural landowners. Through CRP, one can receive annual rental payments and cost-share assistance to establish long-term, resource conserving covers on eligible farmland. Participants enroll in CRP for 10 to 15 years.

Environmental Quality Incentives Programs (EQIP)

The Environmental Quality Incentives Program (EQIP) is a voluntary conservation program. It supports production agriculture and environmental quality as compatible goals. Through EQIP, farmers may receive financial and technical help with structural and management conservation practices on agricultural land.

EQIP may pay up to 75 percent of the costs of eligible conservation practices. Incentive payments may be made to encourage a farmer to adopt land management practices, such as nutrient management, manure management, integrated pest management, and wildlife habitat management.

Wetlands Reserve Program (WRP)

The Wetlands Reserve Program is a voluntary program to restore and protect wetlands on private property. It is an opportunity for landowners to receive financial incentives to restore wetlands that have been drained for agriculture.

Landowners who choose to participate in WRP may sell a conservation easement or enter into a cost-share restoration agreement with USDA to restore and protect wetlands. The landowner voluntarily limits future use of the land, yet retains private ownership. The landowner and NRCS develop a plan for the restoration and maintenance of the wetland.

The program offers landowners three options: permanent easements, 30-year easements, and restoration cost-share agreements of a minimum of 10-year duration.

Wildlife Habitat Incentives Program (WHIP)

The Wildlife Habitat Incentives Program is a voluntary program for people who want to develop or improve wildlife habitat on private lands. It provides both technical assistance and cost sharing to help establish and improve fish and wildlife habitat.

Landowners agree to prepare and implement a wildlife habitat development plan. The U.S. Department of Agriculture Natural Resources Conservation Service (NRCS) provides technical and financial assistance to implement the wildlife habitat restoration practices.

Section 5.2 Natural Resources Inventory

Natural resources in Portage County serve as the foundation for residents' physical, psychological, and economic well being – from groundwater quality to land suitability for agricultural, residential, or commercial development or recreation. According to the results of the 2001 Comprehensive Planning and Zoning Survey (see Appendix B), Portage County residents favored managing the natural resources that support and sustain them.

This section will describe the existing natural resources inventory.

A. Geology and Topography

Portage County is underlain by crystalline rocks of pre-Cambrian age, and sandstone of Cambrian age, which is mantled by glacial deposits of Pleistocene Age (Map 5.2). The crystalline rock is exposed and weathered in the northwest part of the County. These are generally the most poorly drained soils. However, in the southern part of the County, sandstone overlies this crystalline rock (Map 5.3).

The eastern half and south part of the County is covered with glacial drift. Deposits range from a few feet in the north to more than 350 feet in the southeast. This material is deposited in outwash plains; this is where irrigated agriculture has generally developed. It is also deposited in moraine and intermoraine drift, primarily from the Green Bay lobe of the glacier. This glacial topography of irregular hills, which are sometimes quite steep, creates problems of soil erosion due to different forms of land use.

The glacial topography varies from the rolling, terminal or end moraines oriented north to south in the eastern third of the County, to flat sand outwash plain in the southwest portion. Elevation ranges from 1,320 feet above sea level in the Town of Almond to 920 feet above sea level along the southeast border of the County (see Map 5.5).

The land surface of Portage County was formed largely by glacial activity. This and other complex geomorphologic processes have acted together to create a variety of contrasting landforms. For study purposes, the County was divided into four distinct landscape or ecosystem types. Each area has terms of geology, topography, soils and so on. Each area also possesses different land use limitations and potentials. Surface and groundwater resources are discussed separately, because of their overall impact on the land and its present and future uses.

1. Moraine and Lake Landscape

The eastern one-third of the County underwent significant glaciation and is characterized by a series of north-south ridges and moraines, and numerous “pothole” lakes. Large areas of glacial till and outwash were deposited between the moraines. The soils derived from these materials are primarily the sandy loams of the Wyocena-Rosholt association and the loamy sands of the Kranski-Coloma-Mecan association (see Map 5.6 below). These well-drained

soils are valuable for agriculture and are utilized primarily for dairy production. Stoniness is a significant limitation in certain areas, as evidenced by the large boulders lining many farm fields. The steeper moraine slopes are highly erosive under cultivation and have generally remained wooded. Most of the low-lying, poorly drained wetland areas have also limited conversion to farming.

The wooded moraine topography has attracted some non-farm residential development. Certain lakes have also attracted recreational and year-round home development. The lakeshore areas typically have severe limitations for septic systems and are poorly suited for high density development. Care must be taken not to exceed the carrying capacity of these small lakes.

2. Sand Plain Landscape

Lying immediately west of the moraine and lake landscape, and in striking contrast, is the sand plain. Known locally as the “golden sands,” this largely flat area extends throughout the central and southwestern parts of the County. The sand plain is composed of deep layers of sand and gravel that were deposited by glacial melt waters. This porous layer provides a valuable groundwater aquifer. The abundant supply of groundwater, together with advances in irrigation technology, has allowed the droughty soils to be converted to vegetable and cash-crop production. However, this combination has also compromised groundwater quality.

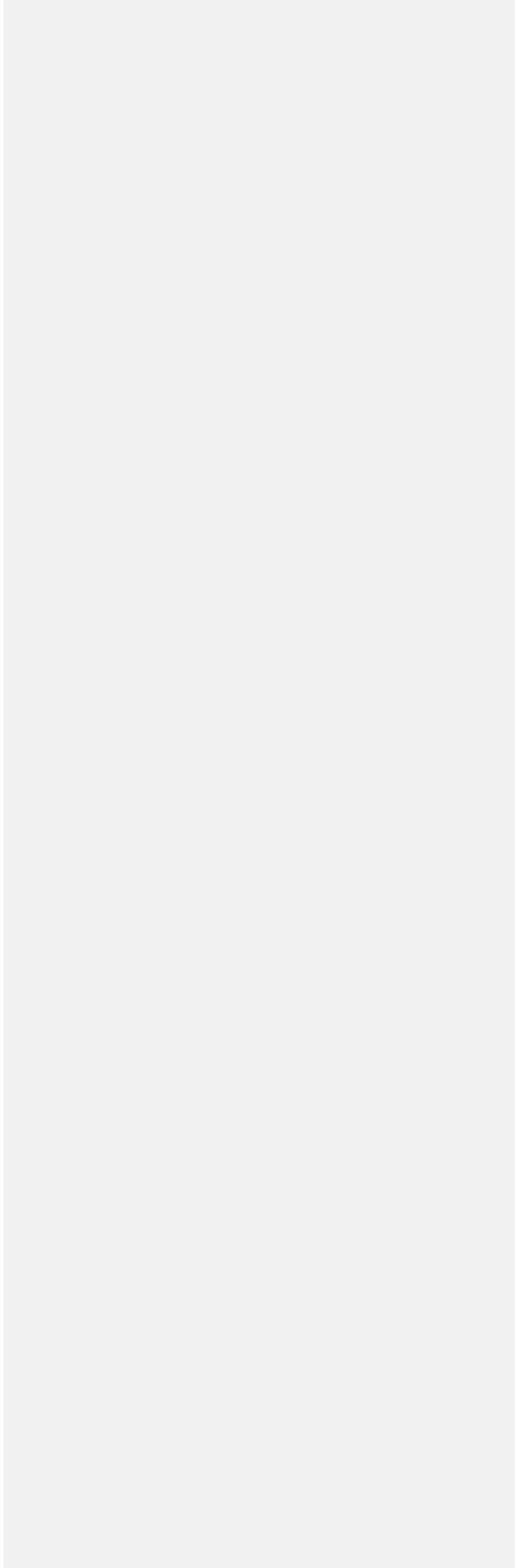
Characteristically, the sand plain soils are excessively drained in the northern part of the County and poorly drained in the southwestern part, in the area of the Buena Vista Marsh in the Towns of Grant, Pine Grove and Buena Vista. Lakes are lacking and streams are few, with a number of watercourses having been straightened and converted into a series of interconnecting drainage ditches. These ditches are used to drain the land, thus allowing high-yield, irrigated vegetable production in the marsh area.

A total of 12,000 acres of prairie chicken habitat are contained in the Buena Vista Marsh Wildlife Area, which is managed by the Department of Natural Resources (DNR) under a lease agreement with two private organizations; the Society of Tympanuchus Cupido Pinnatus and the Dane County Conservation League. The prairie chicken is a threatened Wisconsin species, which survives in significant numbers in only a few areas in central Wisconsin. Management of these lands consists primarily of maintaining a grassland habitat.

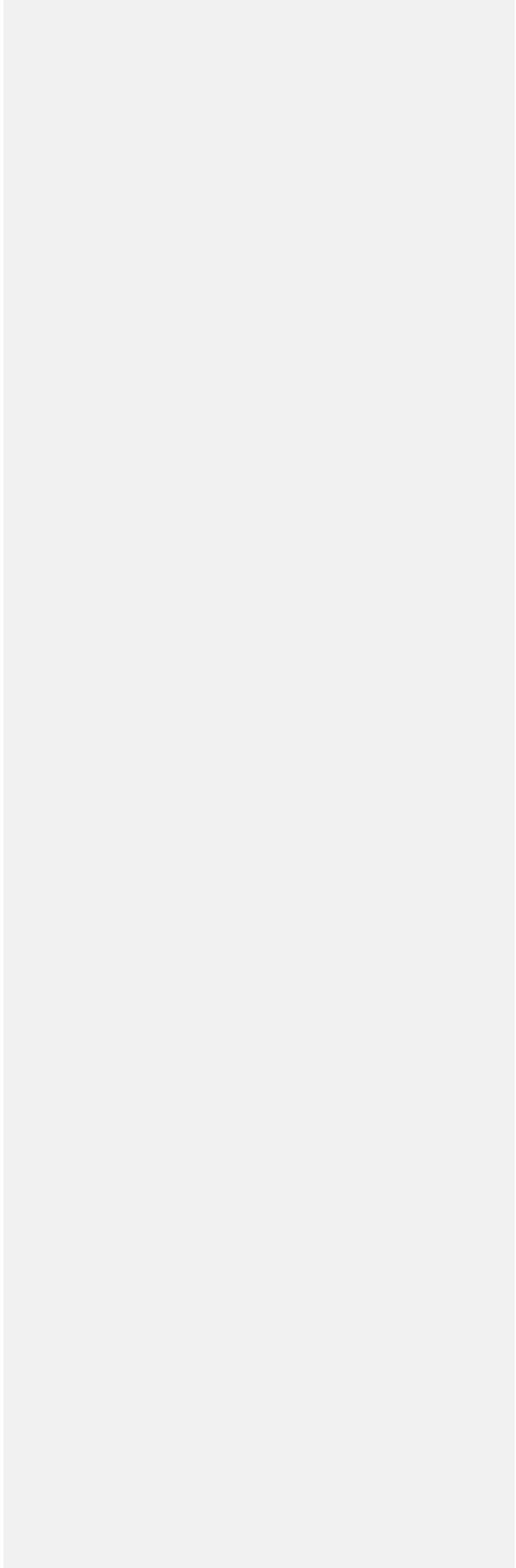
The predominant soil associations in the sand plain are; Richford-Rosholt-Billett, Plainfield-Friendship, Leola-Pearl and Roscommon-Meehan-Markey. The low organic matter, sandy texture, and low clay content of these soils contribute to their characteristic dryness and make them susceptible to wind erosion. Problems are usually worse in the spring when winds are the strongest and fields are bare. Soil losses of 2 to 20 tons per acre occur annually. Cover crops, wind breaks, and crop strips have proven successful in reducing wind erosion.

Because of their porosity or permeability, the sand plain soils do a rather poor job of filtering out pollutants before they reach the groundwater. For this reason the intensive use of agricultural chemicals or livestock manure, and any concentration of homes serviced by septic systems, pose a serious threat of groundwater contamination in the sand plain region. The sand plain region as a whole presents limitations for residential development due to the high water table, the proximity to intensive agricultural activity, and the threat of groundwater contamination. The area is also lacking in certain recreational amenities, such as forests, lakes, and streams, which are abundant throughout the rest of the County.

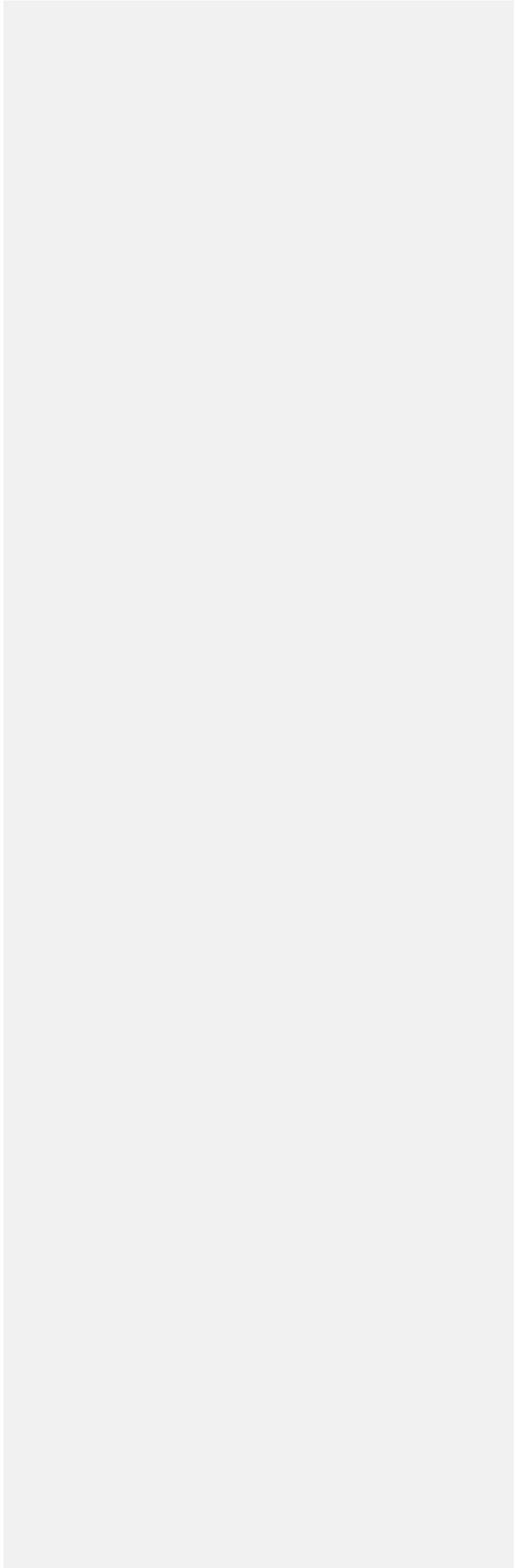
Map 5.2 Pleistocene Geology



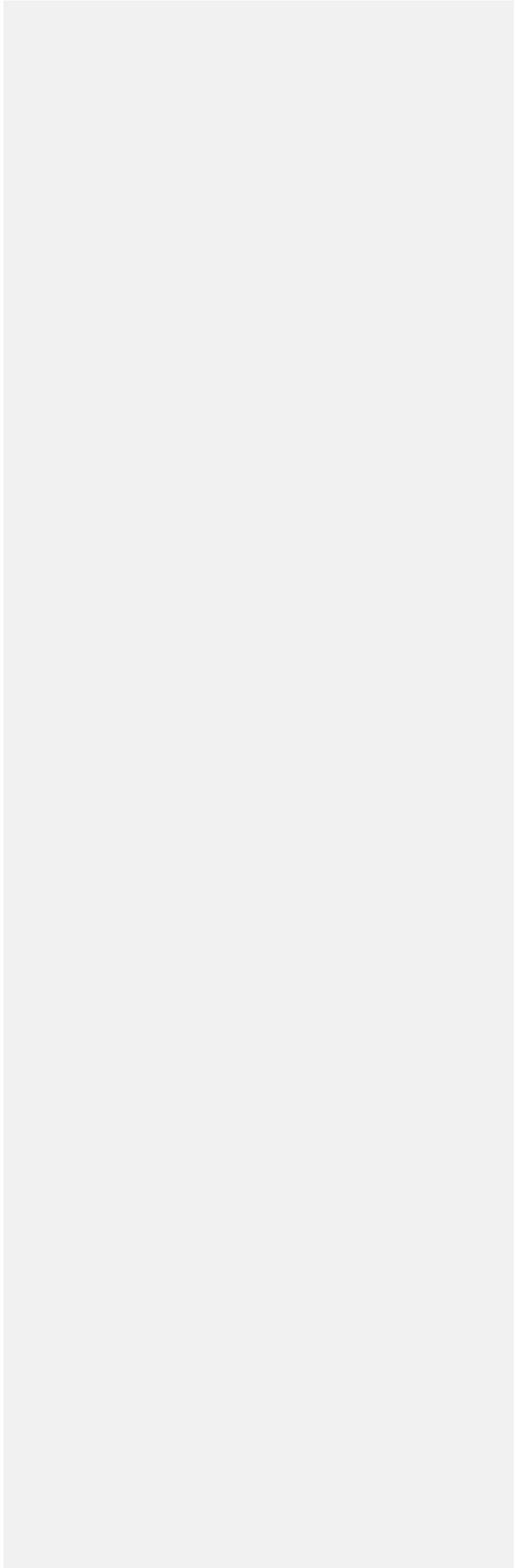
Map 5.3 Bedrock Geology



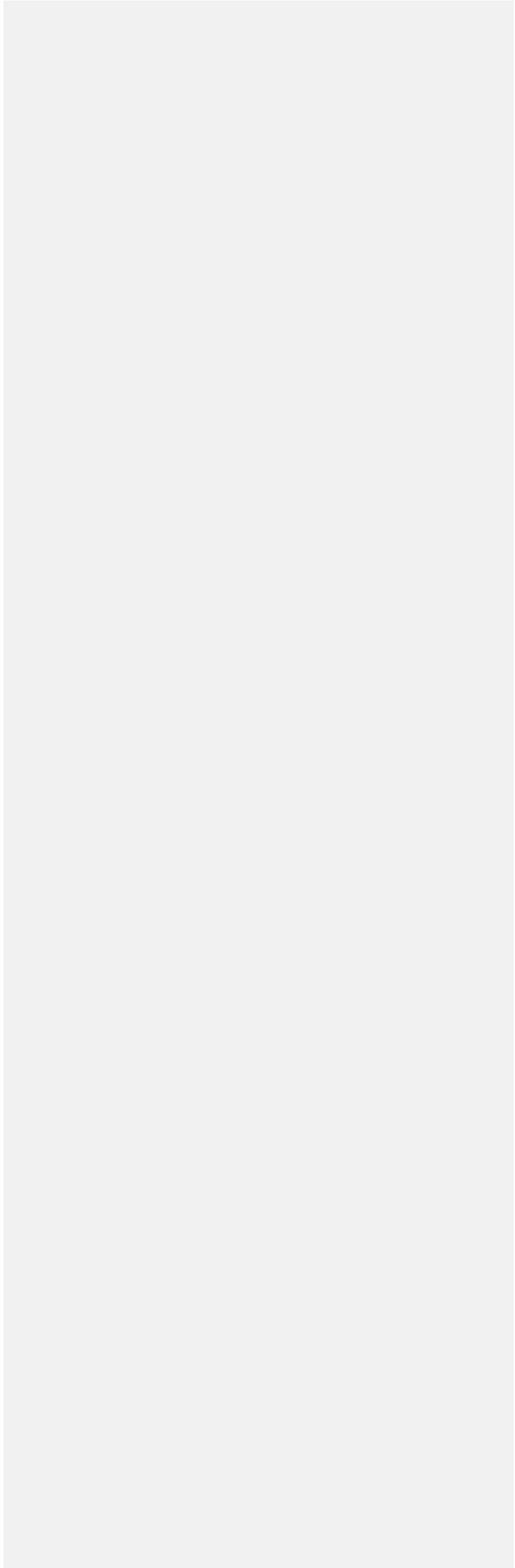
Map 5.4 Surficial Geology



Map 5.5 Topography



Map 5.6 General Soils Associations



3. River and Marsh Landscape

The northwestern part of the County is characterized by its gently rolling topography, shallow soils, high water table and crystalline bedrock at or near the surface. The granite-like aquifer yields only limited amounts of water for wells. While groundwater volumes are small, volumes of surface runoff are large. The area is typified by numerous wetlands and large marshes, such as the Dewey Marsh and the Mead Wildlife Area. The Wisconsin River flowage north of Stevens Point and the Lake DuBay impoundment on the County's northern border are two other notable features of this region. The Wisconsin Department of Natural Resources owns and manages 1,076 acres of prairie chicken lands in the Sherry-Carson Wildlife Area, which straddles the Portage and Wood County Line.

Predominant soils in this area were formed in thin layers of glacial materials and the underlying bedrock residuum. Loam and silt loam soils of the Meadland-Rozellville-Dolph association and sandy loam soils of the Point-Dancy-Mosinee association are common to the area. Organic soils also occur along the stream bottoms. The area's soils are generally very productive for agriculture, with dairy farming being the primary activity. The lack of storage for animal wastes has been a problem affecting water quality in the area. Runoff from barnyards is a particular problem due to farm buildings being located close to surface water courses. Soil conservation practices and proper manure storage facilities are needed to prevent excessive runoff and minimize the degradation of local waters. Wetland restoration projects in these areas will provide a significant benefit for water quality and wildlife, along with a reduction of stream bank erosion caused by rapid rises in stream flow during storms.

Soil suitability for septic systems is poor in many areas due to the shallow depth to bedrock, high water table, and clay soils. These conditions not only present limitations for residential development, but also for underground utilities and road development as well.

4. Floodplain and Wetland Landscape

Floodplains serve as natural water storage areas during high water periods and occur as corridors along streams and rivers. They are also habitat heavily used by terrestrial and aquatic organisms. The largest floodplain zones are associated with the Wisconsin River and areas west, particularly in the Towns of Carson and Linwood.

Wetlands are depression areas that are covered by shallow water or are subject to intermittent flooding and slow drainage. Based on wetland mapping completed by the Department of Natural Resources, there are approximately 92,800 acres of wetlands, which constitutes about 18% of the land area in the County. The largest concentrations are located in the northern and western townships, particularly in association with the Mead Wildlife Area and the Dewey and Buena Vista Marshes. Floodplains and wetlands tend to occur in association along streams and lakes and are generally forested in this situation. Wetlands in the southern part of the County support forest, grassland and scrub vegetation types.

Soils in the floodplain areas range from undeveloped alluvial materials, to organic muck soils of the Markey-Seelyville-Cathro associations. Similarly, wetland and marsh soils consist of organic deposits over sand.

Both the floodplains and wetlands are poorly suited to residential and other permanent structural development, due to the high water table and flood hazard potential. These limitations are less significant with regard to agricultural capability. In fact, certain floodplain soils are among the most agriculturally productive in the County. Wetlands may

also be utilized for agriculture, but generally require improvements such as drainage. Under Wisconsin’s wetland legislation and the County’s shoreland/wetland zoning provisions, drainage of wetlands in shoreland areas can no longer be conducted over and above those areas already drained by existing ditches. A substantial number of marsh and wetland areas have been converted to agriculture since the turn of the century through ditching and drainage. Floodplain and wetland areas have also been utilized for specialty crops, such as cranberries, through controlled flooding of bogs.

Floodplains and wetlands are of exceptional value for wildlife habitat and light recreational use. These areas also play a tremendously important role in the hydrologic regime, as flood storage, water purification and groundwater recharge areas.

B. Soils

As previously stated, soils in Portage County vary from loamy and silty material west of the Wisconsin River (Kent-Norgo, Meadland-Rozellville–Dolph, and Point-Dancy-Mosinee), to sand and gravel throughout the central part of the County (Richford-Rosholt-Billet, Plainfield-Friendship, Leola-Pearl, and Roscommon-Meehan-Markey), to sandy glacial drift in the eastern portion of the County (Wyocena-Rosholt and Kranski-Coloma-Mecan). Alluvial and organic soils (Alluvial land, wet-Dunnville and Markey-Seelyville-Cathro) are also located throughout the County, mainly located in the northern half.

There are 38 identified soil series in Portage County grouped into 11 soil associations (Map 5.6 above). Four associations are generally related to the sand plain providence, two to the drift providence, three to the drift-crystalline rock providence, and two associations are related to alluvial or organic deposits. See the Soil Survey of Portage County, Wisconsin (1978, U.S. Department of Agriculture) for a complete description of these soil associations.

C. Climate

1. **Temperature** - The annual average temperature for Portage County ranges from 44 degrees to 45.5 degrees. The warmest month is July, with an average high temperature of 80°; the coldest is January with an average high of 22.7°.
2. **Precipitation** - The average annual precipitation is 32 inches, of which about six inches (rainfall equivalent) is from snowmelt. The average annual snowfall is about 44.5 inches.
3. **Growing Season** - The average dates from last frost to first frost is May 11th to October 1st. The average length of the growing season is 142 days.

Table 5.3: Portage County Climate Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Average Degree High (F°)	22.7	27.8	39.0	53.8	67.1	76.0	80.0	77.5	68.7	56.3	40.5	26.9	53.0
Average Degree Low (F°)	3.2	7.9	20.2	33.4	44.9	54.4	59.4	57.1	47.3	36.2	23.2	9.9	33.1
Precipitation (inches)	1.11	0.98	1.95	2.87	3.63	3.66	4.12	4.11	3.78	2.31	2.27	1.34	32.1
Snowfall (inches)	11.6	7.8	7.1	1.9	0	0	0	0	0	0.1	4.6	11.4	44.5
Growing Degree Days	0	1	24	127	319	494	621	567	348	152	25	1	2,674

Source: Weather Station Number 478171, Stevens Point WI

D. Groundwater

Maintaining the quality AND quantity of groundwater is vital to safeguarding the economy and quality of life in Portage County, and protecting the health of its residents. One hundred percent of domestic water use and greater than ninety percent of all water use in the County is from groundwater resources.

The possible pollution of groundwater from agricultural practices, on-site sewage disposal systems, lawn chemicals, domestic animal waste, chemical spills, leaking underground storage tanks, landfills, existing land uses and landowner practices continue to endanger the municipal water supply, private wells and affect important surface waters such as the Wisconsin River, Plover River, Little Plover River, Tomorrow River and tributaries, Flume Creek, as well as Portage County lakes.

Groundwater Inventory and Analysis

1. Geology and aquifers

Groundwater is the water that occupies the spaces in between soil particles and rocks below the earth's surface. Aquifers are water bearing geologic formations that contain groundwater. Geological formations have different physical and chemical properties which affect the quality of groundwater as well as its storage and transport.

Bedrock aquifers consist of the consolidated material that underlies the soils and surficial deposits; "bedrock type" is defined as type of the uppermost rock layer. In Portage County there are granite and sandstone bedrock types. Sandstone is an excellent aquifer because it is very porous and is permeable allowing water to move through very easily. Granite is a very poor aquifer since it is virtually impermeable, highly weather resistant and only allows water movement through fractures in the bedrock. Some granite in Portage County has also been found to contain high levels of iron and naturally occurring radioactive substances.

Surficial deposits are defined as the unconsolidated material between the soil and the top of the bedrock. The texture and permeability of the surficial deposits and soils affect the rate at which infiltrating water will reach the water table. Portage County has surficial deposits consisting mostly of large glacial deposits of well sorted sand and gravel which are highly permeable and allow water to move through very quickly.

The sand and gravel aquifer is the most important aquifer in the County. Wells in the sand and gravel aquifer generally have a potential yield exceeding five hundred gallons per minute (gpm). All municipal water supplies (except the Village of Junction City which obtains its water from the granite bedrock) are from wells terminating in sand and gravel aquifers. Wells terminating in granite bedrock can produce flows from below one gallon per minute to 60-70 gpm, while sandstone wells typically producing 10-100 gpm. Because there is a strong connection between surface and ground water, water withdrawals have the potential to negatively affect flow in rivers and lakes.

2. Groundwater susceptibility to contaminants

The susceptibility of groundwater to contamination from land-use activities can be highly variable depending on location. Geologic factors such as soil type, depth to water, depth of bedrock, type of bedrock, and depth of surficial deposits are all factors that are considered when determining how susceptible an area is to groundwater contamination. However, it is important to keep in mind that the types of land use activities that are allowed, where they are

located, and how carefully those activities are performed ultimately determine whether the groundwater resource becomes contaminated.

As shown in Map 5.7, much of Portage County rates from medium to high in terms of groundwater contamination susceptibility. In terms of statewide susceptibility, Portage County is located in one of the most susceptible areas of the state for groundwater contamination. This is due to the prevalence of highly permeable sandy soils and well sorted sand and gravel surficial deposits which allow rapid water movement and little attenuation of chemical contaminants.

3. Groundwater quality

Nitrate

Nitrate pollution affects much of Portage County's groundwater and most of its wells. About 20% of wells tested in the county exceed the drinking water standard. Nitrate can dangerously reduce the amount of oxygen in the blood of infants under six months old. It may also be toxic to aquatic wildlife. Maps 5.8-5.8c below shows the nitrate results of voluntary well samples across the County. Natural nitrate levels in central Wisconsin are less than 2 parts per million. Nitrate concentrations in Portage County groundwater have been increasing for about 30 years, and the increase continues. The areas of Portage County most affected by high nitrate levels are in the areas of agriculture, especially irrigated agriculture, on sandy soils, and in areas of unsewered small lot residential development. Especially high levels are found along the groundwater divide northwest of Almond.

Reducing nitrate pollution will require addressing agricultural sources, which are responsible for approximately 95% of nitrate pollution. (2004 Portage County Groundwater Management Plan, Sections 4.1 & 4.3.2).

Pesticides

Pesticide residues have been detected in numerous private wells and some municipal wells in Portage County. Pesticides include herbicides which are used to kill weeds, insecticides which are used to kill insects, nematocides which are used to kill nematodes, fungicides which are used to kill fungi and other compounds. Over 60 different pesticides have been used in Portage County. The occurrence of the herbicides atrazine, alachlor and metolachlor in Portage County groundwater are discussed below.

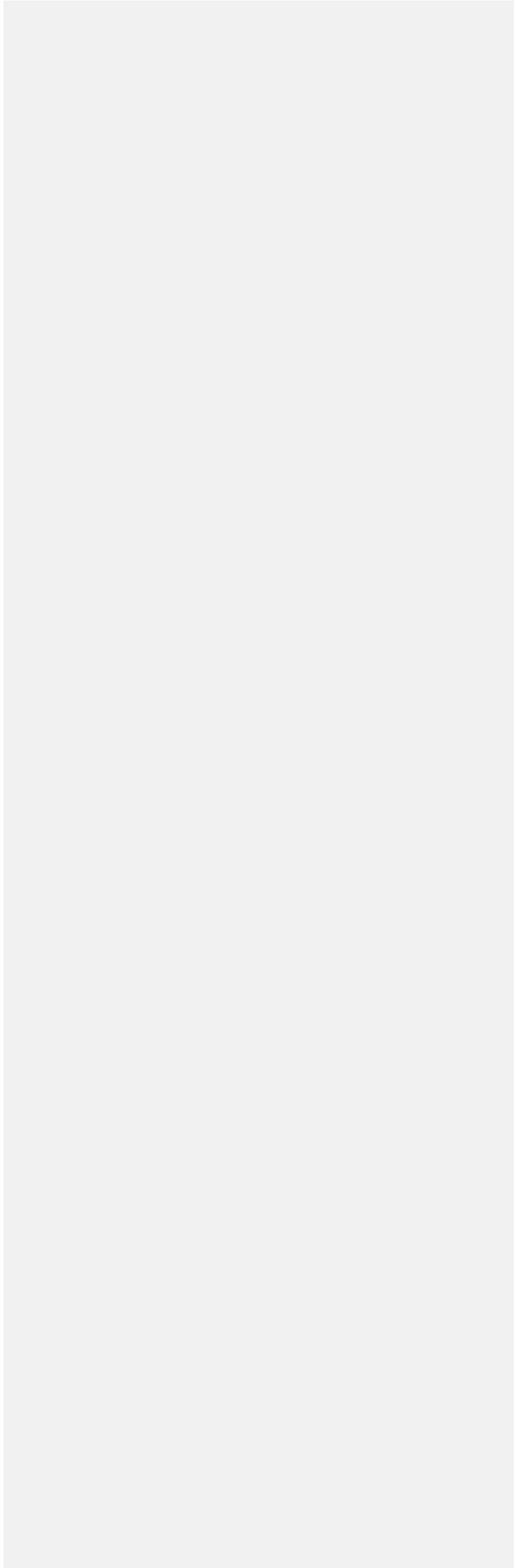
Pesticide application rates vary substantially among crops; averaging about 0.8 pounds (as active ingredient) per acre for soybeans, 2 to 3 pounds per acre for field corn, and around 28 pounds per acre on potatoes (DATCP, 1997). Pesticides are also used on lawns and gardens, but this is less than 1% of total pesticide use (2004 Portage County Groundwater Management Plan, Section 4.3.2).

Atrazine residues have been detected in over 40% of Portage County private wells that have been tested and some municipal wells. The municipal wells have not been over the drinking water standard (3 parts per billion). About 3% of private wells have been estimated to exceed the safe drinking water standard for atrazine. The Wisconsin Department of Agriculture and Consumer Protection has banned atrazine use on 42,573 acres (66.5 square miles or about two complete townships) in areas where atrazine levels in groundwater exceed the 3 ppb drinking water standard (Map 5.9, Atrazine Prohibition Areas).

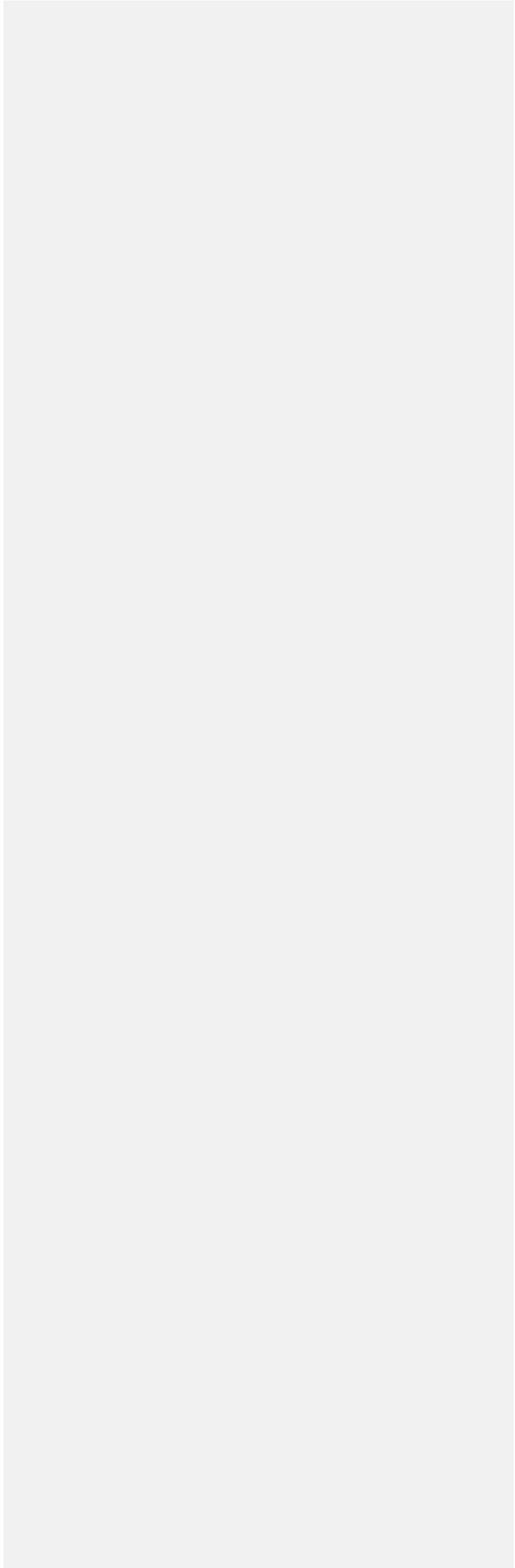
Atrazine is a concern because it is listed as a possible human carcinogen and has been associated with causing imbalances in hormone levels in laboratory animals, possibly

7.7 Groundwater Contamination Susceptibility

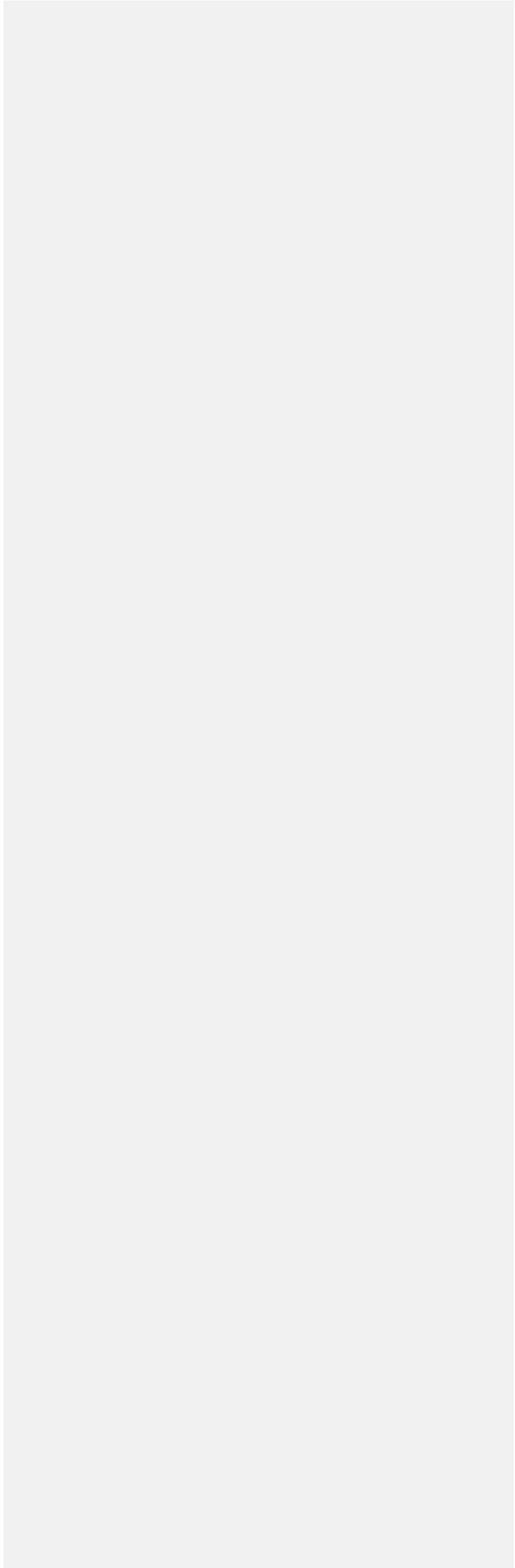
Map 5.8 Nitrate Map (most Recent Samples)



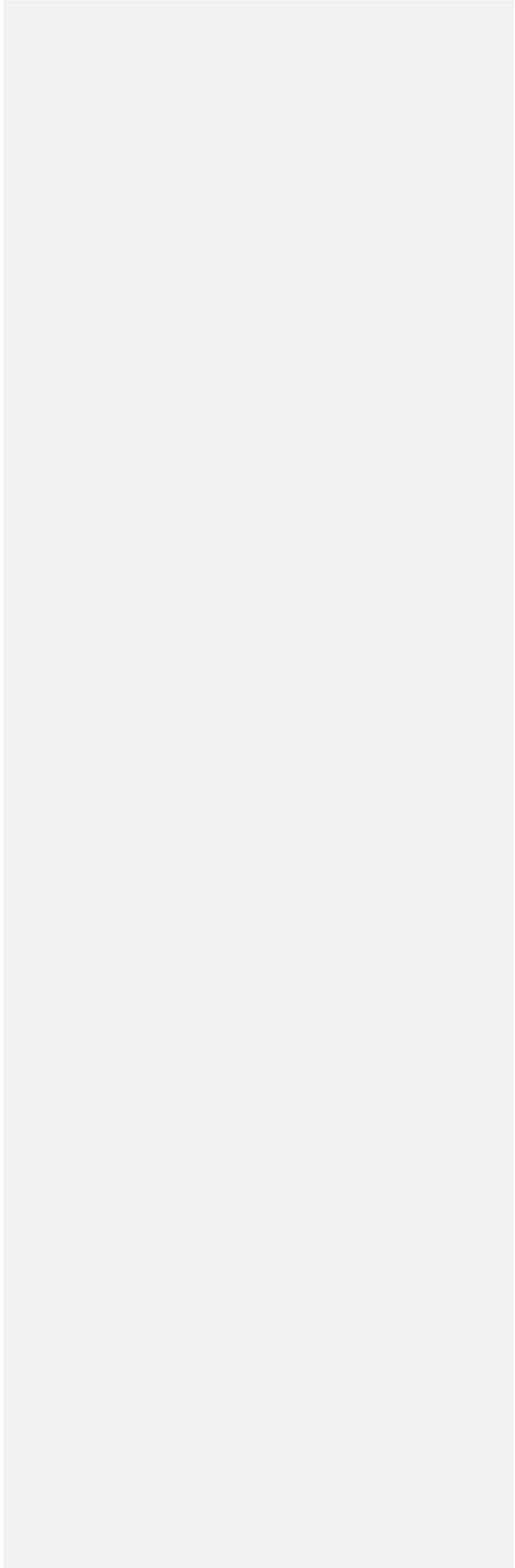
Map 5.8a Nitrate Map (Samples taken before 1990)



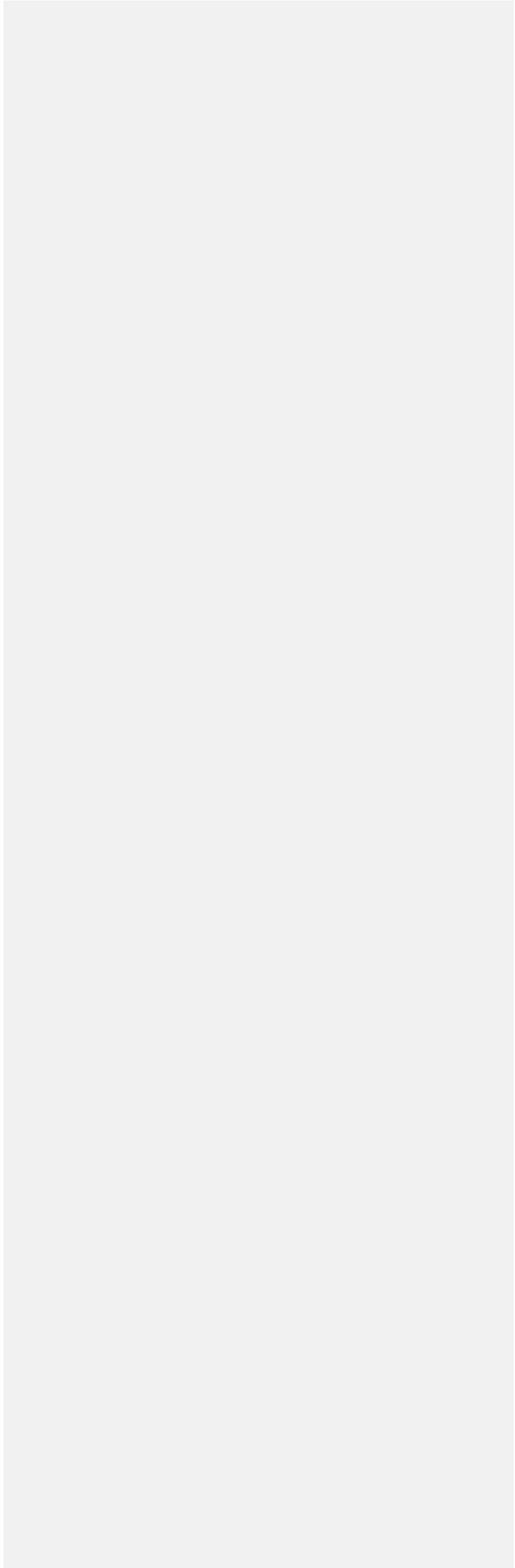
Map 5.8b Nitrate Map (Samples taken between 1990 and 2000)



Map 5.8c Nitrate Map (Samples taken since 2000)



Map 5.9 Atrazine Prohibition Areas



disrupting reproductive and developmental processes (U.S. Environmental Protection Agency). A recent study found that male frogs develop both male and female sex organs when exposed to concentrations of atrazine at 1/30th of the current drinking water standard (Hayes, 2002).

Alachlor and metolachlor residues have been detected in Stevens Point well number 10 and Whiting wells numbers 1 and 7, however, data on most municipal and private wells are lacking (UW-Stevens Point and DATCP). No drinking water standards currently exist for most alachlor and metolachlor breakdown products and the health effects are not fully known. The Wisconsin Division of Health has recommended an interim 20 parts per billion Health Advisory Level for an alachlor breakdown product known as alachlor ESA.

Very few wells have been sampled for the other pesticides which are also likely present in groundwater in the areas where they have been used (2004 Portage County Groundwater Management Plan, Section 4.3.2). Very little is known about the health effects of being exposed to a combination of pesticides or other chemicals in groundwater.

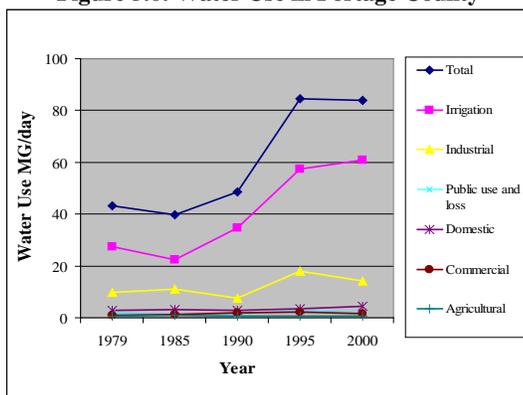
4. Groundwater quantity

Groundwater is a precious resource that has been largely taken for granted in Portage County because it is often only a few feet below the surface in the sand plain and easily accessible to anyone who wanted it. It also allowed the development of the irrigated agricultural industry that is such a large part of Portage County’s economy and culture.

Figure 5.6 shows water use in Portage County from 1979-2000 compiled by U.S. Geological Survey. Notable trends include:

- The largest water users were irrigation and industries. These two users also had the largest water use increases from 1979-2000. Irrigation accounted for 83% of the increased water use, which is a 33 million gallon per day increase. Industrial use accounted for 11% of the increased water use, which is a 4 million gallon per day increase.
- Water use increased for all categories except agriculture. Agriculture is a separate category from irrigation.

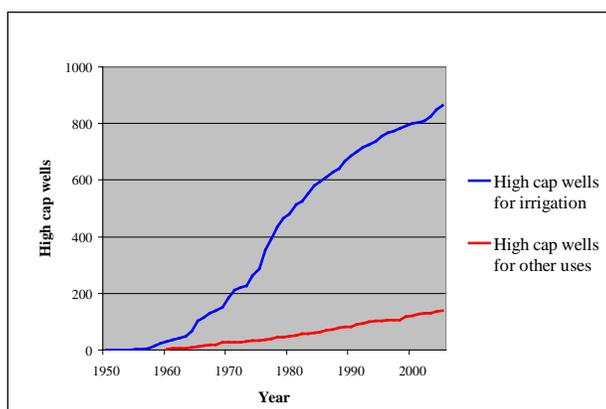
Figure 5.6: Water Use in Portage County



Source: US Geological Survey, University of Wisconsin Stevens Point (UWSP)

High capacity wells are those that are capable of pumping 100,000 gallons or more of water per day which equates to 70 gallons or more per minute. For comparison, the average Wisconsin resident uses 63 gallons of water per day. Figure 5.7 shows the trend of an increasing number of high capacity wells in the county since 1950. In the last 55 years, over 1000 high capacity wells have been drilled in Portage County, 865 of them for irrigation (WDNR).

Figure 5.7: High Capacity Wells in Portage County



Source: Department of Natural Resources (DNR), University of Wisconsin Stevens Point (UWSP)

A common question asked is whether or not increased water use is lowering the water table. Three separate types of data suggest that the water table is being lowered in some parts of the County.

- The water levels in ten municipal wells in the County have decreased between the time they were drilled and 2000. The decreased water levels range from 6 inches to 11 feet with an average drawdown of 5 feet. The water level has not increased in any municipal well (WDNR).
- A section of the Little Plover River went dry during August 2005. This has never been observed before despite more severe droughts. Therefore, groundwater withdrawal from nearby high capacity wells for irrigation and/or the Village of Plover have affected the river.
- Of four U.S. Geological Survey wells in the County that have been monitored since 1952, three of them show clearly lower water levels compared to historical water levels.

In bedrock wells in the northwestern part of the county, low flows can severely limit available quantities of water. This is especially challenging for the Village of Junction City and agricultural operators located in this area.

In areas where high volume users, such as municipalities, industries, and irrigated agriculture all draw significant quantities of groundwater, they affect each other and the natural environment.

A distinction needs to be drawn between the amount of water pumped out of the ground and the amount actually removed from its natural discharge area. Groundwater pumped from private wells is usually returned to the aquifer after treatment in a POWTS. Only a negligible amount is lost. However, when water is pumped for irrigation, industrial, and municipal uses, a good deal of the water is "consumed" rather than returning to its natural discharge zone. For agricultural irrigation, the net effect is that groundwater recharge is reduced about 30 to 40% on each irrigated acre, which reduces discharge to lakes and streams by an equal amount. Pumping for industrial and municipal purposes can have a greater influence because most of this pumping is concentrated in small areas, and groundwater pumped for this purpose is frequently diverted away from the streams where the groundwater would naturally discharge. Also contributing to reduced groundwater recharge is development with the associated expansion of impervious surfaces like roads, driveways and rooftops that prevent rain and snow from soaking into the ground.

For example, the City of Stevens Point pumps water from the Plover River basin (amounting to about 10% of the river's flow), circulates it through the City, and discharges the water to the Wisconsin River. Similarly, the Village of Plover wells take groundwater from the Little Plover Basin, and discharges it to the Wisconsin River. Groundwater models have shown that flows in the Little Plover could diminish by over 40%, when the well pumping reaches design capacity. This 40%, added to the 10% or so reduction from irrigation, could mean the demise of the Little Plover as a native brook trout fishery.

By far, the most concentrated withdrawal of groundwater in the County is in the Village of Whiting, where a high density of municipal and industrial wells is located. This wellfield likely has some, though possibly small, influence on surface water. Monitoring wells in the vicinity of this wellfield have shown some declines in water levels.

In addition to water users in Portage County, the City of Wisconsin Rapids announced plans in 2002 to study installation of a municipal well in the Town of Grant in Portage County (2004 Portage County Groundwater Management Plan, Section 4.2). The City of Wisconsin Rapids drilled a test well on property they owned in Grant, found the water quality was not acceptable for their use, and are now looking for other locations in the Town to install a municipal well.

5. Groundwater Planning Process

In September 1984, the Portage County Board of Supervisors created a Groundwater Council, charged with the primary task of developing a strategy and policy for addressing public concerns on groundwater protection and management for recommendation to the County Board. The Council was composed of local public officials representing various units of government from throughout the County.

The Portage County Groundwater Management Plan was originally adopted in 1988, and revised in 2004. The goals of the revised plan effort remain the same as the original – to identify the major problems facing Portage County with respect to groundwater resources, and to provide a technical basis and justification for these recommendations based on the best available information. An important instrument for implementing the Groundwater Management Plan is the Citizen's Advisory Committee, which consists of representatives appointed by each of the incorporated and unincorporated municipalities who advise the Portage County Planning and Zoning Committee on ways to implement the recommendations of the Groundwater Management Plan.

6. Groundwater Planning Goals

The following goals are taken directly from the 2004 Portage County Groundwater Plan.

Pesticide goals

1. Determine what pesticides are being used and where. Target the above areas and sample wells for possible detection of these pesticides and their metabolites.
2. For pesticides with established groundwater standards:
 - a. In areas where pesticide concentrations in groundwater are below the Preventive Action Level (PAL), pesticide concentrations should be maintained below the PAL.
 - b. In areas where pesticide concentrations in groundwater are at or over the PAL, pesticide concentrations should be lowered to below the PAL.
 - c. In all cases where multiple pesticides are present below their individual enforcement standards in groundwater, the sum of all pesticide residues (including their metabolites) should not exceed the most stringent enforcement standard for any of the individual pesticides detected.
3. For pesticides without groundwater standards:
 - a. In areas where these pesticides are detected in groundwater, levels should be maintained or lowered to levels below the PAL established for similar pesticides (of similar toxicities and modes of action) with established groundwater standards.
 - b. In all cases where multiple pesticides are present in groundwater, the sum of all pesticide residues should not exceed the most stringent enforcement standard established for pesticides (of similar toxicities and modes of action) having established groundwater standards.

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Nitrate goals

1. In areas where groundwater nitrate is:
 - a. Below the enforcement standard (10 ppm nitrate nitrogen), nitrate concentrations should be maintained or lowered.
 - b. At or over the enforcement standard, nitrate concentrations should be reduced to below the enforcement standard.
2. In areas where nitrate concentrations are below the enforcement standard, but cause negative environmental impacts, measures should be taken to reduce nitrate levels.

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Water quantity goals

1. Avoid significant human-influenced depletion of the County's lakes, streams, wetlands, and groundwater reserves.
 - Identify areas within the County that may have groundwater shortages now or in the future.
 - Existing Policies

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Continue Implementing Current County, City, Village and Town Policies Related to Groundwater

The County Zoning Ordinance covers the unincorporated Towns, except for Pine Grove (no zoning) and Grant (Town zoning).

It is very difficult to isolate new, rural residential development from agriculture, which uses pesticides and fertilizers (with associated leaching) to produce food crops. Given that nonfarm, rural residents make up eighty percent of the rural population, this type of isolation may be unrealistic. Because of groundwater flow paths up to several miles, and Portage County's history of agriculture, a well installed in most areas of the County will produce drinking water that has been affected by agricultural contaminants. Areas down-gradient from intensive, irrigated agriculture will likely show the greatest impacts. No zoning districts have been designed to keep future development out of these down-gradient areas.

Wellhead Protection Ordinances protect the Urban Area well fields through the City of Stevens Point, Villages of Plover, Whiting, Amherst, Junction City and Portage County. The ordinances delineate wellhead protection zones, prohibit unsewered development in Zone A (one year time of travel), and prohibit certain other uses such as gas stations and hazardous chemicals in Zone B (five year time of travel) based on past groundwater pollution experience.

The County Subdivision Ordinance applies to lots fifteen acres or smaller created in the unincorporated areas of the county. If existing wells in the area immediately surrounding the proposed lot have shown acceptable water quality, the lot split is not held up due to water quality concerns. If the data is incomplete or not sufficiently current, water tests from surrounding wells are taken. In the case of a proposed lot split in an atrazine moratorium area (known atrazine contamination above the health standard), the developer is required to install a well, and obtain a water sample meeting health standards, prior to approval of the lot split. If the groundwater is not suitable for human consumption, the proposed lot split will not be approved. However, the drinking water standard for nitrate is not currently being applied.

The County Private Sewage System Ordinance regulates private onsite wastewater treatment systems, and alternatives for waste disposal (such as privies and self contained toilets) in all areas of the County, both unincorporated and incorporated, where municipal sewer service is not provided. Lack of proper maintenance of private sewage systems can result in system failures and serious health hazards.

The Portage County Manure Storage and Nutrient Management Ordinance regulates manure storage and utilization. Groundwater and surface water contamination from improper manure management can be quite serious. Even proper application of animal waste, according to a nutrient management plan, can result in some nitrate nitrogen groundwater contamination (2004 Portage County Groundwater Management Plan, Sec. 5.2).

Nitrate removal plants were built in the Villages of Plover and Whiting because the nitrate levels in the municipal wells were above the drinking water standard. In addition, the Village of Amherst drilled a new well due to high nitrate levels. Table 5.4 provides capital and maintenance costs for nitrate reductions in the three villages (DNR, 2005).

Table 5.4: Capital Costs and Annual Maintenance Costs

	Capital costs	Annual maintenance costs
Village of Plover	\$4,000,000	\$24,000
Village of Whiting	\$669,999	\$2,501
Village of Amherst	\$477,834	\$0

Source: Department of Natural Resources (DNR), University of Wisconsin Stevens Point (UWSP)

Many home owners have installed water purification systems to remove nitrate, pesticides and other contaminants from their private well water; the cost for these systems is unknown.

Public Education includes environmental education curriculum in our schools, presentations to community groups, issue-specific education of property owners, a County groundwater website and media coverage of groundwater news.

7. Policy Prioritization from Portage County Groundwater Citizen Advisory Group

Policies to work on immediately

- Continue current County programs which affect or improve groundwater
- Ongoing public education
- Establish well abandonment program in Portage County
- Determine areas with high nitrate and pesticide levels
- Develop collaborative partnerships between Portage County agencies

Policies to work on next

- Determine recharge rates and water budgets for the County's aquifers
- Encourage organic and sustainable agriculture
- Develop a Portage County agricultural pesticide reporting database

Policies to work on after the others

- Attract businesses that can utilize groundwater friendly crops
- Negotiate with food processors regarding pesticides and nutrients required for grower contracts
- Negotiate conservation easements – buy land
- Support a statewide pesticide reporting database

H. Surface Waters and Watersheds (Map 5.10)

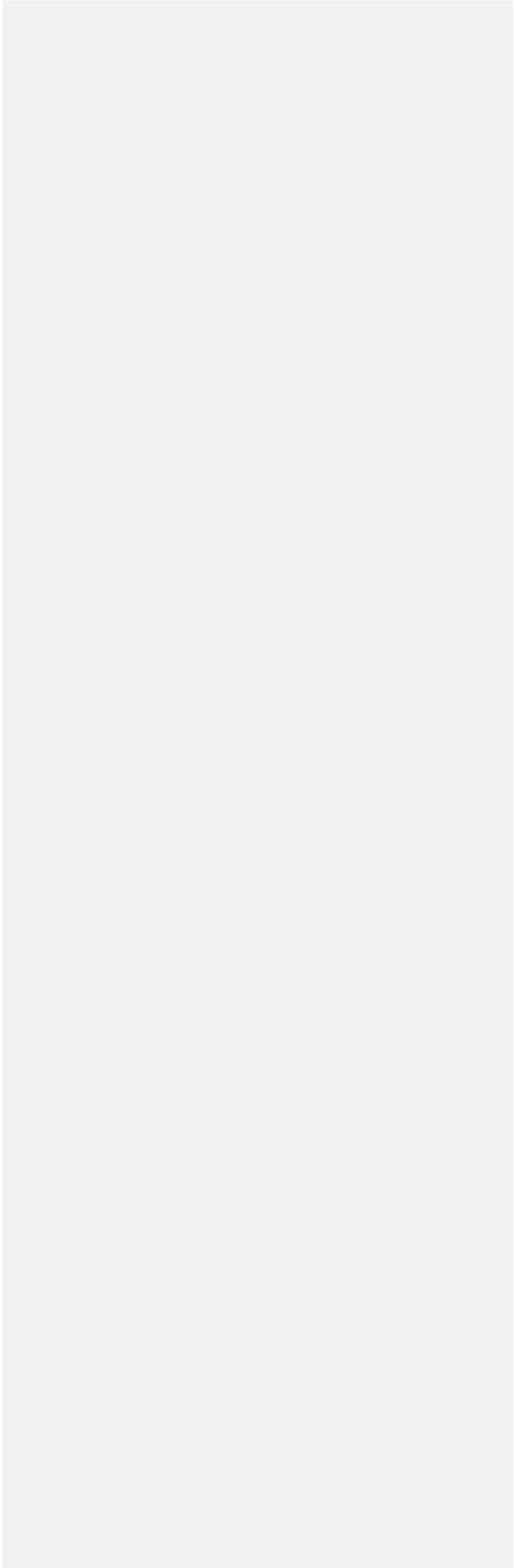
Portage County is divided between the Wisconsin River drainage basin on the western half and the Wolf River basin on the east. This surface water divide is also a continental divide, as the Wisconsin River flows to the Gulf of Mexico and the Wolf River flows to Lake Michigan, and eventually the Atlantic Ocean. Based on an inventory of water resources by the Wisconsin Department of Natural Resources (WiDNR), there are approximately 85 lakes and 64 streams in the County, totaling approximately 6,600 acres. The largest watercourse (Wisconsin River) is the length of about 19 miles, much of which is impounded within the County. The Wisconsin River Flowage No. 3 near Stevens Point is the largest single body of water in the County covering 2,093 acres.

Portage County has three river basins designated by WiDNR: Wisconsin River, Tomorrow-Waupaca River and Little Wolf River. Twelve watersheds make up these Portage County river basins: Little Eau Pleine River, Johnson Creek, Little Eau Claire River, Lower Little Wolf River, Upper Little Wolf River, Plover and Little Plover River, Waupaca River, Mill Creek, Wisconsin Rapids, Fourmile and Fivemile Creek, Sevenmile and Tenmile Creek, and Fourteenmile Creek. (Map 5.11) Each of these watersheds includes additional streams and lakes.

Parts of the Towns of Grant, Pine Grove, Buena Vista, and Plover make up the Portage County Drainage District formed in the early 1900's (please see additional information in the Utilities/Community Facilities Chapter of this Comprehensive Plan). This area is drained by a series of interconnecting ditches and dams. Maintenance dredging of the ditches is allowed by Wisconsin Statutes. There are approximately 93 miles of ditches in Portage County.

Map 5.10 Hydrography

Map 5.11 River Basins and Watersheds



Minimal surface water is used for irrigation in the County; however, some surface water is used for watering livestock and in some areas is utilized for cranberry bogs. The Wisconsin River is used to receive and dilute effluent from municipal and paper mill waste treatment plants.

Most of the rivers and lakes in the County receive a significant amount of water from groundwater; therefore, contaminated groundwater can impact the surface water quality and biota. Additionally, significant water withdrawal from groundwater pumping can impact the amount of water in lakes and rivers. Parts of the Little Plover River dried out during summer 2005. Historically this has never been observed and is due to low water levels in addition to groundwater withdrawal from nearby high capacity wells. The number of high capacity wells in Portage County has increased from 60 in 1960 to approximately 1,000 today.

Most of the naturally occurring lakes are small and are located in the eastern part of the County. Forty-one of the 84 lakes listed by the Department of Natural Resources (WiDNR) are less than 30 acres. Lake Emily is the largest of the natural lakes (105 acres). The seepage (groundwater fed) lakes that are located near the basin divide experience significant fluctuations in water level from year-to-year. Additional groundwater withdrawal has the potential to further reduce the lake levels during or following periods of drought. Fifteen of the 85 lakes are impoundments of rivers, and there are a number of farm ponds that have been developed over the years.

According to the 2001 Portage County Comprehensive Planning Survey, residents support the protection of the lakes and rivers in the County. Wisconsin lakes and rivers are public resources, owned in common by all Wisconsin citizens under the State's Public Trust Doctrine. Based on the State constitution, this doctrine has been further defined by case law and statute. It declares that all navigable waters are "common highways and forever free", and held in trust by the Department of Natural Resources for all of the people in Wisconsin.

Recreation depends heavily on the County's surface water resources. The Wisconsin River, while utilized extensively for hydro-electric power generation, is used extensively for fishing and recreational boating. Smaller streams and lakes throughout the County provide tremendous recreational opportunities for both public and private use. There are 20 municipal, County, or State parks located on Portage County lakes/rivers and an additional 10 public access points for Portage County lakes. Five of the parks provide opportunities for camping which helps to boost the local economy. Nine of the lakes in the County, however, now have invasive aquatic plants. These plants reduce the enjoyment of a lake due to expansive growth, making it difficult to swim, boat, and fish. In addition, they out-compete native aquatic plant species and can significantly and permanently change a lake's ecosystem.

Recent studies in the Midwest and U.S. indicate that water quality has a direct effect on the value of nearby land. Decreasing water clarity decreases property values. Land use practices within a watershed can affect the water quality and habitat of a water body. County shoreland zoning ordinances were designed to help reduce the impact of development to adjacent lakes and rivers. Additional measures can be taken by landowners to further minimize changes to the water body's ecosystem. These measures can include minimizing impervious surfaces, controlling runoff to the water body, leaving/promoting natural vegetation on much of the property especially near the water body, limiting/eliminating the use of fertilizers and pesticides, controlling soil erosion, keeping livestock out of water bodies, and controlling manure runoff. State and federal programs exist that provide funds to help implement agricultural best management practices, restore shoreland vegetation buffers, and purchase sensitive lands near a lake/river. The Portage County Land Conservation Department provides guidance for landowners interested in these programs.

A number of studies have been conducted on the lakes, rivers, and groundwater in Portage County. Many of the studies are available at the UW-Stevens Point library. The most recent studies include evaluations of 29 of the Portage County Lakes, the Plover River Watershed, and the Tomorrow/Waupaca Watershed. A tremendous amount of information is also available on the Little Plover River.

The Portage County Lake Study was conducted in response to the 2001 Portage County Comprehensive Planning Survey which indicated that water quality in our lakes and river is a high priority among the survey respondents. Twenty-nine lakes were evaluated for water quality, land use in their surface and groundwater watersheds, aquatic plants, amphibians, critical habitat, fisheries, and changes that have occurred since the 1970's. The Lake Study will be available soon on the Portage County website.

Currently the lakes in Portage County have water quality that ranges from poor to very good. Some of the lakes have improved in water quality from the 1970's, generally due to the restriction of agricultural animals from the water. About seven of the lakes have significantly reduced water quality compared to historic data from the 1970's. Atrazine was detected at low levels in all 29 lakes.

The lakes in Portage County are quite variable, which means protection of critical habitat and water quality is more challenging in some of the lakes due to different characteristics. These characteristics include the amount of time water spends in a lake, the type, shape, and size of the lake, the water resources (groundwater versus surface runoff), the amount of hardness (calcium carbonate), the amount of woody debris removed from the shoreland, and adjacent and watershed-scale land uses and land use practices.

A few significant highlights from the Portage County Lake Study include:

- There are dramatic fluctuations in water level in the seepage lakes located near the groundwater divide (Emily, Pickerel, Wolf). These lakes would be very sensitive to additional groundwater withdrawal from high capacity wells.
- Some of the lakes in the County (South Twin, Jacqueline, Collins, Boelter, and Bear) have "soft" water. This condition makes the lakes highly responsive to phosphorus inputs that can result in significantly degraded water quality, algae blooms, and excessive plant growth.
- Lakes created by damming a river (Amherst Millpond, Bentley, Jordan, McDill, Rosholt Millpond, and Springville Pond) have some general characteristics which create different realities than natural lakes. Nutrient rich sediment from the watershed and local land uses accumulate behind the dams decreasing the depth of the lakes. Water slows and is generally shallow, which results in higher temperatures. These conditions are ideal for algae and aquatic plant growth and therefore often result in chronic lake management for aesthetic purposes.
- Invasive aquatic plant species can alter the aquatic plant community of a lake by choking out native species and growing in abundance often to nuisance levels. These plants are frequently spread to lakes from pieces of invasive aquatic plants on boats trailers, boats, ballast water, and aquatic recreation equipment. The Portage County Lake Study identified Eurasian Water Milfoil (*Myriophyllum spicatum*) in Bear, Emily, Joanis, and Thomas Lakes and Jordan, McDill, and Springville Ponds. Curly Leaf Pondweed (*Potamogeton crispus*) was identified in Spring Land and the Amherst Millpond.

The Plover River watershed lies within a small part of Langlade, Marathon, and Portage Counties. Water quality in the Portage County section of the Plover River depends upon the land uses activities in all three counties. Currently the upper portion of the river is predominantly in grass-based agriculture and showed the least impact to water quality. The water quality in the mid-section of the Plover River was impacted by fertilizers and pesticides more common to cropped agriculture, and the lower portion of the river shows effects to water quality from urban land use practices.

The Plover River watershed provides up to two-thirds of the City of Stevens Point drinking water during some parts of the year. It is not known how this affects the flow in the Plover River. The Plover River Alliance, in conjunction with the City of Stevens Point, has purchased a conservation easement on 120 acres of land located on Jordan Pond to protect the water quality, recreational opportunities and aesthetics of the Plover River. There is an old partial impoundment of the Plover River that creates Bentley Pond. A functioning hydro dam creates Jordan Pond, and the Plover River is also impounded downstream where the backed up water creates McDill Pond. This was originally a mill pond. The Plover drains to the Wisconsin River in Whiting.

The Tomorrow River is located in eastern Portage County with its headwaters originating in the northern part of the County. Its name changes to the Waupaca River when it crosses into Waupaca County, and eventually drains into the Wolf River. The Tomorrow River and its tributaries receive much of their water from groundwater. Generally the water quality in much of the Tomorrow River is in good condition however, elevated concentrations of nitrate and pesticides move to the river in the groundwater. Atrazine was detected at nearly all of the tributary and river sampling sites in Portage County. The Tomorrow River receives the effluent from the Amherst wastewater treatment facility and a fish hatchery which is also located in Amherst. In 1993, funding for best management practices was made available by the State to assist landowners in the reduction of non-point source impacts to the Tomorrow/Waupaca River. The river and its tributaries are used for recreation and aesthetics. Parts of the Tomorrow River are identified as a high quality trout fishery.

Mill Creek is located in western Portage County, with its headwaters originating near the City of Marshfield wastewater treatment plant. This creek used to house an excellent fishery, but it is currently on the state's 303d list of impaired water bodies due to low dissolved oxygen. A recent study found relatively high concentrations of atrazine in the water. To date no work has been done to measure pharmaceuticals in the water.

The Little Plover River watershed lies completely within Portage County. It is a 6 mile long, cold water stream which receives most of its water from groundwater. The stream supports a coldwater fishery featuring naturally reproducing brook trout. In earlier times, the fishery was highly prized, but the fishery quality seems to have deteriorated substantially for reasons not understood (Hunt, 1985 and 1988), possibly related to flow regime or water quality deterioration. Levels of nitrate and pesticides have been increasing in the Little Plover River. The Little Plover River Fishery area located along a portion of the stream corridor provides recreational opportunities to the public.

The Little Plover River groundwater basin has been greatly developed for groundwater extraction. The high capacity well density in places reaches 10 per square mile, among the highest in Wisconsin. In addition to wells installed for irrigation, two Village of Plover municipal water supply wells were developed in 1989.

In 2003, awareness began building from anecdotal observations that Little Plover River stream flows were becoming unhealthily low. A new record low flow, 2.9 cubic feet/second, which is a full 25% less than the historical period low flow, was measured in September, 2003. The water year of 2005 started that spring near the historic period record low, and crashed on August 7. On that date, a 1.6 cubic feet/second flow, which is 60% less than the historic period daily low flow, was measured at Hoover Rd., and a ~1 km stream stretch went completely dry. Dead fish and other fauna were found in isolated pools where they were trapped while the stream around them dried up. Flow likely was smaller during the period, as indicated by desiccation cracks in submerged streambed.

The Little Plover River is impounded near Business 51 in Plover, creating the Springville Pond. Downstream the Little Plover River drains to the Wisconsin River.

I. Wetlands and Flood Plain

Wetlands are an important part of the watersheds, acting as a filter system for pollutants, nutrients, and sediments, along with serving as buffers for shorelands and providing essential wildlife habitat, flood control and groundwater recharge. Wetlands within Portage County (Map 5.12) include three general types: forested, scrub or shrub, and emergent/wet meadow.

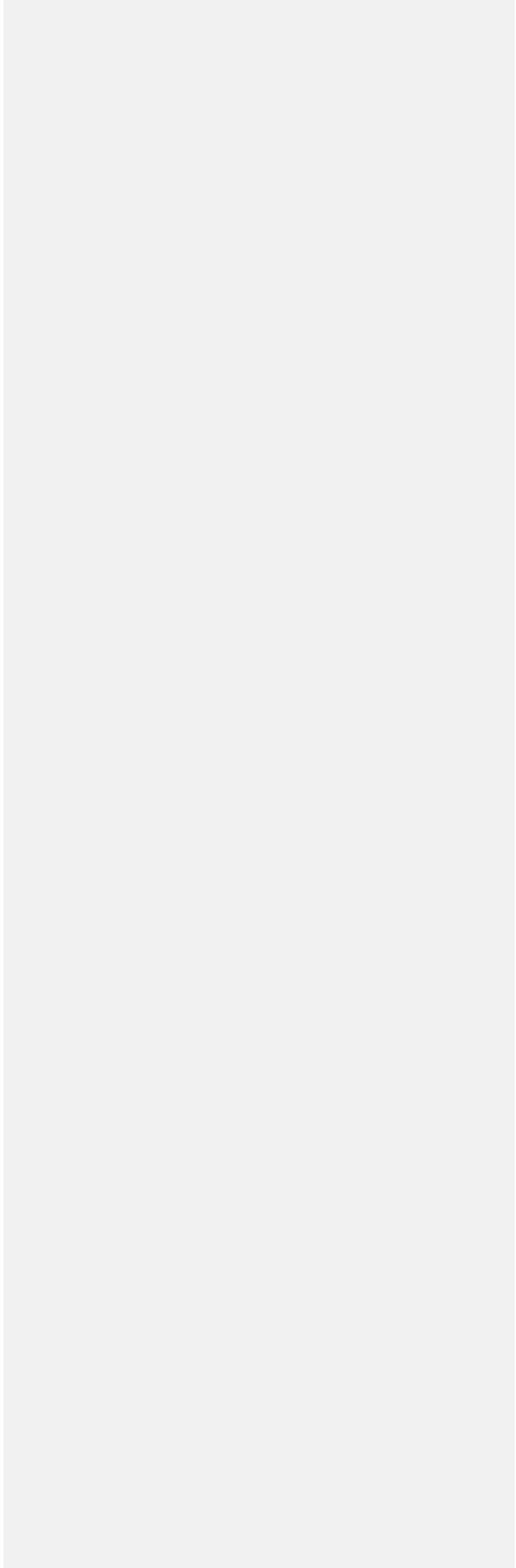
- Forested wetlands are the predominant type, including bogs and forested floodplain complexes that are characterized by trees 20 feet or more in height such as, tamarack, white cedar, black spruce, elm, black ash, and silver maple.
- Scrub/shrub wetlands are the second most abundant type. These wetlands, which include bogs and alder thickets, are characterized by wood shrubs and small trees such as tag aster, bog birch, willow and dogwood.
- Emergent/wet meadow, the third most numerous type of wetland, consists of areas that may have saturated soils more often than having standing water. Vegetation includes sedges, grasses and reeds as dominant plants, but may also include blue flag iris, milkweed, sneezeweed, mint and several species of goldenrod and aster.

Flood plain is defined as that land which has been or may be covered by floodwater during a regional flood. The flood plain includes the floodway and flood-fringe areas. A 100-year flood is defined as a flood event having a one percent chance of reaching the 100-year flood elevation in any given year. Contrary to popular belief, it is not a flood occurring once every 100 years. A 100-Year flood plain then, is the area adjoining a river, stream, or watercourse covered by water in the event of a 100-year flood.

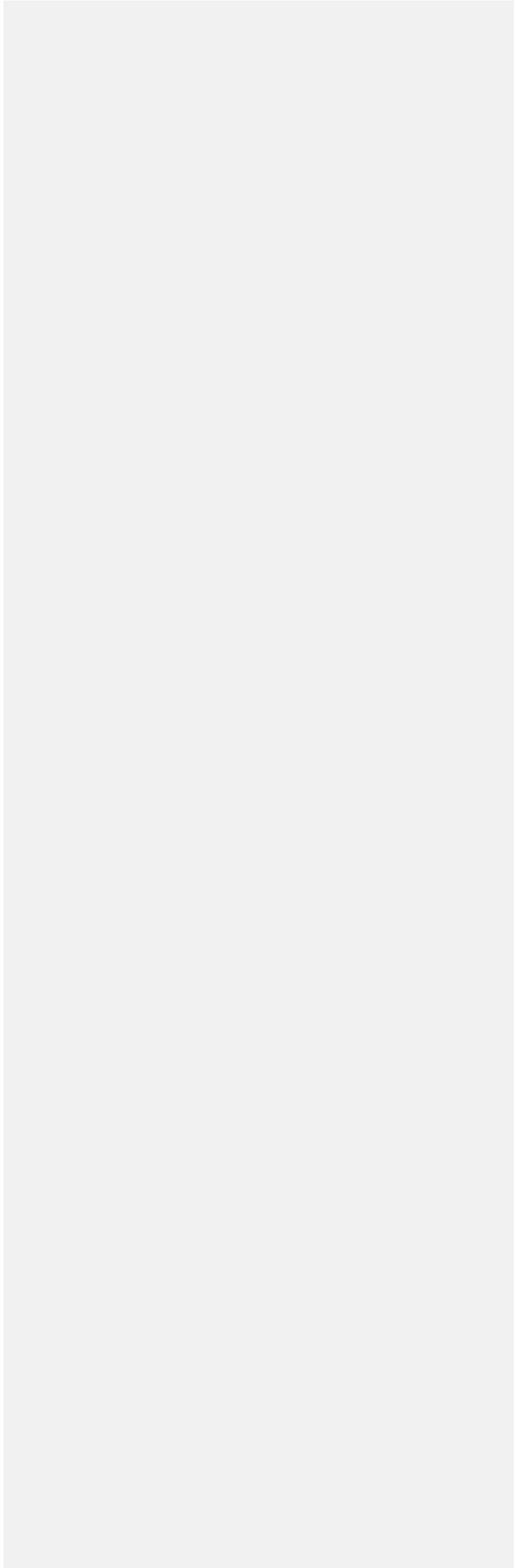
Flood plains provide many benefits including: natural flood and erosion control, water quality maintenance, groundwater recharge, and fish and wildlife habitat. Some of these areas are also desirable for residential development due to aesthetic reasons, and agricultural development due to the presence of nutrient rich soils. If development in these areas increases, the benefits listed above will decrease. The flood plains within Portage County are designated by Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (see Map 5.13). These areas are regulated by Portage County Flood plain and/or Shoreland Zoning Ordinance.

Map 5.12 Wetlands

Map 5.13 Flood plain



Map 5.14 Wildlife Areas



J. Wildlife Habitat and Forested Areas

Woodlands or forested lands, together with wetlands, account for over half of the land area in Portage County. According to 2001 Portage County Comprehensive Planning survey data, 83% of respondents felt that an effort should be made to identify and protect woodlands, and 77% felt the same about wetlands and flood plains. Woodlands are present in the County primarily due to an inability to sustain successful agricultural practices in those areas. Loss of these habitat types can threaten the viability of certain species.

Portage County residents recognize the fact that human beings play a role in protecting or restoring, as well as, degrading or destroying wildlife and its habitat. They also recognize that while it will be very difficult to preserve all ecosystems in the County from human encroachment or interaction, it is the desire of residents to protect wildlife habitat where practicable.

Wildlife. There are three larger wildlife properties in the County managed by the DNR (Map 5.14 above). The Mead Wildlife Area contains 28,500 acres in Portage, Marathon, and Wood Counties. One quarter of the acreage is located in the northwestern portion of Portage County. The Buena Vista Grassland Wildlife Area consists of 12,000 acres of grasslands providing habitat for prairie chickens in the southwestern area of the County. The Dewey Marsh Wildlife Area in the north central part of the County has 5,100 acres managed largely as upland game habitat. There are approximately 6,000 acres of smaller parcels owned by the DNR that are associated with trout streams, or natural areas that support a variety of game and non-game species.

1. State Managed Grassland Areas for Wildlife

Portage County has approximately 14,000 acres of protected grasslands to support the needs of a wide range of grassland species. Three large areas include:

Buena Vista Grassland (12,200 acres) The Wisconsin Department of Natural Resources currently owns about 7,800 acres and manages an additional 4,400 acres (owned entirely by the Dane County Conservation League). These grasslands support the State's largest populations of the State-Threatened Greater Prairie Chicken and short-eared owls, as well as healthy populations of the State-Threatened Henslow's sparrow and several other grassland bird species of management concern. The Regal fritillary (State Endangered butterfly) and Franklin ground squirrel (State Special Concern) also occur here.

George Mead (200+). This large Wildlife Area hosts diverse habitats including open and forested wetlands, upland grassland, and mixed deciduous/coniferous forests. The Mead has nearly 7,000 acres of grassland between Wood, and Marathon Counties, but only a few hundred acres of grassland are found here in Portage County.

Paul Olson (1,350). This area is divided between a few smaller acreages in Wood and Portage Counties. It has similar habitat diversity and acres of grassland to the Mead here in Portage County

Dewey Marsh (100+). This approximately 6,000 acre area is predominately a mix of forested and open wetlands. There is enough grasslands to support populations of these rare species. A great diversity of declining or rare grassland birds, including: sedge wren, Wilson's phalarope, bobolink, upland sandpiper, Brewer's blackbird, Eastern and Western meadowlark, northern harrier, and several rare sparrows are also found locally in these areas. The goal of the DNR is to maintain a predominantly open, unforested, undeveloped landscape where agriculture is the dominant land use, particularly in areas critical to the life

history needs of grassland species. **Management success depends not only in protecting and restoring grassland habitat, but also in the future of agriculture.** If grasslands or the surrounding agricultural lands are converted to forests, residential, commercial or industrial development, then grassland species will decline.

Privately owned lands and how they are used and managed have the most effect on total wildlife populations. There has always been a strong tradition for wildlife management in the private sector. However, with increased economic pressure to make "all" land produce some economic return, we are in danger of losing a valuable resource. Landowners continue to withdraw their land from use by others in an attempt to eliminate trespassing. Hunting pressure is not consistent, so game populations are concentrated, which further exacerbates conflicts between landowners with crop damage. When people think about wildlife, birds, fish, and mammals most likely come to mind. It is important, however, to consider all organisms that make up an ecosystem in order for that system to continue providing the maximum benefit to humans and the environment.

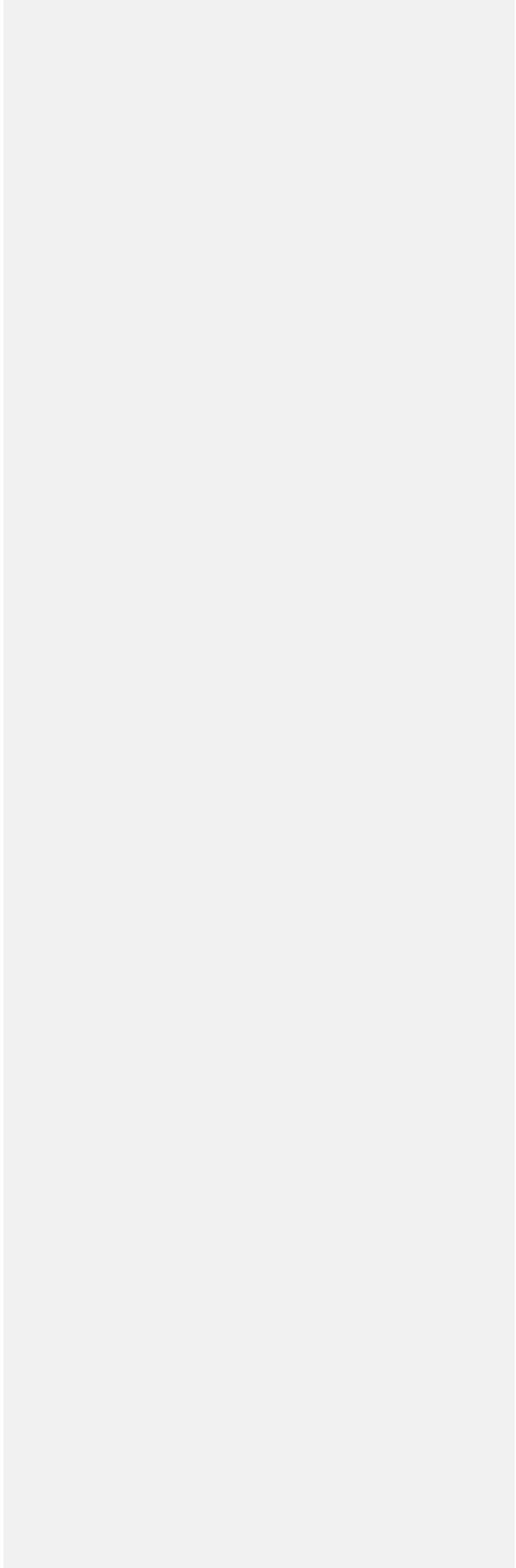
The biggest threats to wildlife are loss of habitat quality and quantity. These threats can be attributed primarily to fragmentation, invasive species, and pollution. **Fragmentation** refers to the loss of large, contiguous sections of land through subdivision into smaller parts, which can lead to an alteration and possible degradation of the native plant and animal communities on these properties. **Invasive species** (both plant and animal) tend to out-compete or prey on native species, altering the native ecosystem. **Pollution** can lead to habitat degradation, and cause birth defects and increased mortality rates in animal species. Habitat areas are important for providing food and cover for nesting, brooding, and sheltering. Farmland is one type of habitat that also provides food, as well as travel corridors between wetlands and woodlands.

2. Threatened and Endangered Species

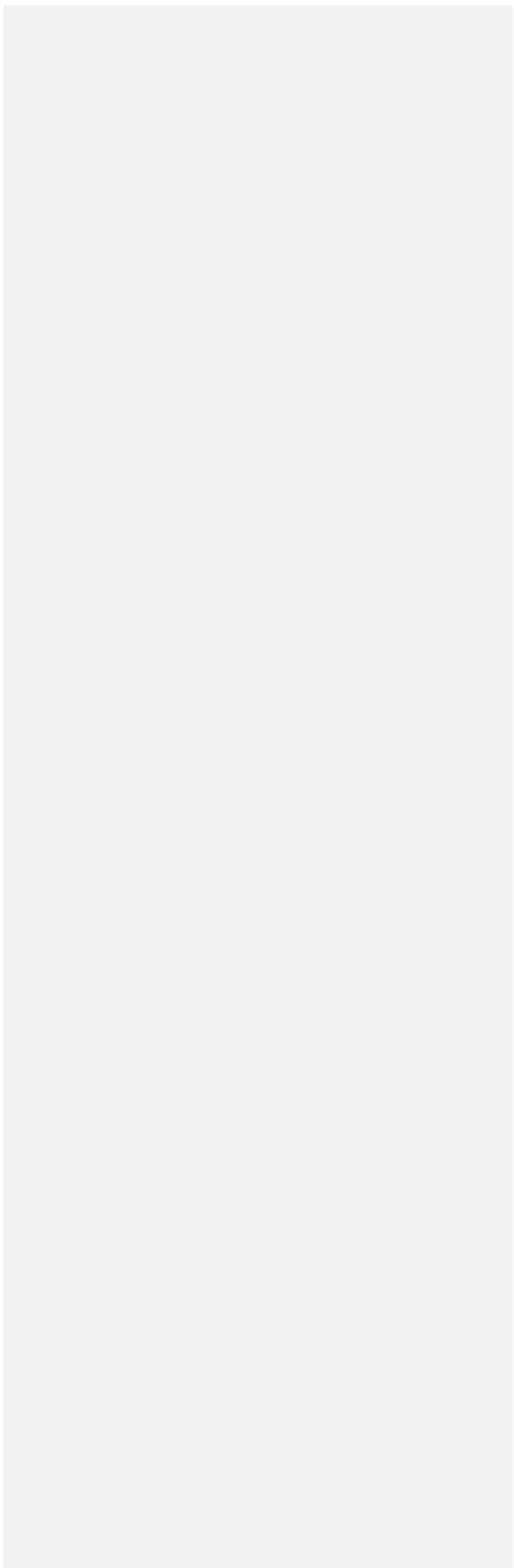
There are several known rare and endangered animal species identified by the Wisconsin Department of Natural Resources (WI DNR) Wisconsin Natural Heritage Inventory (NHI) that are located within Portage County (see Appendix E). A detailed description of rare and endangered plants and animals can be obtained from the WI DNR.

Forested Areas. A significant portion of Portage County is commercially valuable forestland. Forest Service surveys of 1996 indicate 33%, or 171,400 acres, were forested. A large majority of the County's woodlands contain hardwoods. Oaks are the predominant species on the coarse sandy soils of the south and southwest. Maple or aspen dominate the timber stands in the north. Red and white pine dominate 19% of the forestland, mostly in the south. Private landowners control 84% of this forestland. Only 8% is owned by government and 8% is owned by corporations. This division of ownership should not change in the foreseeable future. There is a trend toward forest fragmentation as the result of the parceling off of large woodlots. Another trend involves building homes in the woods, which removes that area from the productive forest category. All forestland requires management at several times during the life of the trees and this information needs to be conveyed to landowners. Many forest landowners do not take advantage of the free forest management opportunities offered by the Wisconsin DNR. It has been estimated that 10% of the State's privately owned forests change ownership each year. This adds extra difficulty to tasks of forest managers. However, the forester assists in management of approximately 3,000 acres per year. This includes the planting of an average of 650 acres of trees and shrubs. The majority of planting is done with softwood species on idle land. These plantings also aid in soil and water conservation, provide habitat for wildlife, and add aesthetic qualities to the land.

Map 5.15 Forested Areas



Map 5.16 Portage County Non-metallic Mining Resources and Pits



Pulpwood production statistics from 1996 indicate that Portage County produced 43,000 cords of pulpwood in round wood, and smaller amounts of mill residue from the two saw mills and several smaller pallet mills located in the County. Nevertheless, there is a projected larger shortfall in the State's production of pine pulpwood as the plantations of the 50's grow to saw log size, the jack and white pine stands are cut and allowed to convert to hardwoods, and private landowners build homes in the woods. Three saw mills produce approximately eight million board feet of largely hardwoods each year. Another five smaller mills produce less than one million board feet.

The Managed Forest Law (MFL), administered by the Wisconsin Department of Natural Resources, allows a landowner to set their woodlot aside for timber production and receive an incentive in the form of a reduced property tax rate for doing so. The MFL requires a minimum of 10 acres entered under a 25-year contract. As of February, 2005, there were 9,278 acres in the County under the intensive management of the Forest Crop Law and Managed Forest Law. These programs are intended to foster timber production on private forests while promoting other benefits that forested lands provide. Participants in the MFL program have the option to choose a 25 or 50-year contract period and pay property taxes at a reduced rate on enrolled lands. A portion of the difference in property taxes is recouped by the state at the time of a timber harvest when a yield tax is imposed based on the volume of timber removed.

The protection of woodlands within Portage County could also benefit from the creation of a new "Forested District" within the Portage County Zoning Ordinance. Forestry is currently listed (spring 2006) as a permitted use in Portage County Ag districts, however, the wording of the ordinance does not encourage the use of Ag districts to protect forestland. The primary goal of a forestry-specific district would be to protect forest land from subdivision, much like the restrictions already in place for prime agricultural lands.

K. Air Quality

The following information comes from the WI DNR and the Environmental Protection Agency:

"A few common air pollutants are found all over the United States. These pollutants can injure health, harm the environment and cause property damage. The Environmental Protection Agency calls these pollutants **criteria air pollutants** because the agency has regulated them by first developing health-based **criteria** (science-based guidelines) as the basis for setting permissible levels. These pollutants include: ozone, nitrogen dioxide, sulfur dioxide, carbon monoxide, particulate matter, and lead. One set of limits (**primary standard**) is designed to protect public health, including the health of "sensitive" populations such as asthmatics, children, and the elderly; another set of limits (**secondary standard**) is intended to protect public welfare, including protection against decreased visibility and damage to animals, crops, vegetation, and buildings. A geographic area that meets or does better than the primary standard is called an **attainment area**; areas that don't meet the primary standard are called **non-attainment areas**."

All of Portage County is listed as an attainment area by the WI DNR.

L. Non-metallic mining

The glacial and geologic history of Portage County has created conditions that are highly suitable for certain types of non-metallic mining. Along the moraines in the eastern third of the County, glacial deposits have resulted in some lands that are desirable for gravel and aggregate extraction. This is in contrast with lands west of the Wisconsin River where soils are heavier and have higher clay content.

With the significance of sand and gravel deposits in the County, there are several sand and gravel pits located in the Towns. There are currently 23 active sand and gravel extraction sites located in Portage County (see Map 5.16 above). Continued development pressure within Portage County will lead to increased interest in developing additional extraction operations within the County.

Section 5.3 Cultural Resources

Cultural and historic resources help link the past with the present and can give a community a sense of place or identity. These resources include structures and places with historic significance as well as cultural contributions from a diverse resident population. For additional information, please see the municipal Comprehensive Plans.

A. Historic Resources Inventory

There are 14 sites listed in the National Register of Historic Places in Portage County. These include:

- Folding Furniture Works Building
- Fox Theater
- Hardware Mutual Insurance Companies Building
- Hotel Whiting
- Jensen J.L. House
- Kuhl Christian House
- Mathias Mitchell Public Square – Main Street Historic District
- MicMillian, David House
- Morgan J.H. House
- Old Plover Methodist Church
- Pipe School
- Pomeroy L.A. House
- Severance – Pipe Farmstead
- Stevens Point State Normal School

Portage County also has two Historic Districts. The Main Street Historic District in Stevens Point consists of roughly Main Street from Strongs Avenue to Second Street, in downtown Stevens Point. While not all historically significant buildings are located on the National register, there are many additional historically significant places and structures located within Portage County. The State of Wisconsin Historical Society contains a data base that includes numerous historic properties, archeological site, and other areas of historical importance.

In September 2000, the Village of Plover designated Heritage Park as an historic district, based on the regulations in place from the Village's Historic Preservation District Ordinance created in 1996. The Village Plan Commission also serves as the Historic Preservation Commission, and as such, only meets upon request.

The Portage County Historical Society is the sole owner of Plover's Heritage Park, which is bordered by Washington Avenue on the east, Willow Street on the south, Madison Avenue on the west, and Canadian National Railroad on the north. Directly west of Madison Avenue is the location of the original Village square when the community of Plover served as the County seat. The property now contains ten buildings, five of which have been restored and are open to the public for educational purposes, meetings, as well as museum displays.

The Portage County Historical Society also has a collection of photos located in the University of Wisconsin Stevens Point library. Their mission statement states that the purposes of the organization are exclusively educational and shall be to preserve, advance, and disseminate knowledge of this history of Portage County, Wisconsin. Besides the Heritage Park, the Society also runs the Synagogue Museum in Stevens Point and Rising Star Mill in Nelsonville.

B. Cultural Resource Programs

At the state level, the Wisconsin Historical Records Advisory Board (WHRAB) works in association with the Wisconsin Historical Society. The Board's activity falls primarily into three areas: it provides guidance and assistance to archives and records management programs in Wisconsin, promotes the value of historical records as keys to our cultural heritage and works through partnerships with statewide organizations whose purpose and goals support that end, and to bring federal grant funds to Wisconsin for improving access and preservation of historical records.

Section 5.4 Rural Vision Statement for Agricultural, Natural and Cultural Resources

A. Portage County Rural Area Vision Statement Related to Agriculture

(Adopted 6-26-02 by the Portage County Comprehensive Plan Rural Area Steering Committee)

In 2025, the agricultural industry in Portage County is healthy and thriving. Development has been directed away from productive agricultural land, giving farmers, both large and small, ample space and freedom to be productive and efficient. A variety of agricultural commodities are produced for direct sale in local markets and for marketing worldwide. Farmers value the environment with practices that are sustainable, using methods that protect air, soil, and water resources. Agriculture remains an integral part of the Portage County economy, providing enjoyable employment opportunities and livable wages for their employees.

Key Vision Ideas for Agriculture:

- Farms, both large and small, are integral part of the local economy due to their direct link to retailers and consumers, and diversified offering of product.
- Sustainable agriculture exists through sensible regulation and a partnership between farmers, their neighbors and local units of government.
- The Agricultural industry in Portage County is strongly supported and the farm land that it relies on is protected from development.
- Agricultural practices are environmentally sensitive, using practices that protect air, soil, and water resources.

B. Portage County Rural Area Vision Statement Related to Natural Resources

(Adopted 6-26-02 by the Portage County Comprehensive Plan Rural Area Steering Committee)

In 2025, Portage County residents share a common bond in their enjoyment of the environment. Nature is precious to the people who live here, and they devote considerable efforts and attention to enjoying, protecting and enhancing it. From keeping water clean and abundant to protecting critical ecosystems, residents are dedicated to maintaining their very special part of the world.

Key Vision Ideas for Natural Resources:

- Preservation, protection and utilization of natural resources contribute to a high quality of life. Citizens understand their role in this effort, which is reflected in their actions and financial support.
- Development occurs in ways that protect the natural resources we enjoy in rural Portage County. We direct growth away from sensitive areas and account for the protection of our air, land, and water resources.
- Regulations are in place to assure that our air quality is assessed and maintained.

- Groundwater and surface water body quality is periodically monitored and assessed, and a set of regulations restricts development in groundwater recharge areas and areas contributing to surface water bodies.
- Public access to our natural resources is promoted.
- Groundwater throughout the County is safe to drink without treatment.
- Water quality in streams is maintained.

Section 5.5 Agricultural, Natural and Cultural Resources Issues and Conclusions

A. Agriculture

1. Agricultural-based industries and businesses are important to the existing and future County economy. At the same time the County’s rural residential population continues to increase, creating an increasing type and number of land use conflicts. How can agriculture be protected from these conflicts?

- *When future residential development occurs next to agricultural uses, new residential land owners should be made aware of the agricultural operations that take place and incorporate a buffer between residential and agricultural uses. Please see each individual Towns buffer requirements.*
- *Educational programs should be developed to inform landowners and town officials of the issues related to ag use/non-ag land use conflicts.*
- *Educational programs should be developed to inform landowners and town officials of the issues related to groundwater protection, particularly regarding nitrate and pesticide levels.*

2. Changes in the economics of agriculture have put great pressures on the need to produce income from the sale of land for non-agricultural purposes. To what extent will local municipalities place a value on protection of productive agricultural lands?

In many areas of Portage County, development potential is pressuring the agricultural potential. How will those increased demands for residential use be weighed against the loss of productive farmlands?

B. Natural Resources

1. The natural resources of Portage County have a high level of value for all who reside or visit here. The expectations for how to use and manage the resources are as diverse as those that wish to enjoy them. Highly restrictive protection is appropriate and essential for our most delicate and “perishable” resources such as groundwater, surface waters, wetlands, flood plains, and certain forested areas. Less restrictive protection may be appropriate for certain areas which offer high natural, aesthetic value, but still can accommodate a low-intensity, low-density form of rural residential development. How can Portage County best approach these two types of resource use?

- *Future Land Use designations should include two different approaches for guiding the use of important natural resource areas: Natural Areas – Restricted and Natural Areas – Limited Development.*

- *The two types of land use classification should be carried through into the Portage County Zoning Ordinance, through the creation of a two-tiered Conservancy zoning approach paralleling the previously-mentioned land use classifications.*
 - *Careful consideration should be given to what type of activities and/or development densities are allowed in each of these land use categories and zoning districts.*
2. Groundwater and surface water quantity and quality are of paramount importance to the high quality of life enjoyed by most Portage County residents. How can these resources be protected and enhanced for future generations?
 - *Continually evaluate current and potential programs for protecting the County's water resources.*
 - *Pursue full implementation of water resource protection programs and regulations.*
 3. Open space (non-agricultural) and forested areas of rural Portage County can have high value for both commercial and wildlife habitat purposes. How should these competing interests be addressed?
 - *Regulation options for large, contiguous forested areas of Portage County should receive attention similar to that of prime agricultural land.*
 - *Policies need to be developed to maintain and enhance uninterrupted and continuous areas of wildlife habitat.*
 4. Land Use conflicts with non-metallic mining operations have increased along with the rise in the number of mining operations permitted within Portage County. How can these be minimized?
 - *Portage County should convene an ad hoc group to discuss the locational characteristics of non-metallic resources within the County, the potential points of conflict between mines and surrounding land uses, the needs of the mining industry, and possible State intervention into the regulation of mining operations. This ad hoc group would make policy recommendations to the Portage County Planning & Zoning Committee.*
 5. Tree disease and pest management (invasive species) is of vital importance to the area. Should regulation regarding the timing of cutting oaks to prevent the spread of the disease be in place?
 - *Educational programs should be developed to inform landowners and loggers of the issues related to tree disease and invasive species management.*

C. Cultural Resources

None identified at this time

**Section 5.6 Guiding Principle and Preliminary Goals for
Agricultural, Natural and Cultural Resources**

A. **Guiding Principle for Agriculture:** Sustain an economically viable agricultural industry.

Agriculture Preliminary Goals: *(adopted 10-23-02 by the Rural Area Steering Committee)*

- The agricultural community is economically viable.
- Agricultural practices are unencumbered by development.
- Educate the public about the operations and activities of the agricultural community.
- Develop a process where the general public shares in the cost of protecting agricultural resources.
- Utilize agricultural practices that are environmentally sensitive and protect air, soil, water and wildlife resources.
- Preserve productive agricultural land county-wide.

B. **Guiding Principle for Natural Resources:** Manage the natural resources that support and sustain us.

Natural Resources Preliminary Goals: *(adopted 10-23-02 by the Rural Area Steering Committee)*

- Utilize agricultural practices that are environmentally sensitive and protect air, soil, water and wildlife resources.
- Identify, manage, preserve and protect natural resources throughout Portage County.
- Development takes into consideration the protection of our natural resources.
- Local units of government work together to define and develop appropriate public access to natural resources.
- Develop an ongoing educational program for municipal boards and the public related to natural resource issues.
- Develop partnership efforts that result in the preservation and restoration of natural resources.
- Metallic and nonmetallic mineral resources are identified for their extraction potential.
- Natural resources that provide recreational opportunities on public land are managed to ensure their lasting presence.

C. **Guiding Principle for Cultural Resources:** Encourage identification and protection of historic and cultural resources.

Cultural Resources Preliminary Goals: *(adopted 10-23-02 by the Rural Area Steering Committee)*

- Develop guidelines for identifying and protecting cultural and historic resources.
- Historic and Cultural Arts become an integral part of our communities.
- Make the general public more aware of cultural resources.