

## **CHAPTER 3**

# **AGRICULTURAL NATURAL & CULTURAL RESOURCES**

## INTRODUCTION

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This chapter represents an inventory analysis of the Agricultural, Natural & Cultural Resource base of the Town of Mukwonago. Included is descriptive information pertaining to the topography, soils, groundwater resources, surface water resources, wetlands, woodlands, natural areas, critical species habitat areas, environmental corridors, historical and cultural resources and agricultural lands.

The natural resource space of the Town is one of the most important factors influencing the type of development in the Town. It is the natural resource base which makes the Town an attractive location for residential development. The natural resource base has great economic value including but not limited to development potential and agriculture, as well as recreational and aesthetic value. In order to preserve and protect this important asset, future development in the Town must remain consistent with the ability of the natural resource base to support various forms of rural development without deterioration or destruction of the underlying and sustainability of the natural resource base. The natural resources in the Town are susceptible to irreversible damage through inappropriate land use, transportation and public facility development in areas of the Town where the population resides in close proximities to the Phantom Lakes, the Mukwonago River, the Vernon Marsh, the Jericho Creek and Spring Lake which are all environmentally sensitive inland lakes and waterways.

Without a specific understanding and recognition of the character, and importance of the various elements of the natural resources in the Town, alteration of the natural environment proceeds at the risk of excessive cost in terms of both monetary expenditures and environmental degradation. A sound and meaningful planning effort must therefore acknowledge that natural resources are limited and urban and rural type development should be properly adjusted to the natural resources, so that serious and costly environmental problems can be avoided.

According to the 1998 Town of Mukwonago Master Plan update, the land use chart indicated there were 10,792 acres of agricultural land in 1990 in the Town of Mukwonago. The 1995 land use inventory indicated that there was 9,648 acres of agricultural land and the 2000 inventory done by SEWRPC indicated that there was 8,268 acres. There has been a reduction of over 6,044 acres of agricultural lands in the Town of Mukwonago from 1963 to 2000.

The existing Town of Mukwonago Master Plan establishes goals to recognize that the natural environment is an interdependent system of land, water, and air components and that the health and stability of this resource system should be maintained and enhanced for future generations. The directives of the existing plan are as follows:

1. Protect the existing natural resources within the Town and promote the maintenance of environmentally sensitive areas in their natural state.
2. Promote open space preservation for general public access, recreational use, and preservation of scientific and historical resources and to enhance community identity by providing permanent open spaces between expanding developed areas.
3. Encourage the enhancement and preservation of permanent environmental corridors, wooded areas, fence rows, and wildlife habitat areas within the Town.
4. Provide for a balanced natural environment in the Town by preserving agricultural land to complement developed residential, commercial, industrial and institutional areas.
5. Encourage the preservation of public and privately owned open spaces in a manner which will not impair their original appearance or importance to the environment.
6. Encourage the preservation, recognition and maintenance of the historical sites within the Town as essential elements of the natural environment as a means of protecting the historical character of the Town.
7. Protect shoreland and floodplain areas in the Town as focal points of natural beauty and recreation.
8. Consider and recognize potential damage, which may be caused by pesticides and fertilizers, which degrade the quality of the Town's land and water resources.
9. Promote development design, which will use natural drainage control measures to minimize pollution entering the surface water and ground water.
10. Develop a full range of programs for preservation of environmentally sensitive areas utilizing devices such as acquisition, dedication, zoning, and easements.
11. Explore innovative methods of preserving open space and creating green belts between developed areas of the Town and within subdivisions.

## SURFACE WATERS

The Town of Mukwonago contains diverse and significant water resources. The inland lakes, streams, ground waters, shorelands, floodplains, wetlands and natural drainage systems; in addition to being part of the ecosystem and worthy of environmental protection, water resources often influence land use decisions. Development can be restricted on land, which is classified as floodplains, wetlands, and high ground water resources areas.

Sewerage treatment plant construction, which often leads to concentrated development, may be dependent upon discharge to a body of water, fresh drinking water supplies from wells or municipal water supplies fed by lakes or rivers are essential for any kind of development. Lakes and streams are complex systems, which include concentration of chemicals, and nutrients, aquatic plant life, fish life and shore land configurations, which support terrestrial plants and animals.

The Town of Mukwonago has 3 major lakes; Upper Phantom Lake, Lower Phantom Lake, and Spring Lake along with two major streams, the Fox River and the Mukwonago River. Lower Phantom Lake was created by damming the Mukwonago River at the Village of Mukwonago. It covers 433 acres with a maximum depth of 12 feet, with an average depth of 3 feet. Because it is so shallow, Lower Phantom Lake is marshy and is often full of algae and aquatic vegetation. Upper Phantom Lake is 106 acres in size and is irregularly shaped. Because Upper Phantom Lake is deeper with a maximum depth of 29 feet and an average depth of 11 feet, and has greater recreational usage and residential shoreland development. Together, these two lakes share about 4 miles of shoreline. Spring Lake is in the north central part of the Town, which has fluctuating water levels generated by wetlands to the north and west. The lake covers 107 acres not including wetlands, and is shallow and weedy with a maximum depth of 22 feet and an average depth of five feet.

The Town of Mukwonago is part of the Fox River watershed, which runs south from northern Waukesha County near Menomonee Falls and flows through most of Waukesha, Racine, and Kenosha Counties into Illinois. In the Town, the Fox River is a sluggish stream, which can support boat travel only near the Village of Mukwonago and serves as the outlet for treated sewage for the Village of Mukwonago sewerage treatment plant. The part of the 81-mile stream/lake, which is located in the Town flows between low moraine ridges and wetlands in the Vernon Marsh to the Village. The Mukwonago River runs west to east in the southern portion of the Town through the Village and feeds upper and lower Phantom Lake. High quality floodplains and wetlands lie along its 13-mile length, in addition to providing recreational opportunities.

"A Lake Management Plan for the Phantom Lakes" was prepared by SEWRPC in January 2006 consisting of two volumes. In volume 1 the inventory data used as a basis for alternative lake management measures and developed recommendations for management measures in volume 2. The inventory included an overview of the lakes and their watersheds, a review of the governance structures currently in place, a summary of the water quality, a summary of their biology, and a review of the water use objectives. Volume 2 discusses alternative lake management and watershed measures and addresses current and future lake management issues relevant to Upper and Lower Phantom Lakes. The Plan recommends that maintaining historic

residential densities, enforcing setback regulations, adoption of storm water and groundwater protection ordinances and the protection of shorelands and wetlands.

Additionally, two other bodies of water that exist in the Town of Mukwonago are Spring Lake and Willow Spring Lake, which are located in the north central portion of the Town. Spring Lake is 105 acres and is primarily spring fed with some contribution of surface water from localized surface run off. Spring Lake is roughly a circular lake with an elongated northern bay. The lake has a maximum depth of 22 feet, a mean depth of five feet and a volume of 553 acres. It drains to the north through a short section of Spring Creek into Willow Spring Lake.

Willow Spring Lake is a 46-acre water body, which receives most of its water from Spring Lake and Spring Creek, and surface water from the immediate area surrounding the lake. Willow Spring Lake drains through Spring Creek in a northerly and easterly direction to Genesee Creek. The lake is roughly oval in shape, with one large basin. Willow Spring Lake has a maximum depth of 13 feet, a mean depth of five feet and a volume of 230 acres.

According to the lake protection plan for Spring Lake and Willow Spring, about 1,250 acres or 36 percent of the drainage area is devoted to urban uses and 2,270 acres, or about 64 percent to rural uses. The Plan anticipates by the year 2020 that additional urban density residential development would be expected to occur in the area north of the area west of Willow Spring Lake for a conversion of about 280 acres of agricultural land.

In a wetland inventory, which were conducted between 1971 and 2000 in the vicinity of Spring and Willow Spring Lakes, it had been determined, that disturbances in these areas included ditching, clear cutting, filling, vegetative removal, agricultural activity and dumping. It was generally associated with agricultural activities and subsequently urban development. Of the species present in this area, about 20 percent were considered to be exotic species indicating that the wetlands were moderately to heavily disturbed in the past. The surveyed wetland parcels contained a variety of wetland types with a number of federal and state designated rare, threatened or endangered species being present. About 10 percent of the drainage area or 415 acres is wetland in the spring and Willow Spring Lake's watershed. The surface water quality of Spring Lake and Willow Spring Lake is reported to be poor to good.

The Plan recommends consideration of public acquisition or acquisition of conservation easements over lands within the primary environmental corridor to ensure the protection and preservation of the ecologically valuable areas in a manner consistent with the regional natural areas and critical species habitat protection plan. The Dunlop property and a portion of the Smart property were recently purchased by Waukesha County. Those areas are just east of Spring Lake. Most of the area adjacent to Spring Lake and Willow Spring Lake in the undeveloped portions are designated in the C-1 conservancy/ wetland category or the environmental corridor zoning district on the Towns Land Use Plan and on the current town zoning maps. This will serve to protect those areas immediately adjacent to the lake and limit the amount and type of disturbance.

Recommendations were made in the Lake Protection Plan for Spring Lake and Willow Spring Lake, which would encourage the management of non-point source pollution on page 61 of the document.

The Town contains two other lakes. Browns Lake is located in the southwestern portion of the town, which is considered a Natural Area and is surrounded by upland environmental corridors and conservancy/wetland areas. As part of the Lakewood Farms Preserve development east of that water body, a 27-acre parcel was donated to the Waukesha County Land Conservancy to protect the waterbody and buffer provisions were required for that portion of the development that drained directly to the water resource.

The Rainbow Springs property contains two other water bodies where there have been numerous inventories conducted on the wetlands, environmental corridors, endangered, and critical species habitat areas surrounding them. As required in recent land use plan amendments by both the Town of Mukwonago and Waukesha County, detailed inventories will have to be completed on that property prior to any development proposal being approved by the Town. The intent of those inventories will be to protect the environmentally sensitive areas, critical species habitat area, and the surface water resource in any design for development of the property.

According to the Water Classification Code as described in Chapter 3 of the update to the Waukesha County Development Plan, the Jericho Creek and Spring Creek in the Town are classified as "coldwater streams" and Spring Lake and the Mukwonago River are classified as "outstanding resource waters".

### **Groundwater Resources**

Groundwater is a vital natural resource in these parts of Waukesha County, which not only sustains lake levels, wetlands and provides base flow of the streams, but also, it is a major source of water supply. In general, Waukesha County has an adequate supply of ground water to support its growing population, agriculture, commerce, and viable diverse industries; however, reduction of water sources may occur in areas of concentrated development and intensive water demand, especially in the sand stone aquifer. The amount of recharge, movement and discharge of the groundwater is controlled by several factors including precipitation, topography, drainage, land use, and soil conditions. In 2002, SEWRPC published Technical Report 37, entitled, "Groundwater Resources in Southeastern Wisconsin" which provided baseline information regarding groundwater availability in southeastern Wisconsin. In 2008, SEWRPC also published Technical Report 47, titled, "Groundwater Recharge in Southeastern Wisconsin Estimated by GIS-Based Water-Balance Model," which explains the methodology used to identify groundwater recharge areas in southeastern Wisconsin.

### **Groundwater Aquifers**

Groundwater occurs within three major aquifers that underlie the County. From the land's surface downward, they are: 1) the sand stone and gravel deposits in the glacial drift; 2) the shallow dolomite strata in the underlying bedrock; and 3) the deeper sandstone, dolomite, siltstone and shale strata. Because of their proximity to the land's surface and hydraulic interconnection, the first two aquifers are commonly referred to collectively as the "shallow aquifer," while the latter is referred to as the deep aquifer. Within most of the County, the shallow and deep aquifers are separated by the Maquoketa shale, which forms a relatively impermeable barrier between the two aquifers. This shale layer is absent in the northwesterly portion of Waukesha County. All residential homes in the Town are served by private water

supply systems. A large part of the Town of Mukwonago is contained within an area designated as having a "High Contamination Potential" (See Map G).

The Town is aware that in January of 2005 SEWRPC announced that it would initiate the conduct of a regional water supply study for southeastern Wisconsin. This study will lead to the preparation and adoption of the regional water supply system plan. The preparation of the regional water supply plan represents the third and final element of SEWRPC regional water supply management program. The first two elements comprise the development of basic groundwater inventory and the development of a groundwater model for the southeastern Wisconsin. It is anticipated that the regional water supply will address the following major components.

- Development of water supply service areas and a forecast demand for water use.
- Development of recommendations for water conservation efforts to reduce water demand.
- Evaluation of alternative sources of supply, culminating in identification of recommended sources of supply for each surface area and in recommendations for development of the basic infrastructure required to deliver that supply.
- Identification of groundwater recharges areas to be protected from incompatible development.
- Specification of any new institutional structures found necessary to carry out the plan recommendations.
- Identification of any constraints to development levels in sub areas of the Region that may emanate from water supply sustainability concerns.

It is anticipated that this study will be based upon a design year of 2035. It was originally anticipated the plan would be completed in 2006 and the adoption would occur in early 2007. As of July 2007, the plan has not been completed. It should be noted that the governor has designated Waukesha County as a "Groundwater Management Area". (See ACT 310)

### **Floodlands**

The floodlands of a river or stream are the wide, gently sloping areas contiguous with and usually lying on both sides. Streams and rivers occupy their channels most of the time. However, during even minor flood events, stream discharges increase beyond the capacity of the channel to accommodate the entire flow, especially where urban development increases runoff or alters the stream channel. The periodic flow of a river onto its floodlands is a recurring phenomenon and, in the absence of costly flood control measures, will occur regardless of the extent of urban development in floodlands.

For planning and regulatory purposes, floodlands are normally defined as the areas, excluding the channel, subject to inundation by the 100-year recurrence interval flood event. This is the event that would be reached or exceeded in severity on the average of once every 100 years. It should be noted that the 100-year recurrence interval floodland contains within its boundaries the areas inundated by floods of less severe but more frequent recurrence such as every 5, 25 or 50 years. Floodlands are not suited to urban development because of flood hazards, high water tables and inadequate soils. These areas are, however, generally suitable locations for park and

open space areas. Floodlands also provide storage for floodwaters and thereby decrease downstream flood discharges and stages.

According to a report issued by the Federal Emergency Management Agency, (FEMA) on February 2, 2007 for some of the streams and rivers in the Town of Mukwonago, the 100-year flood elevation on Phantom Lake will raise by 1.9 feet once adopted. The flood lands within the Town are along the Mukwonago River, Jericho Creek, and Fox River systems. (See Map A)

## **Soils**

Soil properties exert a strong influence on the manner in which land is used, since they affect the costs and feasibility of building site development, installation of onsite sewage disposal systems and provisions for public facilities. In the case of productive agricultural lands and potential mineral extraction areas, soils are a valuable and irreplaceable resource. A need, therefore, exists in any planning program to examine not only how land and soils are currently used, but also how they can best be used and managed. Soil suitability interpretations for specific types of urban and rural land uses are therefore important aids to physical development planning and for determining the best use of soils within an area.

In 1963, to assess the significance of the diverse soils found in Southeastern Wisconsin, the SEWRPC negotiated a cooperative agreement with the U. S. Department of Agriculture, Soil Conservation Service (SCS), now known as the Natural Resources Conservation Service (NRCS), under which detailed operational soil surveys were completed for the entire County. The results of the soil surveys have been published in SEWRPC Planning Report No. 8, Soils of Southeastern Wisconsin and subsequently updated by the NRCS, 2003. These soil surveys have resulted in the mapping of the soils within the Town of Mukwonago in greater detail than previously available but individual borings are the best measure on individual properties. At the same time, the surveys have provided definitive data on the physical, chemical and biological properties of the soils and, more importantly, have provided interpretations of the soil properties for planning, engineering, agricultural and resource conservation purposes. (See Map B)

## **Suitability for Agricultural**

In order to lend uniformity to the identification of productive farmlands throughout the nation, the U. S. Department of Agriculture, Soil Conservation Service, established a soil classification system under which soils are categorized relative to their agricultural productivity. The two most highly productive soils are categorized as either National prime farmland or as farmland of statewide significance. National prime farmland is defined as land that is well suited for the production of food, feed, forage, fiber, and oilseed crops, with the soil quality, growing season, and moisture supply needed to produce economically sustained high yields of crops when properly treated and managed. Farmland of statewide significance includes land in addition to National prime farmland, which is of statewide importance for the production of food, feed, fiber, forage and oilseed crops.

Class I and II soils for agricultural productivity are generally considered prime in this area of Waukesha County, along with Class III soils being soils of statewide significance, which are also considered good for agricultural uses. Map C designates the areas within the Town of Mukwonago where Class I and II soils exist, which are considered prime. There are still a



number of large blocks of agricultural operations, which exist in the Town. It appears from discussions with the Focus Group, the Town would like to retain those areas, if at all possible.

When analyzing the soils in general in the Town, most of the soils around the area are well-drained sandy gravel soils classified as Casco-Rodmen and Fox. There are Pella and Houghton Mucky Peat soils in the areas adjacent to the Fox River and Mukwonago River, the low areas adjacent to the Phantom Lakes. Many of these are considered hydric soils and are poorly drained and not suitable for onsite sewage disposal systems or development. Map B designates the location of these hydric and poorly drained soils, most of which are also located in designated wetlands and floodplains. Map B also indicates the location of slopes greater than 12 percent, which are sandy gravelly soils, which are not considered good for residential development.

### **Surface Geology Physiography**

Four major stages of glaciations, the last of which was the Wisconsin Stage ending approximately 10,000 years ago in the state have largely determined the physiographic, topography, and soils of Waukesha County. The dominant physiographic and topographic feature in Waukesha County is the Kettle Moraine and interlobate glacial deposit form between Green Bay and Lake Michigan. Lobes of continental glaciers moved in a generally southerly direction from its region of origin in what is now Canada. The Kettle Moraine which is orientated in a general southwest direction across western Waukesha and Washington Counties, is a complex system of kames or conical hills, kettle holes formed by glacial ice blocks that became separated from the ice mass and melted to form depressions and small lakes as the melt-away deposited material around the ice blocks and eskers which are long narrow ridges of drift deposit and abandoned drainage waste. The remainder of the county is covered by a variety of glacial landforms and features, which includes various types of moraines, drumlins, kames, outwash plains and lake deposit. According to a general topographic map (See Map D), the highest elevations in the Town of Mukwonago range from 1,000 to 1,100 feet above sea level. There are two general areas of nearly level outwash, one in the western portion of the Town along the basin of the Jericho Creek and the other just west of the Vernon Marsh generally from the northerly town line south through the village and adjacent to the Phantom Lakes. The lowest in elevations in the Town are generally between 700 and 800 feet and those areas are generally along the Fox River in the easterly portion of the Town and the Mukwonago River in the southerly portion of the Town.

### **Environmental Corridors & Isolated Natural Resource Areas**

The most important elements of the natural resource base of this area of Waukesha County (including the best remaining woodlands, wetlands, prairies, wildlife habitat, surface water and associated shorelands and floodlands, and related features, including existing park and open space sites, scenic views, and natural areas and critical species habitat sites,) occur in linear patterns in the landscape, termed "environmental corridors." The most important of these have been identified as "primary environmental corridors," which are by definition at least 2 miles long, 200 feet wide and 400 acres in area. As shown on Map E, the primary environmental corridors are generally located along the Fox & Mukwonago River systems in wetland areas. The current Town master plan and zoning regulations preserve the primary environmental corridor in natural and open space uses. The preservation of those corridors is considered essential to the overall environmental quality of the Town and the maintenance of its unique

cultural and natural heritage and beauty. Because these corridors are generally poorly suited for urban development due to soil limitations, steep slopes or flooding potential, their preservation will also help to avoid the creation of new environmental and developmental problems. In addition to primary environmental corridors, other concentrations of natural resources referred to as secondary environmental corridors and isolated natural resource areas have been identified as warranting strong consideration for preservation. Secondary environmental corridors contain a variety of resource features and are by definition at least one mile long and 100 acres in areas. Isolated natural resource areas are considered concentrations of natural resources of at least five acres in size, 200 feet in width that have been separated from an environmental corridor network by urban or agricultural uses. Map E designates the location of all primary, secondary, and isolated natural areas within the Town of Mukwonago. While the Town's current Master Plan recommends protection of environmental corridors and isolated natural areas, it recognizes that certain development may be accommodated in these areas without jeopardizing their overall integrity. The plan recognizes that certain transportation and utility uses may out of necessity, have to be located within such areas and that limited residential and recreational uses may be accommodated in those areas. The policy of the Town is that the residential development in the corridors should be limited to upland environmental corridors at an overall density of no more than one dwelling unit per five acres. The Town has a policy in the review and approval of planned unit developments or conservation design subdivisions of making every effort to try to preserve those environmental corridors in their entirety.

### **Wetlands**

Wetlands perform an important set of natural functions, which make them particularly valuable resources lending to overall environmental health and diversity. Some wetlands provide seasonal groundwater recharge or discharge. Those wetlands that provide groundwater discharge often provide base flow to surface waters. Wetlands contribute to the maintenance of good water quality, except during unusual periods of high runoff following prolonged drought, by serving as traps, which retain nutrients and sediments, thereby preventing them from reaching streams and lakes. They act to retain water during dry periods and hold it during flooding events, thus keeping the water table high and relatively stable. They provide essential breeding, nesting, resting, and feeding grounds and predator escape cover for many forms of fish and wildlife. These attributes have the net effect of improving general environmental health, providing recreational, research, and educational opportunities, maintaining opportunities for hunting, fishing, and adding to the aesthetics of an area.

Wetlands pose severe limitations for urban development. In general, these limitations are related to the high water table, and the high compressibility and instability, low bearing capacity, and high shrink-swell potential of wetland soils. These limitations may result in flooding, wet basements, unstable foundations, failing pavements and failing sewer and water lines. Moreover, there are significant and costly onsite preparation and maintenance costs associated with the development of wetland soils, particularly in connection with roads, foundations, and public utilities. Map F designates the areas of wetlands in the Town of Mukwonago. The Town has designated most of these areas in the C-1 zoning district, AE (Exclusive Agricultural) zoning district and EFO (Existing Floodplain Overlay) on their zoning maps.

## **Woodlands**

Woodlands have both economic and ecological value and can serve a variety of uses providing multiple benefits. Located primarily on ridges and slopes and along streams and lakeshores, woodlands provide an attractive natural resource, accentuating the beauty of the lakes, streams and the topography of the Town. In addition to contributing to clean air and water, woodlands contribute to the maintenance of a diversity of plant and animal life and provide for important recreational opportunities.

Under balanced use and sustained yield management, woodlands can, in many cases, serve scenic, wildlife, educational, recreational, environmental protection, and forest production benefits simultaneously. Map F designates the areas in the Town of Mukwonago where there are significant amounts of woodlands. Many of these areas are also contained within the primary environmental corridor.

## **Rare and Endangered Species**

For residents, the Town's attraction is not merely the land and water resources, but the accompanying abundance of wildlife. The Town is home for many species of fish, mammals, reptiles and birds. Many opportunities exist for hunting, fishing and for wildlife study and observation.

The major lakes and streams in the Town all contain largemouth bass, pan fish and northern pike. Walleye is also found in Lower Phantom Lake, and the Mukwonago River supports smallmouth bass. In the wetlands surrounding the lakes and streams, waterfowl, muskrat and mink find their home. Muskrat is abundant and widely distributed throughout southeastern Wisconsin. The muskrat house is also used by other wildlife. Waterfowl "loaf" and nest on it, while mink and raccoon den in it.

Raccoon, skunk and opossum are woodland animals but migrate to wetlands for their water-based food. White-tailed deer are found in an area west of Spring Lake and in the Vernon Marsh. Other persistent mammals are the gray squirrel, fox squirrel, cotton tail rabbit, coyotes, wolves and red and gray foxes. These latter three animals are hunted as game.

Waterfowl hunting includes both resident ducks and migratory geese since the area lies within the major pathway of the "Mississippi Flyway." Other game birds include pheasant, woodcock, and jacksnipe. A study area in the Vernon Marsh contains many bird residents such as the loon, cormorant, great blue heron, sandpiper, plover, grouse and tern. Bird species unique to the Vernon Marsh are yellow-headed blackbirds, bald eagles and ospreys. The pickerel frog and sandhill cranes, both endangered species, are also found in the Vernon Marsh. Birds found throughout the Town include the eagle, turkey, vulture, hawks, owls, kingfisher, woodpeckers, robin, whippoorwill and mourning dove.

Wildlife performs vital functions in the ecological chain. Some examples are birds, which eat crop pests, or waterfowl, which keep streams clear by feeding on aquatic vegetation. Endangered species are a special concern. Any action, which affects wildlife, goes beyond recreational importance to potential environmental consequences.

Some of the state (special concerned) species, state threatened and endangered species are located within the Town of Mukwonago. Due to the sensitivity of this data, mapping is only allowed to show graphically the data on a section-by-section basis. Resource maps indicate natural areas, critical species habitat site, rare bird species habitat sites, rare reptile species habitat sites, state threatened and endangered species habitat and special concerns species sites. The species which are considered state (special concerned) species are not as rare as threatened or endangered but require the watchful eye of advocacy groups to keep them from dwindling in numbers and becoming threatened and endangered. The DNR and environmental advocacy groups monitor and assist in protecting individual threatened and endangered species. Recent conservation efforts have changed to be more proactive by focusing on and concentrating on entire habitats or ecosystems surrounding these species. The Town continues to promote improving the chance of these threatened and endangered species from surviving and growing, by their land use regulations.

### **Climate**

Its mid-continent location gives Waukesha County a continental climate that spans four seasons, one season succeeding the other through varying time periods of unsteady transition. Summers, generally the months of June, July and August, are relatively warm, with occasional periods of hot, humid weather and sporadic periods of cool weather. The cold winter, accentuated by prevailing frigid northwesterly winds, generally spans the months of December, January and February, but may in some years include parts of November and March. Autumn and spring in the County are transitional times of the year between the dominant seasons and usually periods of widely varying weather conditions. Temperatures are extremely varied, and long periods of precipitation are common in autumn and spring. Some of the more pronounced weather events include tornadoes and major snowmelt occurrences.

Air temperatures within Waukesha County are subject to extreme seasonal variation. Data on temperature observations in the County, recorded at the City of Waukesha, indicate variations in temperature from a low in January with a mean daily temperature of 18.7 degrees to a high in July with a mean daily temperature of 71.8 degrees. The growing season, which is defined as the number of days between the last freeze in the spring and the first freeze in the fall, averages about 155 days in Waukesha County. Precipitation in Waukesha County, in the form of rain, sleet, hail, and snow, ranges from gentle showers to destructive thunderstorms. The more pronounced weather events can cause major property and crop damage, inundation of poorly drained areas, and lake and stream flooding. Daily precipitation data for observations recorded at the City of Waukesha record that the total average annual precipitation observed is slightly more than 32 inches, expressed as water equivalent. Monthly averages range from a low of 1.2 inches in February to a high of 3.70 inches in June. Snowfall and sleet averages approximately 41 inches annually, with January receiving the most snow and sleet, at about 11 inches.

Prevailing winds in Waukesha County are generally northwesterly in the late fall and winter, northeasterly in the spring, and southwesterly in the summer and early fall. Wind velocities are less than five miles per hour (mph) for about 15 percent of the year, between 5 and 15 mph for about 60 percent of the year, and more than 15 mph for about 25 percent of the year.

## **Air Quality**

The Clean Air Act requires the U.S. Environmental Protection Agency (EPA) to set national ambient air quality standards (NAAQS) for six criteria pollutants (carbon monoxide, lead, nitrogen dioxide, particulate matter, ozone, and sulfur oxides) which are considered harmful to public health and the environment. Areas not meeting the NAAQS for one or all of the criteria pollutants are designated as nonattainment areas by the EPA. In areas where observed pollutant levels exceed the established NAAQS and which are designated as "nonattainment" areas by the EPA, growth and development patterns may be constrained. For example, major sources of pollutants seeking to locate or expand in a designated nonattainment area, or close enough to impact upon it, must apply emission control technologies. In addition, new or expanding industries may be required to obtain a greater than one-for-one reduction in emissions from other sources in the nonattainment area so as to provide a net improvement in ambient air quality. Nonattainment area designation may therefore create an economic disincentive for industry with significant emission levels to locating or expanding within or near the boundaries of such an area. In order to eliminate this disincentive and relieve the potential constraint on development, it is necessary to demonstrate compliance with the NAAQS and petition EPA for redesignation of the nonattainment areas.

The Southeastern Wisconsin Region currently meets all but the ozone NAAQS, and the EPA has designated a single six-county ozone nonattainment area within the Region which is made up of Kenosha, Milwaukee, Ozaukee, Racine, Washington, and Waukesha Counties. Ozone is formed when precursor pollutants, such as volatile organic compounds and nitrogen oxides, react in the presence of sunlight. The ozone air quality problem within the Region is a complex problem because ozone is meteorologically dependant. In addition, the ozone problem in the Region is believed to be attributable in large part to precursor emissions, which are generated in the large urban areas located to the south and southeast and carried by prevailing winds into the Region. The ozone problem thus remains largely beyond the control of the Region and State and can be effectively addressed only through a multi-state abatement effort. Over the past decade, the combination of local controls and offsets implemented within and external to the Region, along with national vehicle emissions control requirements have resulted in a significant improvement in ambient air quality within the Region as well as nationally, and projections of future emissions indicate a continued decline in precursor emissions and a continued improvement in air quality. The Town is not aware that they have any emissions issues due to their lack of business and industrial uses.

## **Culture Resources**

Historic sites often have important recreational, educational and cultural value. A variety of inventories and surveys of sites that process architectural, cultural and archeology value have been conducted by the Wisconsin Historic Society and by various units and agencies in Waukesha County. Certain sites of known historic significance in Waukesha County are listed on the National Registry of Historic places in Appendix B of the updated Waukesha County Development Plan. It is important to note, that the potential exists for identification of additional sites of historical significance which either are eligible for listing on the National Register or which are potentially eligible for listing, but would require additional evaluation. In 2005, there were 44 eligible historic sites in Waukesha County that have not been listed on a National

Registry. Eligible historic sites are also designated on Exhibit B of the Waukesha County Development Plan update.

The Town of Mukwonago is fortunate to have numerous sites of scenic and historic significance. Each site is representative of three general categories: Native American Legacy, early settlement history, and unique natural or man-made contributions.

Members of the Winnebago and Potawatomi Tribes lived in the Town before settlers appeared in the 1830s. Tribal burial mounds were found throughout the Town. Native Americans used today's Field Park for recreation; it was the site of an Indian horse race track. Though no physical evidence remains, Indians congregated around Kellogg Springs on CTH LO, one of the many natural springs in Waukesha County.

Sites of unique or scenic importance include the Mukwonago and Fox Rivers, Vernon Marsh, and the Rainbow Springs development. Besides possessing great natural beauty, Beulah Road and CTH LO carried Native American and white settler travelers long before they were paved for automobiles. The two quality prairies identified in the Town, are located off CTH LO and CTH I, are remnants of prairies, which covered much of the Town before the settlers arrived.

The remainders of the scenic and historic sites are associated with the white settlers. Several school sites and gravesites are represented though physical structures may be absent. In the Village of Mukwonago, several historic hotels and homes are still being used. The Mukwonago Plank Road, now abandoned, was the main highway to and from Milwaukee. City folks roomed in the Village hotels but traveled along CTH LO, then just a rustic road to Kellogg Springs for day picnics. Two farm communities, the Bud Sugden Farm and the Owenite Settlement Site, are recommended for recognition.

Appreciation of the Town's scenic and historic resources is pervasive among Town residents. Many have urged not only recognition of them as a vital aspect of the Town's character and heritage, but also preservation. If that is desired, designation of historic districts or sites can be included in Town Zoning Ordinance.

### **Recreational**

The Town of Mukwonago's Recreational Element in the 1981 Plan indicated it was the Town's intent to have two types of recreational development – passive and active. Passive development protects environmentally sensitive areas with the only alteration of the site being associated with the maintenance of the natural state for such uses as nature study, hiking, fishing and hunting. Active recreational areas were to include parks and trails. The 1981 plan stated, if a new school was built in the Town, its facilities could be used for youth and adult recreation activities.

The 1981 Recreational Element encouraged the development of neighborhood parks in residential developments, protection of environmentally sensitive areas, chose not to follow the recommendation of SEWRPC for a 100-249 acre park in the northwest portion of the Town, encouraged the Village to develop a 5-25 acre park west of the River Park Estates in the Village of Mukwonago, develop a 25-99 acre park site with limited outdoor recreational facilities, east of STH 83, and north of I-43 and develop a 40-50 acre park site in close proximity to the Town Hall for outdoor recreational activities. Further, the element went on to explain, it was the Town's

intent to promote equestrian, bike and nature trails; encourage trail development to protect environmentally sensitive areas and to separate subdivisions while linking existing areas of residential development and encourage the development and maintenance of local and State recreational corridor plans as recommended by SEWRPC.

In general, the intent was to encourage the development of a centralized recreational facility to provide family, youth and adult activities, cooperate with the Village of Mukwonago and School District in developing shared recreational programs, and explore programs for delineation and acquisition of development of large parcels within the township for recreational activities.

As part of the Town of Mukwonago's 1998 recreational element update, the Town decided that they did concur with the recommendation of the Waukesha County Development Plan, Park and Open Space Plan, which includes the acquisition by Waukesha County of an additional 316 acres adjacent to the 220-acre Mukwonago County Park. Initially, they did not concur with the recommendation of the acquisition of 755 acres of parkway along the Mukwonago River of which Waukesha County owned 17 acres in Section 26 & 34, or support the acquisition by the State of Wisconsin for an additional 411 acres adjacent to their 1,844 acres in the Vernon Marsh. Subsequent to that time, the Town Plan Commission adopted and the Town Board endorsed the incorporation of the Waukesha County Parks & Open Space Plan in its entirety into the Town of Mukwonago's recreational element.

In the Town of Mukwonago's update of the Recreation Element, an inventory was completed of all lands owned by the Town of Mukwonago, and whether they were considered active or passive recreational areas (see attached Table 15). In the Town's analysis and update of the Recreational Element of the Town Plan, the Town created 16 principles and standards for analyzing lands for town park purposes. The Town reviewed four potential park sites, 3 of which were in the general vicinity of the Town Hall and adjacent to existing Town properties which are intended to be used for recreational facilities and 1 on Sugden Road which is an outlet which has been dedicated to the Town for recreational purposes. In the inventory and analysis of the potential park sites, the Town analyzed the amount of arterial road frontage, soils, topography, drainage, adjacent land uses, highway access, presence of environmentally sensitive areas and the recreational group classification according to the USDA soils inventory. The two sites which were chosen were an approximately 30 acre parcel located west of Beulah Road and east of CTH EE adjacent to the existing Town Hall facility, a 38.8-acre site east of Beulah Road and south of CTH EE immediately adjacent to the parcel which was recently dedicated to the Town of Mukwonago and the Clydesdale Farms North Development. Most sites are adjacent to or in close proximity of the Town Hall and the existing park facility on Beulah Road. Both of these sites have good soils types, which can accommodate good turf, have the capability to handle heavy foot travel, are adequate for play and athletic fields, and intensive play areas having slopes of less than 6 percent.

It is the intent of the Town to acquire these 2 sites when they are available either through the dedication as part of a Planned Unit Development, Conservation Design Development or as an outright purchase. The Town currently owes 30.4 acres of active recreational lands in the vicinity of the Town Hall and with the additional acquisition of 38.8 and 30 acres described above will have more than enough active recreational areas to accommodate the Town's projected population through 2030 along with the associated amenities such as parking and sanitary facilities.

In the update of the current Waukesha County Development Plan, Park & Open Space Element, it designates areas in the Town for proposed state ownership (DNR), local ownership, or County ownership, and designates most of the environmental corridor/wetland areas as being open space land which should be protected through land use regulations.

Since the Town is participating with 27 other communities in Waukesha County in the update of the Waukesha County Development Plan, the focus group reviewed the planning objectives and standards as set forth in the updated County Development Plan and determined that since the adoption of the original Master Plan and Park & Open Space Plan, that the Town has adopted many of the policies or ordinances and regulations which comply with the implementation recommendation of the County's Plan and the agricultural natural and cultural resource chapter. The Town is under the jurisdiction of the Waukesha County Shoreland & Floodland Protection Ordinance that preserves wetlands and floodplain along the Mukwonago River and Fox River and floodplains around the Phantom Lakes. The Town has adopted zoning regulations, which preserve the environmental corridors by only allowing development of one unit per five acres.

In the review of the objectives and standards of the County Plan regarding the preservation of prime agricultural areas of soils, the Town has concluded that there are still significant amounts of prime agricultural land remaining in the Town.

The Town supports the concept of major parks within the County within four miles of every resident of the County and believes that because of the Town's current population and projected population, that their recreational plan to accommodate approximately 100-acre site around the Town Hall will meet the recreational needs for local parks for its citizens.

The Town supports the implementation recommendations of the updated County Development Plan and believes the Town has implemented many of these measures as suggested in their previous Master Plan, such as, prohibiting development on areas having high groundwater, raising existing residences that are located in floodplains, adopting the land division check list as part of the land division ordinance, regulating primary and secondary environmental corridors along with requiring planned unit or conservation type developments on the majority of the undeveloped land in the Town.



**Table 15****TOWN OF MUKWONAGO PUBLIC LANDS INVENTORY**

<b>Subdivision or Document</b>	<b>Parcel</b>	<b>Size</b>	<b>Category</b>
Highlands of Willow Springs	Outlot 1	.25 acres	Lake Access CSM Volume
9, Page 273	Outlot 1	.72 acres	Lake Access
Buckingham Oaks	Outlot 1	10.4 acres	Environmental Area
Country Squire Estates, East	Outlot 1, Block 4	8.5 acres	Environmental Area
Country Squire Estates, East Add No.1	Outlot 2, Block 1	23.8 acres	Environmental Area
Country Squire Estates, East Add No.1	Outlot 3, Block 4	1.66 acres	Environmental Area
Mayflower Hills	Outlot 1	13.61 acres	Environmental Area
Part of NW ¼ of Section 9	Meets and Bounds	16.87 acres	Environmental Area
Arbor Heights	Outlot 1	4.8 acres	Passive
Part of E ½ of Section 9	Meets and Bounds	1.86 acres	R.O.W.
Part of NE ¼ of Section 17	Meets and Bounds	1.58 acres	Passive
Jericho Ridge	Outlot 1 & 2	2.6 acres	R.O.W.
Part of SE ¼ of Section 17	Meets and Bounds	2.2 acres	Town Hall
Part of SE ¼ Section 17	Meets and Bounds	13.98 acres	Active
Meqwanego Hills	Lot 26	1 acres	Passive
Part of SE ¼ of Section 35	Meets and Bounds	35 acres	Passive
Clydesdale Farms North	Outlots 2 & 3	25.8 acres	Passive and Active
Oak Ridge Meadows	Outlot 1	30.12 acres	Passive

Given the comparatively large number of acres in the Town in state ownership, there is often a concern regarding a perceived loss of tax base. A recent Department of Revenue study in 2000 indicates that DNR land ownership of recreational lands does not increase the local tax burden. Since the 1990s, the DNR makes annual full tax payments to towns using the higher of assessed fair market value from the tax rolls or the actual purchase price. The study indicated that with this payment in lieu of taxes and the reduced need for roads, emergency services and other town services that the state land ownership actually helps decrease the taxes paid by residents of a town.

## PLANNING OBJECTIVES AND STANDARDS

### **Agricultural, Natural and Cultural Resources Objective No. 1**

A spatial distribution of the various land uses which maintains biodiversity and which will result in the preservation and sustainable use of the natural resources of the Town and County.

#### **Environmental Corridors and Isolated Natural Resource Areas**

##### **Principle**

The preservation of environmental corridors and isolated natural resource areas in essentially natural, open use yields many benefits, including recharge and discharge of groundwater, maintenance of surface water and groundwater quality, attenuation of flood flows and flood stages, maintenance of base flows of streams and watercourses, reduction of soil erosion, abatement of air and noise pollution, provision of wildlife habitat, protection of plant and animal diversity, protection of rare and endangered species, maintenance of scenic beauty, and provision of opportunities for recreational, educational, and scientific pursuits. Conversely, since some environmental corridors and isolated natural resource areas are poorly suited for urban development, their preservation can help avoid serious and costly development problems while protecting the Town's most valuable natural resources.

*Notes: Environmental corridors are elongated areas in the landscape that contain concentrations of natural resource features (lakes, rivers, streams, and their associated shore lands and flood lands; wetlands; woodlands; prairies; wildlife habitat areas; wet, poorly drained, and organic soils; and rugged terrain and high-relief topography) and natural resource-related features (existing park and open space sites; potential park and open space sites, historic sites, scenic areas and vistas, and natural areas and critical species habitat sites). Primary environmental corridors include a variety of these features and are at least 400 acres in size, two miles long, and 200 feet in width. Secondary environmental corridors also contain a variety of these features and are at least 100 acres in size and one mile in length. Isolated natural resource areas are smaller concentrations of natural resource features that are physically separated from the environmental corridors by intensive urban or agricultural uses; by definition, such areas are at least five acres in size and 200 feet in width.*

##### **Standards**

- a. Primary environmental corridors shall be preserved in natural, open uses to the extent practical
- b. Secondary environmental corridors and isolated natural resource areas should be preserved in essentially natural, open uses to the extent practicable, as determined in the Town Plan.

Uses considered being compatible with the preservation of environmental corridors and isolated natural resource areas are indicated in Table 13.

**Table 13**

**GUIDELINES FOR DEVELOPMENT CONSIDERED COMPATIBLE WITH ENVIRONMENTAL CORRIDORS**

Component Natural Resource and Related Features within Environmental Corridors <sup>a</sup>	Permitted Development															Rural Density Residential Development (see General Development Guidelines below)
	Transportation and Utility Facilities (see General Development Guidelines below)				Recreational Facilities (see General Development Guidelines below)											
	Streets and Highways	Utility Lines and Related Facilities	Engineered Stormwater Management Facilities	Engineered Flood Control Facilities <sup>b</sup>	Trails <sup>c</sup>	Picnic Areas	Family Camping <sup>d</sup>	Swimming Beaches	Boat Access	Ski Hills	Golf	Playfields	Hard-Surface Courts	Parking	Buildings	
Lakes, Rivers, and Streams...	X <sup>e</sup>	X <sup>f,g</sup>	--	X <sup>h</sup>	X <sup>i</sup>	-	--	X	X	--	--	--	--	--	--	--
Shoreland.....	X <sup>p</sup>	X	X	X	X	X	--	X	X	--	X <sup>s</sup>	--	--	X <sup>p</sup>	X <sup>j</sup>	--
Floodplain.....	X <sup>k</sup>	X	--	X	X	X	--	X	X	--	X <sup>s</sup>	X	--	X <sup>p</sup>	X <sup>l</sup>	--
Wetland <sup>m</sup> .....	X <sup>k</sup>	X	--	--	X <sup>n</sup>	-	--	--	X	--	X <sup>o</sup>	--	--	--	--	--
Wet Soils.....	X <sup>p</sup>	X	X	X	X	-	--	X	X	--	X	--	--	X <sup>p</sup>	--	--
Woodland.....	X <sup>p</sup>	X <sup>p</sup>	X <sup>p</sup>	--	X	X	X	--	X	X	X <sup>p</sup>	X <sup>p</sup>	X <sup>p</sup>	X <sup>p</sup>	X <sup>p</sup>	X <sup>p</sup>
Steep Slope ...	X <sup>p</sup>	X	--	--	X <sup>q</sup>	-	--	--	--	X <sup>r</sup>	X	--	--	--	--	--
Park.....	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	--
Historic Site..	--	X <sup>g</sup>	--	--	X <sup>q</sup>	-	--	--	--	--	--	--	--	--	--	--
Scenic Viewpoint .....	X	X	--	--	X	X	X	--	X	X	X	--	--	X	X	X
Natural Area or Critical Species Habitat Site.....	--	--	--	--	X <sup>q</sup>	-	--	--	--	--	--	--	--	--	--	--

NOTE: An "X" indicates that facility development is permitted within the specified natural resource feature. In those portions of the environmental corridors having more than one of the listed natural resource features, the natural resource feature with the most restrictive development limitation should take precedence.

## GENERAL DEVELOPMENT GUIDELINES

- Transportation and Utility Facilities: All transportation and utility facilities proposed to be located within the important natural resources should be evaluated on a case-by-case basis to consider alternative locations for such facilities. If it is determined that such facilities should be located within sensitive natural resources, development activities should be sensitive to, and minimize disturbance of, these resources, and, to the extent possible following construction, such resources should be restored to preconstruction conditions.

The above table presents development guidelines for major transportation and utility facilities. These guidelines may be extended to other similar facilities not specifically listed in the table.

- Recreational Facilities: In general, no more than 20 percent of the total environmental corridor area should be developed for recreational facilities. Furthermore, no more than 20 percent of the environmental corridor area consisting of upland wildlife habitat and woodlands should be developed for recreational facilities. It is recognized, however, that in certain cases these percentages may be exceeded in efforts to accommodate needed public recreational and game and fish management facilities within appropriate natural settings.

The above table presents development guidelines for major recreational facilities. These guidelines may be extended to other similar facilities not specifically listed in the table.

- Residential Development: Limited residential development may be accommodated in upland environmental corridors, provided that buildings are kept off steep slopes. The maximum number of housing units accommodated at a proposed development site within the environmental corridor should be limited to the number determined by dividing the total corridor acreage within the site by five, with only a limited portion of the site, which is covered by surface water, floodplain and wetlands being counted in the total corridor acreage. The permitted housing units may be in single-family or multi-family structures. When rural residential development is accommodated, conservation subdivision designs are strongly encouraged to locate development outside the corridor while maintaining an overall development density of no more than one dwelling per five acres.

Single-family development on existing lots of record should be permitted as provided for under county or local zoning at the time of adoption of the land use plan.

Footnotes to Table 13

<sup>a</sup>The natural resource and related features are defined as follows:

Lakes, Rivers, and Streams: Includes all lakes greater than five acres in area and all perennial and intermittent streams as shown on U. S. Geological Survey quadrangle maps.

Shoreland: Includes a band 50 feet in depth along both sides of intermittent streams; a band 75 feet in depth along both sides of perennial streams, a band 75 feet in depth around lakes; and a band 200 feet in depth along the Lake Michigan shoreline...

Floodplain: Includes areas, excluding stream channels and lakebeds, subject to inundation by the 100-year recurrence interval flood event.

Wetlands: Includes areas that are inundated or saturated by surface water or groundwater at a frequency, and with a duration sufficient to support, and under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions.

Wet Soils: Includes areas covered by wet, poorly drained, and organic soils.

Woodlands: Includes areas one acre or more in size having 17 or more deciduous trees per acre with at least a 50 percent canopy cover as well as coniferous tree plantations and reforestation projects; excludes lowland woodlands, such as tamarack swamps, which are classified as wetlands.

Wildlife Habitat: Includes areas devoted to natural open uses of a size and with a vegetative cover capable of supporting a balanced diversity of wildlife.

Steep Slope: Includes areas with land slopes of 12 percent or greater.

Prairies: Includes open, generally treeless areas, which are dominated by native grasses; also includes savannas.

Park: Includes public and nonpublic park and open space sites.

Historic Site: Includes sites listed on the National Register of Historic Places. Most historic sites located within environmental corridors are archeological features such as American Indian settlements and effigy mounds and cultural features such as small, old cemeteries. On a limited basis, small historic buildings may also be encompassed within delineated corridors.

Scenic Viewpoint: Includes vantage points from which a diversity of natural features such as surface waters, wetlands, woodlands, and agricultural lands can be observed.

Natural Area and Critical Species Habitat Sites: Includes natural areas and critical species habitat sites as identified in the regional natural areas and critical species habitat protection and management plan.

<sup>b</sup>Includes such improvements as stream channel modifications and such facilities as dams.

<sup>c</sup>Includes trails for such activities as hiking, bicycling, cross-country skiing, nature study, and horseback riding, and excludes all motorized trail activities. It should be recognized that trails for motorized activities such as snowmobiling that are located outside the environmental corridors may of necessity have to cross environmental corridor lands. Proposals for such crossings should be evaluated on a case-by-case basis, and if it is determined that they are necessary, such trail crossings should be designed to ensure minimum disturbance of the natural resources.

<sup>d</sup>Includes areas intended to accommodate camping in tents, trailers, or recreational vehicles, which remain at the site for short periods of time, typically ranging from an overnight stay to a two-week stay.

*e* Certain transportation facilities such as bridges may be constructed over such resources.

*f* Utility facilities such as sanitary sewers may be located in or under such resources.

*g* Electric power transmission lines and similar lines may be suspended over such resources.

*h* Certain flood control facilities such as dams and channel modifications may need to be provided in such resources to reduce or eliminate flood damage to existing development.

*i* Bridges for trail facilities may be constructed over such resources.

*j* Consistent with Chapter NR 115 of the Wisconsin Administrative Code.

*k* Streets and highways may cross such resources. Where this occurs, there should be no net loss of flood storage capacity or wetlands. Guidelines for mitigation of impacts on wetlands by Wisconsin Department of Transportation facility projects are set forth in Chapter Trans 400 of the Wisconsin Administrative Code.

*l* Consistent with Chapter NR 116 of the Wisconsin Administrative Code.

*m* Any development affecting wetlands must adhere to the water quality standards for wetlands established under Chapter NR 103 of the Wisconsin Administrative Code.

*n* Only an appropriately designed boardwalk/trail should be permitted.

*o* Wetlands may be incorporated as part of a golf course, provided there is no disturbance of the wetlands.

*p* Only if no alternative is available.

*q* Only appropriately designed and located hiking and cross-country ski trails should be permitted.

*r* Only an appropriately designed, vegetated, and maintained ski hill should be permitted.

*s* Allow only if proper safeguards can be put into place to preserve the environmental characteristics.

Source: SEWRPC

## **Other Environmentally Sensitive Areas**

### **Principle**

Care in locating urban and rural development in relation to other environmentally sensitive areas can help to maintain the overall environmental quality of the Town and to avoid developmental problems.

### **Standards**

- a. All wetlands, woodlands, and prairies not identified as part of an environmental corridor or isolated natural resource area should be preserved to the extent practicable, as designated on the Town Plan.
- b. All natural areas and critical species habitat sites identified for preservation in the Regional Natural Areas and Critical Species Habitat Protection and Management Plan for Southeastern Wisconsin SEWRPC Planning Report # 42 adopted by the Waukesha County Board on April 27, 1999 shall be preserved to the extent practical.
- c. 100-year recurrence interval floodlands should not be allocated to any development, which would cause or be subject to flood damage; and only structures specifically authorized and designed for that purpose shall be allowed to encroach upon and obstruct the flow of water in perennial stream channels and floodways.
- d. Urban and rural development should be directed away from areas, with steep slopes (12 percent or greater) or with seasonally high groundwater one foot or less from the surface.
- e. Land use patterns should be designed to discourage development of below grade structures on soils with seasonally high groundwater less than three feet from the surface. The intent is to allow development on these marginal soils, providing below grade structures (including basements) maintain a minimum of one foot separation from the seasonally high groundwater level.

## **Restoration/Enhancement of Natural Conditions**

### **Principle**

The restoration of unused farmland and other open space land to more natural conditions, resulting in the re-establishment or enhancement of wetlands, woodlands, prairies, grasslands, and forest interiors, can increase biodiversity and contribute to the overall environmental quality of the Town by providing additional functional values as set forth in Objective No. 1 above.

### **Standard**

- a. Carefully planned efforts to restore unused farmland and other open space land to more natural conditions should be encouraged.

## **Agricultural, Natural and Cultural Resources Objective No. 2**

### **The Preservation of Productive Agricultural Land**

#### **Principle**

The preservation of productive agricultural land is important for meeting future needs for food and fiber. Agricultural areas, in addition to providing food and fiber, can provide wildlife habitat and contribute to the maintenance of an ecological balance between plants and animals. Moreover, the preservation of agricultural areas also contributes immeasurably to the maintenance of the scenic beauty and cultural heritage of the County. Maintaining agricultural lands near urban areas can facilitate desirable and efficient production-distribution relationships, including community-supported agriculture operations.

The preservation of agricultural lands can maximize return on investments in agricultural soil and water conservation practices, and minimizes conflicts between farming operations and urban land uses.

#### **Standard**

Prime agricultural lands in the Town of Mukwonago includes those lands in agricultural use, unused/open lands, primary/secondary environmental corridor or isolated natural areas and within a five square mile contiguous area (including adjacent counties) that meet all of the following criteria: 1) is outside of any planned sewer service area boundary; 2) 75 percent is agricultural or open/unused land use; 3) 50 percent is Class I or II soils which meet Natural Resources Conservation Service standards; and 4) 75 percent consists of land ownership parcels of 35 acres or more. This standard is a modification of the standard used to prepare the Development Plan for Waukesha County in 1996.

The standard in the 1997 Development Plan read "Prime agricultural lands in Waukesha County includes those lands in agricultural use which meet the following criteria: 1) the farm unit must be at least 35 acres in area, 2) at least 50 percent of the farm unit must be covered by soils which meet Natural Resources Conservation Service standards for National prime farmland, and 3) the farm unit must be located within a block of farmland at least five square miles in size". The definition used in 1997 became difficult to map using land information system technology. As a result, the Agriculture, Natural and Cultural Resources Element Subcommittee of the Comprehensive Development Plan Advisory Committee at their August 3, 2005 meeting approved the modification of the standards used for the delineation of prime agricultural lands. The modified standards can be mapped using land information system technology. In general, the modified standards produced the same map results used in the 1997 Development Plan.



The standard utilized in the identification of prime agricultural lands in the design year 2010 regional land use plan, including the criterion indicating that the farm unit be located within a block of farmland at least 100 acres in size, and the criterion indicating that at least 50 percent of the farm unit must be covered by Class I, Class II, or Class III soils was, to a large extent, based upon criteria utilized in the identification of farmland preservation areas in county farmland preservation plans completed within the Region in the early 1980s, including the Waukesha County Agricultural Land Preservation Plan. The 100-acre minimum combined farmland area was chosen for such plans because it was consistent with the State's minimum acreage planning criterion for farmland preservation areas under Wisconsin's Farmland Preservation Program. This relatively small area would enable the largest number of farmers to qualify for tax credits under the State Farmland Preservation Program.

While the recognition in a land use plan of smaller blocks of farmland may enable a larger number of farmers to qualify for tax credits, the maintenance of long-term agricultural use within such smaller blocks in an urbanizing region such as Southeastern Wisconsin has proven to be very difficult. Among those reasons frequently cited to explain that difficulty is the following:

1. Relatively large blocks of farmland are necessary to support such agriculture-related businesses as distributors of farm machinery and parts and farm supplies. Scattered, relatively smaller blocks of farmland do not provide the critical mass necessary for such agribusiness support enterprises. Consequently, farmers remaining in such smaller blocks must travel ever-increasing distances for support services.
2. In many cases, smaller blocks of farmland are merely remnants of formerly larger blocks, which have been subject to intrusion by urban residential development. This intrusion has resulted in significant urban-rural conflicts, including problems associated with the objection by residents of urban-type land subdivision developments to odors associated with farming operations, to the use of fertilizers, herbicides and pesticides, and other agriculturally related chemicals, to the noise associated with the operation of farm machinery during the early and late hours of the day, and to the movement of large farm machinery on rural roads being used increasingly for urban commuting.
3. For most farming enterprises, the economies of scale require relatively large tracts of land, frequently involving many hundreds of acres. The breakup of large blocks of farmland by urban intrusion makes it more difficult for farmers to assemble such larger tracts either through ownership or rental arrangements. Tract assembly is thus complicated by scattered field locations, resulting in costly and inconvenient related travel distances and, therefore, in unproductive time and higher fuel consumption.
4. In agricultural communities on the fringe of urbanizing areas, there is often a declining interest among the next generation of farmers to continue farm operations. This is particularly true where alternative land uses are perceived to be available. This phenomenon is reinforced by the rigors of day-to-day farm life when compared with urban lifestyles.

The criterion specifying that prime agricultural lands include those areas where 50 percent or more of the farm unit is covered by soils meeting U. S. Natural Resources Conservation Service standards for National prime farmland or farmland of statewide importance was valid when the first county farmland preservation plans were prepared in the early 1980's. Inclusion of soils of statewide importance, or Class III soils, in the standard was appropriate even though such soils may have had marginal crop production value because a high proportion of the farms within the County then were dairy operations. Dairy operations can be viable even though a relatively large portion of the farm unit may be covered by Class III soils because such soils are suitable for grazing, production of animal feed crops and the use of cover crops related to the dairy operations. However, increased specialization of farm operations, and loss of smaller "family" farms and dairy farms in Waukesha County has now raised questions concerning continued utilization of farmland of statewide importance, or Class III soils, as a criterion in the identification of prime agricultural lands within Waukesha County.

Local public officials, farmers, landowners, and soil scientists stated, at meetings held to review the preliminary 1997 Development Plan for Waukesha County land use plan, that lands covered by Class III soils should not be considered as prime farmland. It was noted that such soils in Waukesha County being excessively wet, droughty or steep, rendering them unsuitable for the production of cash grain crops such as corn or soybeans. Because Class III soils are not as well-suited for intensive cash grain farming as Class I and II soils, and because of the significant loss of dairy farm operations within Waukesha County over the past three decades, lands covered by Class III soils no longer have the same inherent value as an agricultural resource as when dairy farms were prevalent. The criterion for the five square mile farmland block size is not a new criterion. Indeed, SEWRPC utilized the five-square-mile-block criterion in the identification of prime agricultural land under the first-generation design year 1990, regional land use plan adopted by the Commission in 1996. This criterion was established with direct input from, and utilizing the collective judgment of, University of Wisconsin-Extension agricultural agents working in the region at that time.

As a practical matter, the application of the "block" standard would involve the delineation of gross areas of at least five square miles containing concentrations of farmland meeting the three criteria cited above. At least 75 percent of the gross area should be comprised of such farmland or of environmental corridor lands that occur within the blocks of such farmland.

In 2005, the Agriculture, Natural and Cultural Resources Subcommittee of the Comprehensive Development Plan Advisory Committee reaffirmed the concerns over the inclusion of Class III soils and using a farmland block size smaller than five square miles in the standards for prime agricultural lands.

The Town Board and Plan Commission discussed as an alternative to the large blocks of agricultural lands that sustainable agriculture should be encouraged on smaller areas for truck farming or small specialty type farming operations. These areas could include open space areas in planned unit developments and conservation design developments.

The Town intends to maintain the Agricultural Preservation zoning on all lands in the Town, which are currently, zoned AP until such time as the property owner or developer can verify that any tax credits that must be repaid to the State of Wisconsin have been repaid. Documentation must be presented to the Town of the status of any required payback of tax credits prior to the Agricultural Preservation land use category being changed, rezoning of the property or approval of any development project.

*Notes: National prime farmland consists of agricultural lands covered by U. S. Natural Resources Conservation Service-designated Class I and II soils. Class I soils are deep, well drained, and moderately well drained, nearly level soils with no serious limitation that restrict their use for cultivated crops. Class II soils are generally deep and well drained but may have some limitations that reduce the choice of plants that can be economically produced or require some conservation practices.*

*Farmland of Statewide importance consists of agricultural lands covered by U. S. Natural Resources Conservation Service-designated Class III soils. Class III soils have moderate limitations due to wetness, steepness or drought conditions that restrict the choice of plants or require special conservation practices or both.*

### **Agricultural, Natural and Cultural Resources Objective No. 3**

The preservation and provision of open space to enhance the total quality of the Town environment, maximize essential natural resource availability, give form and structure to urban development and provide opportunities for a full range of outdoor recreational activities.

#### **Principle**

Open space is the fundamental element required for the preservation and sustainable use of such natural resources as soil, water, woodlands, wetlands, native vegetation and wildlife; It provides the opportunity to add to the physical, intellectual and spiritual growth of the population. It enhances the economic and aesthetic value of certain types of development; and it is essential to outdoor recreational pursuits.

#### **Standards**

- a. Major park and recreation sites providing opportunities for a variety of natural resource-oriented, self actualized outdoor recreational activities should be provided by the County within a 4-mile service radius of every dwelling unit in the County and should have a minimum gross site area of 250 acres. Examples of such uses include: campsite, swimming beach, picnic area, golf course, ski hill, hiking and cross-country ski trails, horseback riding, boat launch, nature study area, and play field area.
- b. The Town of Mukwonago will provide one large park complex in the central portion of the Town adjacent to the Town Hall by combining and expanding the existing park facilities east and west of Beulah Road. It is the intent of the Town to acquire portions of the Swan Property through the development process by either a planned unit or conservation design development. Additionally the Town has other park facilities and

open space areas which have been dedicated to the Town through the development process prior to the adoption of the Town Park Plan. It is not the intention of the Town to develop these areas as active recreational areas or obtain additional lands not designated on the Town Park Plan

- c. The Town of Mukwonago intends to provide outdoor recreation facilities to afford the resident population of the opportunities to participate in intensive nonresource-oriented outdoor recreation activities. These types of facilities are activity specific such as tennis, baseball, basketball, soccer and playgrounds.
- d. Areas having unique scientific, cultural, scenic, or educational value should not be allocated to any urban or agricultural land uses; adjacent surrounding areas should be retained in open space use, such as agricultural or limited recreational uses.
- e. The County should acquire or otherwise protect land and establish Greenways along the following major streams: the Fox River and Mukwonago River. For the purposes of this plan, greenways are located along a stream or river and are intended to provide aesthetic and natural resource continuity and often serve as ideal locations for trail facilities.
- f. The Town will continue to encourage development of play areas, walking trails, tot lots and other private recreational facilities in the open space areas of planned unit developments and conservation design developments which are to be owned and maintained by the homeowners in each particular development.

#### **Agricultural, Natural and Cultural Resources Objective No. 4**

A spatial distribution of land uses and specific site development designs which protects or enhances the surface and ground water resources of the Town.

#### **Principle**

Information regarding existing and potential surface and ground water quality conditions is essential to any comprehensive land use and natural resource planning program. The existing quality condition of the surface and ground water resource provides important baseline data. The potential condition becomes the goal upon which planners and resource managers target their land use efforts.

#### **Standards**

- a. Potentially contaminating land uses should not be located in areas where the potential for groundwater contamination is the highest.
- b. Storm water management planning should seek to meet the potential biological use objectives of the streams in the Town.

*Notes: The Wisconsin Department of Natural Resources (DNR) is required, under Wisconsin Statutes and the State Water Resources Act of 1965, to establish a set of water use objectives and supporting water quality standards applicable to all surface waters of the state. The type of aquatic community a particular surface water resource is capable of supporting is represented by the biological use objectives. The potential biological use of streams indicates the biological use or trout stream class a stream could achieve if it was well managed and pollution sources were controlled.*

*The Wisconsin Department of Natural Resources (DNR) has established Administrative Code NR 140 to establish groundwater quality standards for substances detected in or having a reasonable probability of entering the groundwater resources of the state; to specify scientifically valid procedures for determining if a numerical standard has been attained or exceeded; to specify procedures for establishing points of standards application, and for evaluating groundwater monitoring data; to establish ranges of responses the department may require if a groundwater standard is attained or exceeded; and to provide for exemptions for facilities, practices and activities regulated by the department.*

### **Principle**

Information regarding existing ground water quantity conditions is essential to any comprehensive land use and natural resource planning program. The studying and documenting of the existing condition of ground water quantity provides important baseline data. Potential ground water quantity conditions provide important data upon which planners, municipal officials and resource managers can make comprehensive development planning decisions.

### **Standards**

- a. Land use development patterns and practices should be designed to preserve important groundwater recharge areas and should support maintaining or enhancing the natural surface and groundwater hydrology to the extent practicable.
- b. Storm water management planning should seek to encourage or enhance to the extent practicable ground water recharge to maintain the natural groundwater hydrology.

*Notes: As of the writing of this Plan, SEWRPC is engaged in the preparation of a Regional Water Supply Plan. The recommendations contained in the plan will be incorporated into future amendments to this Comprehensive Development Plan for Waukesha County.*

### **Agricultural, Natural and Cultural Resources Objective No. 5**

A spatial distribution of the various land uses which maintains biodiversity and clean air and will result in the protection and wise use of the natural resources of the Town including its soils, nonmetallic minerals, inland lakes and streams, groundwater, wetlands, woodlands, prairies, and wildlife.

## **Principle**

The proper allocation of uses to land can assist in maintaining an ecological balance between the activities of man and the natural environment.

## **Soils**

### **Principle**

The proper relation of urban and rural land use development to soil types and distribution can serve to avoid many environmental problems, aid in the establishment of better regional settlement patterns, and promote the wise use of an irreplaceable resource.

### **Standards**

1. Sewered urban development, particularly for residential use, should not be located in areas covered by soils identified in the detailed operational soil survey as having severe limitations for such development.
2. Unsewered suburban residential development should not be located in areas covered by soils identified in the detailed operational soil survey as unsuitable for such development.
3. Rural development, including agricultural and rural residential development, should not be located in areas covered by soils identified in the detailed operational soil survey as unsuitable for such uses.
4. Urban and rural development should be directed away from areas, with steep slopes (12 percent or greater) or with seasonally high groundwater one foot or less from the surface.
5. Land use patterns should be designed to discourage development of below grade structures on soils with seasonally high groundwater less than three feet from the surface. The intent is to allow development on these marginal soils, providing below grade structures (including basements) maintain a minimum of one foot separation from the seasonally high groundwater level.

## **Nonmetallic Minerals**

### **Principle**

All minerals, including sand and gravel, dimensional building stone and organic materials, have significant commercial value and are an important economical supply of the construction materials needed for the continued development of Waukesha County and the region and for the maintenance of the existing infrastructure. Urban development of lands overlying these resources and urban development located in close proximity to these resources may make it impossible to economically utilize these resources in the future and thus may result in shortages and concomitant increases in the costs of those materials, which would ultimately be reflected in both consumer prices and in the

community tax structure. Existing rural development in the Town of Mukwonago in close proximity to these resources may make it impossible to economically utilize these resources in the future and thus may result in shortages and concomitant increases in the costs of those materials, which would ultimately be reflected in both consumer prices and in the community tax structure.

### **Standard**

Consideration for short term mining projects for public improvement projects will be allowed with approval of the Town Board where the resource is available in close proximity to the project in order to eliminate unnecessary trucking costs which are paid for by the general public.

### **Clean Air**

#### **Principle**

Air is a particularly important determinant of the quality of the environment for life, providing the vital blend of oxygen and other gases needed to support healthy plant and animal life. Air, however, contains pollutants contributed by both natural and human sources which may be harmful to plant and animal life that may injure or destroy such life, and that may severely damage personal and real property.

#### **Standards**

Encourage protection of existing woodlands, wetlands and prairies to enhance atmospheric oxygen supply levels.