

Lake County, Illinois

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Chapter 5 Infrastructure and Services Introduction

Vision

In the year 2020, Lake County will have a network of infrastructure and services to meet the educational, healthcare, sanitary, and public safety needs of the community and to protect natural resources, cultural resources,¹ and community character.

Significance

Lake County residents and businesses rely on infrastructure and services that are provided by a complex, overlapping group of governmental agencies and private utility companies. Lake County provides certain infrastructure and services directly to unincorporated areas and some municipalities. Villages and cities provide additional infrastructure and services within their boundaries to cooperating nearby municipalities and unincorporated areas. Other infrastructure and services, such as schools, parks, and forest districts, are provided by special service districts, which are separate governmental districts with their own elected boards and taxing authority. Additional infrastructure components including electricity, natural gas, and telecommunications are provided by private utility companies.

A major challenge facing infrastructure and service providers is to coordinate activities to provide efficient, cost-effective infrastructure and services. Coordinated, cost-effective infrastructure and services are critical to supporting the physical development and redevelopment of the County, maintaining a desirable quality of life, and protecting natural resources. A community chooses its infrastructure based on what it deems necessary to maintain or achieve its quality of life and community character.

The basic purpose of this chapter is to discuss the necessary public facilities and services, within the context of population forecasts and future land use projections. The infrastructure and service availability and capacity analysis in this chapter provides a basis for Chapter 9, Land Use, of the *Regional Framework Plan*.

Infrastructure and services topics discussed in this chapter are:

- Water Supply
- Sewage Treatment
- Stormwater Management
- Solid Waste
- Energy (Electricity and Natural Gas)
- Telecommunications
- Public Schools
- Fire Protection and Emergency Management
- Law Enforcement
- Public Health System and Regional Hospitals
- Parks and Recreation

¹ Cultural resources include historic resources, archaeological resources, and scenic landscapes.

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Chapter 5 Infrastructure and Services Water Supply

Significance

An abundant, safe, clean, and economical supply of water is essential for prosperity and a desirable quality of life in Lake County. Following the mining of the deep bedrock aquifer, water from Lake Michigan was substituted. After a period of recovery, the deep bedrock aquifer is being mined again and now, due to international law, the County's Lake Michigan allocation cannot be greatly increased. The shallow aquifers are forecast to have sufficient water for the County's need to 2020 but the impacts of increased use of this water source are not known.

Scientific studies are especially needed to determine the recharge rates for the shallow aquifers, the impacts of increased withdrawals from the shallow aquifers on existing shallow aquifer wells and surface waters, and how increased use of the shallow aquifers during a major drought will impact groundwater and surface water resources.

Issues and Opportunities

- The current water allocation from Lake Michigan is not sufficient to supply the water needed for the County's forecast growth. The majority of the water that cannot be supplied from Lake Michigan will have to be withdrawn from the shallow aquifers.
- Information on the amount of groundwater available in Lake County and the northeastern Illinois region is lacking in such areas as how much water is in the shallow aquifers, where the shallow aquifers are located, where the recharge areas are located and the rate of recharge, and the impacts to the aquifers as the amount of water withdrawn from them increases and impervious area increases.
- Illinois law does not restrict the quantity of water that can be pumped from the aquifers and there are few incentives to limit withdrawals.
- Current projections indicate that the shallow aquifer system can meet the Lake County demand for water in 2020 that is not supplied from other sources.
- The impacts on existing shallow aquifer wells and surface waters (flows in streams and water levels in lakes and wetlands) caused by significant increases in shallow groundwater withdrawals are not known.
- The use of water conservation techniques and Best Management Practices may reduce the need to construct additional infrastructure or develop new wells, which will have the dual benefits of saving money and conserving water.
- Finding innovative ways to capture and reuse wastewater and stormwater could have economic benefits and help conserve the water supply.
- Appropriate, long term management of fresh water requires appreciation and integration of water's ecological and economic aspects.

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- Regulations regarding land use, water use, and water infrastructure must be coordinated with water resource management at the local, state, and federal levels.
- Improving water quality, reducing flooding, and restoring wetland and aquatic habitats will require a better understanding of the relationships between surface water and groundwater.
- Regional developments not only impact the immediate site, but the entire aquifer system.

Analysis

The Analysis section has six major components: The Amount of Water Consumed in Lake County, Lake County's Sources of Water, the Types of Water Systems Used in Lake County, Water Quality, Water Conservation and Water Quality Protection, and a Conclusion.

The Amount of Water Consumed In Lake County

The amount of water used in Lake County in 2000, expressed in gallons per capita per day (gpcd), was calculated for the Northeastern Illinois Planning Commission's *Strategic Plan for Water Resource Management* (NIPC, 2001). The gallons per capita per day include both residential and non-residential uses. For the 52 municipalities, the average gpcd was 123 gallons, and for unincorporated Lake County it was 137 gallons (from information supplied by Johnson, 2001). Since most of the County is within a municipality, the 123 gpcd will be used to estimate the amount of water being used today (2000) and to calculate future water demand in 2020.

The 2000 Census for Lake County is 644,356. Using the calculated per capita per day figure of 123 gpcd gives an estimated total water consumption for the County of 77.68 million gallons per day (MGD). Of this estimated total, 50 MGD in round figures came from Lake Michigan, and 28 MGD came from wells in the aquifers, primarily the shallow aquifers (Injerd, 2001A; IEPA/SWAP, August 2001).

The NIPC 2020 endorsed population for Lake County is 806,779. At 123 gpcd, this population will need 99.24 MGD. The amount needed closely matches the 2020 projected water demand of 100.89 MGD calculated by NIPC (NIPC, 2001:Table 2, page 42).

As stated in Chapter 2, Population, the *Regional Framework Plan* is based on a future population range centered around the NIPC endorsed 2020 forecast of 806,779, along with high growth and low growth scenarios of 828,018 and 786,253 respectively (page 2-13). Using the three forecasts with 123 gallons per capita per day means that between 94 and 105 MGD will be needed in 2020, which is an increase of between 16 and 27 MGD over the 2000 estimated consumption of 78 MGD.

Lake County's Sources of Water

The largest source of water consumed in Lake County is Lake Michigan. The shallow aquifer system is second in importance, and the deep bedrock aquifer system is a distant third.

The Illinois Department of Natural Resources forecasts the Lake Michigan service area population in 2020 to be 524,530 people, and have an allocation of 67.218 MGD (Injerd, 2001B). The 282,249 residents not on Lake Michigan water (calculated by subtracting 524,530 from the

NIPC-endorsed forecast of 806,779) will have to obtain water either from groundwater or from inland surface water. Limited amounts of water from the Fox River may be available by 2020 to townships in the western half of the County (NIPC, 2001:77); however, the Lake County Public Works Department thinks this is unlikely.

Using 123 gpcd, the quantity of water needed by the forecast 2020 population of 806,779 from a source other than Lake Michigan will be 35 MGD (34,716,627 gallons). As shown in Figure 5.1, the majority of this water will have to be supplied by the shallow aquifers. For simplicity, the table below assumes that the estimated sustainable supply of water from the deep bedrock aquifers (from NIPC, 2001:77 and Meyer, 2000) will be totally utilized. It also assumes that Illinois' Lake Michigan allocation will not be dramatically increased by the Supreme Court.

Figure 5.1
MGD and Water Sources to Supply
2020 Population of 806,779 (using 123 gpcd)

Water Source	MGD	Population Served
Lake Michigan ¹	67.22	524,530
Deep Bedrock Aquifer	2.40	19,512
Shallow Aquifer	32.32	262,737
Totals	101.94	806,779

¹The MGD and Population Served are from Injerd, 2001B

Lake Michigan Water

Illinois has been diverting water from Lake Michigan (removing water from Lake Michigan and sending it to the Mississippi River via the Illinois River instead of returning it to the lake) since 1898, when the flow of the Chicago River was reversed (Lake County Stormwater Management Commission, 2000:7).

The Great Lakes and lower Mississippi River states' concern over Illinois' diversion of Lake Michigan water has sent the issue to the U.S. Supreme Court on several occasions, with the first decision coming in 1906 (Injerd, 1997:1-2). In 1929 the state of Illinois adopted the "Level of Lake Michigan Act": "An Act in relation to the regulation and maintenance of the levels in Lake Michigan and to the diversion and apportionment of water from the Lake Michigan watershed" (615 ILCS/50/1). The Illinois Department of Natural Resources is the agency that "control[s] and regulate[s] the diversion of Lake Michigan water and is responsible for apportionment of water diverted from the Lake Michigan watershed" (615 ILCS/50/1.2).

The current Lake Michigan diversion and allocation program is based on the U.S. Supreme Court Decree of 1967, as amended in 1980. Through its decrees, the Supreme Court has limited the amount of water that can be diverted to 3,200 cubic feet per second (cfs), which is about 2.1 billion gallons per day. A cubic foot of water is 7.5 gallons. This total includes the domestic water supply of Chicago and northeastern Illinois, the amount of Lake Michigan water directly diverted into the Sanitary and Ship Canal system in order to provide safe navigation and protect water quality, and the stormwater runoff which began to flow into the Mississippi River rather than into Lake Michigan when the Chicago and Calumet Rivers were reversed. The amount of water taken from the lake for domestic use is by far the largest, accounting for over 55% of the diversion (Injerd, 1997:1-4; NIPC, 2001: 54-55).

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Understanding that many variables can effect the amount of Lake Michigan water diverted, the 1967 Decree directed that the determination as to whether or not Illinois was meeting the 3,200 cfs limit would be based on water use averaged over five years. The 1980 amendment increased the averaging interval from five to 40 years, covering the years 1980 to 2020 (Injerd, 1997:2). Because it was found that Illinois had exceeded its "diversion limit during 11 of the 15 years from 1981 through 1995, a Memorandum of Understanding (MOU) was adopted in 1996 between Illinois and the other Great Lakes states under threat of renewed litigation before the Court. Under the MOU, Illinois agreed that it will not only continue to meet its mandated 3,200 cfs limit but will further reduce its Lake Michigan diversion during the remaining 20-year averaging period of the decree to make up for this overuse" (NIPC, 2001:55). The Illinois Department of Natural Resources, Office of Water Resources has produced a compliance plan that shows that, on paper, it is possible to compensate for the over usage even as allocation amounts to permittees are increased and the population grows (Injerd, 2001B).

The Lake Michigan water service area is approximately 120,000 acres, which is about 40% of Lake County by area, as shown in Figure 5.2. Twenty-four of the County's 52 municipalities, and 13 of its 18 townships currently have allocations from Lake Michigan. Three privately owned systems receive small amounts of water (Injerd, 2001B). The Lake Michigan allocation for Lake County in 2003 was about 53.5 MGD. It increases to 59 MGD in 2010 and 67 MGD in 2020 (Injerd, 2001A).

Even though the amount of Lake Michigan water available to the permittees is limited and distributed through the allocation system, it is possible for permittees to request additional increases from the Illinois Department of Natural Resources. These requests are reviewed on a case-by-case basis and increases are possible. Industrial uses that are considered to need large amounts of water, such as peaker power plants, can potentially obtain approval to use water from Lake Michigan.² It is also conceivable that a "New Town" development within the current service area could obtain an allocation.

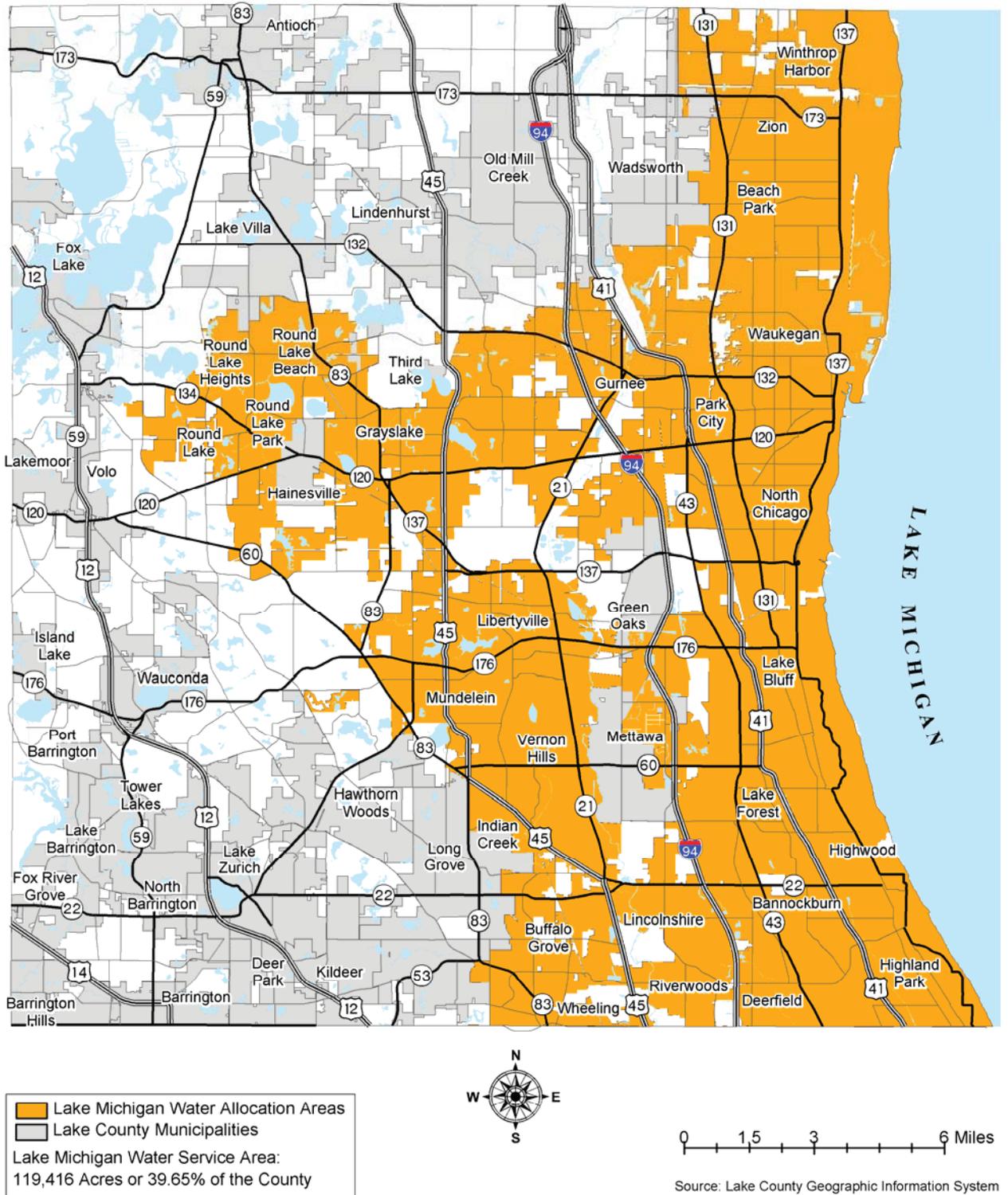
Deep Bedrock and Shallow Aquifers

According to *A Plan for Scientific Assessment of Water Supplies in Illinois*, the two "major aquifers" of northeastern Illinois are 1) the "shallow sand-and-gravel and bedrock aquifers"; considered together as the shallow aquifer and 2) the deep bedrock aquifer system (Illinois State Water Survey, Illinois Department of Natural Resources, 2001:13). A third aquifer, which is only a negligible water source for Lake County, is the Elmhurst–Mt. Simon aquifer.

In general, wells in northeastern Illinois up to 749 feet deep would be in the shallow aquifer; wells between 750 and 1549 feet deep would be in the deep bedrock aquifer; and wells deeper than 1550 feet would be in the Elmhurst–Mt. Simon aquifer (Meyer, 2001C). For the Lake County community water supply wells with known depths, the wells in the shallow aquifer range from 55 feet to 400 feet in depth; wells in the deep bedrock aquifer are between 925 and 1517 feet deep; and Elmhurst–Mt. Simon aquifer wells are between 1870 and 1926 feet deep.

² Peaker plants use from less than 100,000 gallons per day to 2 MGD and operate for between 20 to 90 days per year. Their annual use ranges from 1.4 to 180 million gallons per year (Winstanley, 2000:154).

**Figure 5.2
Lake Michigan Water Allocation**



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Deep Bedrock Aquifer

The deep bedrock aquifers of northeastern Illinois are replenished from precipitation in Boone, McHenry, DeKalb, and Kane counties (Larsen, 1973:18). There is a subsurface, geologic groundwater divide that, generally speaking, is along the boundary between Boone and McHenry counties, and then angles to the southwest, passing underneath the far western edge of DeKalb County (Burch, 2002A: Figure 7, page 26). Water in the deep bedrock aquifers flows to the east and southeast away from this divide (Burch, 2002A: Figure 8, page 27; Visocky, 1997:25). The major recharge area for the deep aquifers of Lake County is McHenry County and the southeastern corner of Boone County. The rate of recharge for the deep aquifers in Lake County has not been studied (Meyer, 2001E).

The Illinois State Water Survey has provided a range of values for the practical sustained yield of the deep bedrock aquifer system in northeastern Illinois (the counties of Lake, Cook, DuPage, Grundy, Kane, Kendall, McHenry, and Will). The sustained yield ranges from 46 to 65 MGD (Illinois State Water Survey, 2000:18; Meyer, 2001A,B,E; Meyer, et al., 2000:1). This is a relatively small amount. The deep bedrock aquifers will not be a major source of water for Northeastern Illinois, including Lake County, as the region grows to 2020 (NIPC, 2001:49).

Hydrogeologists have known since 1959 that the deep bedrock aquifer is not capable of providing large amounts of water. In that year, the Illinois State Water Survey and Illinois State Geologic Survey issued a joint report that “recognized that withdrawals from the key aquifer, the Ironton-Galesville Sandstone, were outstripping the sustained yield of the aquifer. That is, ground-water mining had begun” (Burch and Hlinka, 1994:76 citing Suter et. al, 1959). The largest amount pumped from the deep bedrock aquifer was in 1979 when the eight counties withdrew 182.9 MGD (Meyer, 2001D; Visocky, 1997, cited in NIPC, 2001:39). The mining of the deep bedrock aquifer “dramatically slowed” when Lake Michigan water began to replace groundwater in the 1980s (Burch, 2001B; Burch and Hlinka, 1994:77).

If 65 MGD is considered the maximum sustained yield, then mining has been taking place at least since 1994 when the withdrawal from the deep bedrock aquifer system was 67.1 MGD.³ Withdrawals have resumed their steady increase every year between 1994 and 1999 (the latest year with figures). In 1999, 71.94 MGD were withdrawn from the deep bedrock aquifer (Burch, 2002A:Table 1, page 14).

In its 2001 *Strategic Plan for Water Resource Management*, NIPC assumed a reduction in the use of the deep aquifer system throughout the region to a practical sustained yield of 46 MGD (NIPC, 2001:40). Because the NIPC *Strategic Plan for Water Resource Management* is sensitive to the problem of mining, NIPC’s 2020 forecast for Lake County is 2.4 MGD from the deep aquifers. (The total amount of water forecast to be used by Lake County in 2020 is 102 MGD.) However, NIPC’s 2020 forecast may be too optimistic since Lake County withdrew 3.7 MGD from the deep bedrock aquifer system in 1998 (Meyer, 2001D); 3.90 MGD in 1999 (Burch, 2002A, Table 1, page 14; 2001A); and 3.5 MGD in 2001 (Winstanley, 2003). The Illinois State Water Survey has information indicating that withdrawals of as much as 15 MGD from the deep bedrock aquifer have been proposed for new development in Lake County (Winstanley, 2003).

The gradual increase in the amount of water withdrawn from the deep bedrock aquifer in recent years (up to 2003) has not had a major impact on the wells in Lake County. A 2002 report by the Illinois State Water Survey shows that for 43 deep aquifer wells in Lake County where

³ This amount includes the pumpage of municipalities, subdivisions, mobile home parks, institutions, and self-supplied industries. It does not include country clubs, individual domestic and rural residences, or farm supplies (Burch, 2002:5).

information was available, 24 had an increase in water elevation from 1995 to 2000; the water level elevation decreased in 18 wells; and it was unchanged in one (Burch, 2002A:Appendix A, pages 52-53). Even though the deep aquifers have not been mined to the extent they once were, and some wells have shown an increase in water in recent years, the conclusion of the Illinois State Water Survey is that “users are still removing groundwater from the deep bedrock aquifers faster than scientists’ best estimate of the rate at which nature can recharge them” (Burch, 2002A:35).

If the amount of water withdrawn from the deep bedrock aquifer in Lake County does increase by 15 MGD, and if the other counties in the region also increase their withdrawals, wells in the deep bedrock aquifer could again be impacted as they were in the 1970s and 1980s. Even though the shallow and deep aquifer systems are essentially disconnected by the local geology, the possibility remains that there could be regional impacts on the shallow aquifer system if major pumping—and mining—of the deep bedrock aquifers begins again. Impacts would be on shallow aquifers outside, and to the west, of Lake County in DeKalb and Boone counties (Winstanley, 2003).

Shallow Aquifers

The limited availability of water from Lake Michigan, the deep bedrock aquifers, and potentially the Fox River, leaves only one other, major source of potable water to be developed for the future needs of Lake County: the shallow aquifers.

The amount of water currently being withdrawn from the shallow aquifers is estimated to be about 8 MGD (Winstanley, 2003). The amount forecast to be withdrawn in 2020 is 32 MGD. The Illinois State Water Survey estimates that there *could be* 61.3 MGD available from shallow aquifers in 2020 and beyond (Meyer, 2000), but specific information on the size, extent, and rate of recharge is lacking. At some point before 61.3 MGD is reached, the water table would be lowered, causing some existing wells to go “dry.” It is also not known how large withdrawals from shallow aquifers will impact the stream flows and water levels of the surface waters that connect to the aquifers during *average* conditions (Meyer, 2001A, 2000; NIPC, 2001:40, 48, 49).

During a drought, the recharge rate will decrease, but the water demand may increase substantially. Illinois has had major droughts in the early 1900s, 1930s, 1950s, and 1980s. Based on the historical record of droughts, it is possible, perhaps probable, that a major drought will occur by 2020 (Winstanley, 2003).

More needs to be known about the shallow aquifer system in order to determine its practical sustained yield and the impacts of shallow groundwater development on existing wells and surface water resources. In particular, geologic mapping of the shallow aquifers is needed to identify important factors such as location, thickness, amount of water contained, contamination potential, rate of recharge, and the impact pumping will have on surface waters and other wells.

While it is known that the shallow aquifers are recharged by local rainfall and snowmelt (Larsen, 1973:18; Schicht, et al., 1976:2), the recharge rates of Lake County’s shallow aquifers have never been calculated (Winstanley, 2003). The impervious surface areas of development reduce the areas where water can enter the ground to replenish the shallow aquifers. Research is needed to determine the rate of recharge to the shallow aquifers; identify the remaining recharge areas; and determine the recharge areas that should be preserved in order for sufficient recharge of the shallow aquifers to continue.

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As reported in the Aquifer Recharge section of Chapter 4, Environmental Resources, Open Space, and Farmland, the Central Great Lakes Geologic Mapping Coalition is currently involved in a project to make three-dimensional maps of the surficial (shallow) aquifer system(s) of Illinois, Indiana, Michigan, and Ohio (Berg et al., 1999). Since the speed at which the mapping (in Lake County and throughout the four states in the Coalition) can be completed is directly related to the amount of federal funding provided to the project, it is not possible to provide a date for when the maps will be available (Berg, 2001). There are policies in this *Plan* to develop an aquifer protection plan before the maps are finished so protection will be ready for rapid implementation as soon as the maps have been completed.

What is known about shallow aquifers strongly suggests that the amount of water taken from them in Lake County should not be greatly increased until thorough studies have been completed. The reasons for caution include:

- Shallow groundwater resources and surface streams are hydraulically connected and withdrawal of water from the shallower systems is likely to have an effect on stream flow and wetlands (Illinois State Water Survey, undated:2).
- During a major drought, the water demand from the shallow aquifers will increase but the recharge rate will decrease. This will reduce the amount of water in the shallow aquifers and increase the impact on surface waters and wetlands connected to the shallow aquifers.
- It is not just a potential reduction in the amount of groundwater available to the natural surface waters that is a concern—water chemistry can be changed as well. A change in water chemistry can affect the aquatic systems (NIPC, 2001:54).

Additionally, the shallow aquifers are more susceptible to contamination than are the deep bedrock aquifers, which make the protection of recharge areas all the more important (NIPC, 2001:51-52; Meyer et al., 2000:2; Illinois State Water Survey, 2000:16).

Types of Water Systems Used In Lake County

Water supply systems used in Lake County range from private wells (private water systems) serving one, owner-occupied, single-family dwelling to public water systems supplying millions of gallons to thousands of people, in both residential and non-residential settings.

Public water systems include community (residential) and non-community (non-residential) water systems. Community water systems have at least 15 connections and serve at least 25 residents for at least 60 days per year. Some of these systems use water from Lake Michigan and some use wells in the shallow and deep bedrock aquifers. All these systems are regulated by the Illinois Environmental Protection Agency. Because of international law, the amount of water used by the community water systems that obtain their water from Lake Michigan is allocated and the amount used is monitored by the Illinois Department of Natural Resources.

Non-community water systems are public water systems that have at least 15 service connections used by nonresidents, or regularly serve 25 or more nonresident individuals for at least 60 days per year. Non-community water systems are regulated by the Lake County Health Department. All these systems obtain water from wells.

Semi-private water systems serve more than an individual, owner-occupied, single-family dwelling; but do not exceed the minimum thresholds established for public water systems. A private water system is a well serving a single-family residence. These systems are regulated by the Lake County Health Department. In Lake County all these systems are on wells.

Community Water System Ownership

There are over 100 community water systems in Lake County, about half of which are privately owned. Approximately 30 of the community water systems are on Lake Michigan water; only one of the privately owned systems receives water from Lake Michigan. The majority of the 310 wells in the system are in shallow aquifers (IEPA Source Water Assessment Program Mapsver, 2001).

Lake County: Through its Public Works Department, Lake County owns and operates 13 community water systems (CWS). Three of these systems use water from Lake Michigan and the other 10 systems use wells. Most of the wells are in shallow aquifers, there are a few in the deep bedrock aquifer, and one is in the Elmhurst–Mt. Simon aquifer.

Municipalities: There are 38 municipal (city or village) community water systems. Twenty-one of these obtain water from Lake Michigan while the remaining 17 use wells in the aquifer.

A municipality that does not have its own CWS may get its water from a nearby community water system, or it could obtain its water from private, semi-private, and non-community water systems.

Central Lake County Joint Action Water Agency (JAWA): JAWA is an independent water supply system that treats and transmits water from Lake Michigan. JAWA's membership consists of Lake County (through the Lake County Public Works Department) and the villages of Grayslake, Gurnee, Lake Bluff, Libertyville, Mundelein, Round Lake, Round Lake Beach, and Round Lake Park. Lake County's Knollwood-Rondout, Vernon Hills, and Wildwood water supply systems obtain water as part of JAWA. The Lake County Public Works Department delivers water to portions of the villages of Green Oaks, Mettawa, Third Lake, and Indian Creek. In 2000, JAWA supplied about 20 of the 50 MGD used in the County from Lake Michigan. JAWA is forecast to supply 30 MGD to a population of about 250,000 in 2020 (Injerd, 2001B).

Other Publicly Owned Systems: In addition to the Lake County and municipally owned systems, there are four other publicly owned systems: The Central Lake County Joint Action Water Agency (in this context, this is the treatment and transmission infrastructure of JAWA, not the member water systems listed above), Illinois Beach State Park, the Lake County Public Water District, and the Great Lakes Naval Training Station. These systems obtain their water from Lake Michigan.

Privately Owned Community Water Systems: There are over 50 privately owned, community water systems. Of these, only one uses water from Lake Michigan. In the majority of cases, the wells used in these systems are in shallow aquifers.

Non-Community Water System Ownership

According to the records of the Lake County Health Department (LCHD), there are about 450 non-community water systems which are supplied by one or more on-site wells (LCHD, 2001; Mackey, 2001B).

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Fifty of the County's municipalities have establishments served by non-community systems. The LCHD does not keep computer records on well depth, but the vast majority of the wells [perhaps all but five to eight (Mackey, 2001A)], of the non-community systems are in shallow aquifers. The 450 non-community systems serve about 85,000 people (LCHD, 2001). Since the LCHD is concerned with water quality, not quantity, records on the amount of water used are not kept.

Private and Semi-Private Water Systems

The Lake County Health Department estimates that there are about 30,000 wells in the County. There are no figures for how much water is used by these wells or how many people receive water from these systems. Well depth records are not kept, but most, perhaps all, of these wells are in shallow aquifers.

The Quality of Drinking Water

Contaminants may be present in untreated water from wells and Lake Michigan. These include:

- Microbial contaminants: Such as viruses and bacteria, which come from sewage treatment plants, septic systems, agricultural livestock operations, and wildlife;
- Inorganic contaminants: Such as salts and metals which can be naturally-occurring or result from urban stormwater runoff, industrial or domestic wastewater discharges, oil and gas production, mining, or farming;
- Organic chemical contaminants: These contaminants consist of synthetic organic chemicals (SOC) and volatile organic chemicals (VOC). SOCs include pesticides and herbicides. Nonpoint agricultural runoff appears to be the major source for SOCs. VOCs are byproducts of industrial processes and petroleum production. The major sources of VOC contamination appear to be chemical solvents used by, for example, dry cleaners, automotive service stations, and in metal finishing and fabricating. Gas stations and urban stormwater runoff can also be sources of VOCs (IEPA/Interagency Coordinating Committee on Groundwater, 1998, Chapter IV, Section 4);
- Nitrates: Agricultural uses and poorly functioning sewage systems are nitrate sources; and
- Radioactive contaminants: These can be naturally-occurring or be the result of oil and gas production and mining activities [Title 35: Environmental Protection; Subtitle F: Public Water Supplies; Chapter I: Pollution Control Board; Part 611, Primary Drinking Water Standards; Subpart U: Consumer Confidence Reports; Section 611.883, h) B) i – v].

Water Quality Testing of Community Water Supply Wells

The IEPA is required by the Safe Drinking Water Act (IEPA, undated:3) to monitor raw water quality in community water supply (CWS) wells. To meet this requirement the IEPA established and operates the Ambient Network of Community Water Supply Wells (CWS Network). The

CWS Network is Illinois' only statewide, systematic raw-groundwater sampling and testing program, with each well in the network getting sampled about every two years (IEPA, undated:3). The IEPA developed the network to: "provide an overview of the groundwater conditions in the Community Water Supply Wells in Illinois; provide an overview of the groundwater conditions in the major aquifers in Illinois; establish baselines of water quality within the major aquifers in Illinois; and evaluate the long term effectiveness of Clean and Safe Drinking Water Acts program activities in protecting groundwater in Illinois" (IEPA, undated:1). Using the CWS Network, water quality data will be tracked over decades.

Lake County has 25 wells in 16 CWS systems in the CWS Network (out of a total of about 310 wells in 100 CWS systems) (Konczyk, 2002A). The Lake County community water supplies and number of wells in the CWS Network are in Figure 5.3.

Raw water samples from the wells in the CWS Network are tested for nitrates and other inorganic contaminants (such as arsenic and mercury); organic contaminants including synthetic organic chemicals (SOC) (which include pesticides and herbicides) and volatile organic contaminants (VOC) [including benzene and TCE (tetrachlorethylene)]; and radioactive contaminants⁴ (IEPA/Interagency Coordinating Committee on Groundwater, 1998, Chapter IV, Section 4; 35 IL Adm Code Subtitle F, Section 620.410).

With one exception, nitrate is the only contaminant that has been detected in the Lake County wells included in the CWS Network. For the state as a whole, nonpoint agricultural sources appear to be the cause of the majority of nitrate contamination (IEPA/Interagency Coordinating Committee on Groundwater, 1998, Chapter IV, Section 4).

The highest nitrate amount detected in a Lake County well based on IEPA records was .33 mg/L, which is well below the established Groundwater Quality Standard (GWQS) of 10 mg/L (35 IL Adm Code Section 620.410). The reading of .33 was obtained in 1993. Later readings, including the most recent, which is from 1999, have been less than 0.01.

The other contaminant detected in a well in the CWS Network was dichloromethane (methylene chloride), a VOC identified as a carcinogen. Generally, the detection of methylene chloride is attributed to lab error, unless its presence is confirmed in subsequent samples. No confirming samples from the Towners Subdivision CWS or from the other wells where it has been recorded have been reported. VOC contaminants detected in Lake County wells are discussed below and summarized in Figure 5.4.

Other Water Quality Testing of CWS Wells

According to information supplied by IEPA, some of Lake County's community water supply wells were specifically monitored for VOC contaminants from 1985 to 1999 (information supplied by Konczyk, 2002B). VOC contaminants were found in 15 wells in 12 community water systems. One of the systems (Avalon MHP), which had one well, is now inactive. One other well is also inactive (Island Lake CWS) and three others have been abandoned (two wells in the Libertyville CWS and one well in the Park City MHP CWS).

⁴ When a new well is installed it has to be tested for microbiological organisms including fecal coliform, *E. coli*, *Cryptosporidium*, and *Giardia lamblia*.

Figure 5.3
Lake County Wells in the Ambient Network of Community Water Supply Wells
CWS NETWORK

Community Water Supply Name	Number of Wells	Well Depth in Feet¹
Alternative Behavior	2	280' and 312'
Barrington	2	210' and 305'
Countryside Manor Subdivision	2	242' and 1040'
Fields of Long Grove	2	259' and 980'
Glenkirk Campus South	1	390'
Grandwood Park	2	142' and 145'
Heiden Gardens Condominiums	1	1100'
Lake Villa	1	150'
Lake Zurich	3	1333', 1365', and 1373'
Paul's Mobile Home Park	1	204'
Pekara Subdivision	3	150', 155', and 280'
Saddlebrook Farms	1	250'
Towners Subdivision	1	280'
UTL INC Hilldale MNR WTR	1	123'
Wauconda	1	325'
Wynstone Water Company	1	1000'

¹This is the "Drilled Depth" of the well from the IEPA/SWAP records (2001)
 Source: Koneczyk, 2002B

The name of the community water system where VOCs have been detected, the date of the sample, the VOC contaminant, the amount of the contaminant in the sample, and the Groundwater Quality Standard (GWQS) for the contaminant are in Figure 5.4. The table also shows that the wells that have shown VOC contamination are all shallow, from 110 to 365 feet deep, and most of the contamination is in wells that are in confined aquifers. As shown in Figure 5.4 only two wells in Lake County have exceeded the GWQS limits: Fox Lake (well identification number 20006) and Towners Subdivision (20244).

Water Quality Testing of Private Water Systems

Owners of private water systems (a well for a single-family home) are not required to have their well water tested. The Lake County Health Department recommends that private water systems be tested annually because it is not uncommon for a well water sample to contain some coliform bacteria, even though the users of the well water may not be aware of any problems.

Reasons why a well may unexpectedly show contamination include:

- The well itself may be damaged or the cap may not seal properly, allowing the well to become contaminated by surface water runoff.
- Insects or other pests that make their way into a well can be a source of contamination.

- The contamination could have occurred during repair work to the well or to the plumbing system.

In virtually all cases of private well contamination, after the problem that allowed the contamination has been repaired, the water supply can be disinfected and will be safe to use (Mackey, 2003B).

Groundwater Contamination near the Wauconda Sand and Gravel Landfill Superfund Site

Private wells that are near areas of known groundwater contamination, such as homes near the Wauconda Sand and Gravel Superfund site, do need to be tested regularly. The Wauconda Sand and Gravel Superfund Site was a 46-acre municipal waste landfill that operated from 1955 until it was closed and covered in 1978. The landfill has approximately 3 million cubic yards of waste. Leachate from this site has contaminated Mutton Creek and the shallow sand and gravel aquifers. Contaminants identified in the groundwater include heavy metals, volatile organic compounds (VOCs), and pesticides (USEPA, 2002).

Recent test results from water samples collected from private water wells located around the Wauconda Sand and Gravel Landfill site indicate that the shallow groundwater aquifer system is also contaminated with vinyl chloride. The Lake County Health Department has recommended that residents near the site seek alternative sources of water; but unfortunately a public water supply is not available to most of the homes in the area. The Health Department will issue a permit for a new well that obtains its water from the contaminated aquifer provided the contaminants can be reduced to acceptable levels (Mackey, 2004). Monitoring wells and the private wells for the homes that are near the Wauconda Landfill Superfund site are continually sampled to check for contaminants.

Proposed water wells within 1/4 mile of any operating or closed landfill site will be evaluated by the Lake County Health Department for their potential for contamination. If warranted based on existing information, the Health Department may require the well to be drilled into a deeper aquifer (Mackey, 2003A). Owners of wells near known potential sources of groundwater contamination, such as landfills, should definitely have their water tested regularly.

Lake Michigan Water Quality Testing

From 1977 to the early 1990s, IEPA and the City of Chicago had a cooperative water sampling and reporting program to evaluate the “ecology and quality of water in Lake Michigan” (IEPA and the City of Chicago, 1993:8). The last report produced by this program, the *Lake Michigan Water Quality Report, 1989-1991*, was printed in 1993.

The Lake Michigan water quality testing program consisted of five surveys with 80 sample stations covering the shoreline from Gary, IN to Waukegan. Six of the 10 sampling stations in the North Shore Survey were along the Lake County coastline: off shore from Highland Park, Fort Sheridan, Lake Forest, the Great Lakes Naval Training Center, Waukegan, and Waukegan Harbor (IEPA and the City of Chicago, 1993: Figure 1, page 10; Appendix II-1, page 64).

Testing by Public Water Suppliers

Public water suppliers, which are agencies or companies that deliver treated water to the consumer, are required by law to test for the types of contaminants that are monitored through the

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CWS Network. In addition to the contaminants monitored in the CWS Network, public water suppliers have to also routinely test for microbiological organisms, and do additional testing for asbestos, lead, and copper which can be introduced through the distribution infrastructure. The chemicals used to treat the water also have to be monitored to ensure they do not build up and become contaminants themselves. The water suppliers have to report the results of these tests to their customers (35 IL Adm Code Sections 611.881, 611.885). Customers also have to be notified of any violations (35 IL Adm Code Section 611.901).

Water Conservation and Water Quality Protection

Regulations

In order to be able to obtain water from Lake Michigan, a water supplier has to agree to adopt and enforce the Lake Michigan Water Conservation Program. This program requires the supplier to adopt a plumbing code that includes:

- All new water service be metered (except for private or semi-private wells);
- All existing unmetered services be metered as part of any major remodeling;
- All new or replaced water-cooled air conditioning equipment be a closed system type;
- All lavatories for public use be equipped with metering or self-closing faucets;
- Unrestricted lawn sprinkling will not be allowed from May 15th to September 15th of each year; and

All new construction or repair or replacement projects must use water efficient fixtures that meet the following standards:

- Water closets, tank and flushmeter types: 1.6 gal/flush (6 liters/flush)

- Urinals, tank and flushmeter types: 1.0 gal/flush (3.8 liters/flush)

- Shower heads: 2.5 gallons per minute (9.45 liters per minute)

- Lavatory and sink faucets: 2.5 gallons per minute (9.45 liters per minute)

The Lake Michigan Water Conservation Program also requires the supplier to have an “unaccounted for flow” that does not exceed 8% of a water system’s total pumpage. Unaccounted for losses can be in pumping, transmission, distribution, and storage; they include water lost due to water main breaks; and they also include inaccurate water meters.

This *Plan* contains a recommendation that municipalities outside the Lake Michigan service area adopt a similar conservation program.

Best Management Practices

In addition to mandated conservation programs, there are numerous recommended practices that can voluntarily be used to conserve water, reduce runoff, and protect water quality. These are commonly called “Best Management Practices” or BMPs. Best Management Practices are techniques that can be utilized within an individual building, either residential or non-residential, or on the lot or parcel where the building is located. For larger areas, subdivisions and beyond, BMPs get incorporated into the principles of “Conservation Development.”

An example of a BMP for inside a building is a graywater plumbing system. Graywater is wastewater that is produced through domestic activities, excluding the wastewater from toilets and kitchen sinks. Through a separate system of plumbing pipes, graywater could be collected

and reused to flush toilets or used in the landscape irrigation system. The Sanitary Sewer section discusses effluent discharge from sewage treatment plants.

All development reduces groundwater recharge and creates urban stormwater runoff through removing existing vegetation; compacting, filling, or replacing the soils on the building site; and adding impervious surface. Anything and everything that can be dissolved by water will get picked up in urban stormwater runoff. If this nonpoint source pollution is not removed before the water enters the aquifer or a surface body of water (Lake County Stormwater Management Commission, 2000:124), the water can get contaminated. The cumulative impacts of urban stormwater runoff “pose significant water quality problems for the region” (NIPC, 2001:26).

The best management practices that are used outside a building are directed towards reducing the amount of runoff produced on a developed site and improving the water quality of the runoff that is produced (Lake County Stormwater Management Commission, 2000:225-228). BMPs basically attempt to reduce the amount of impervious surface area of a development and promote ways to filter and infiltrate (put back into the ground) the runoff that is produced (Lake County Stormwater Management Commission, 2000:292).

Examples of outside BMPs include: using natural landscaping that thrives in the local environment, with little or no pesticides, herbicides, fertilizer, or water beyond the natural precipitation (Lake County Natural Resources/Economic Development Task Force, 1998:6; Lake County Stormwater Management Commission, 2000:240); installing a rain garden; and when washing a car at home, park the car on the lawn; use a non-toxic, low phosphate soap; put a nozzle on the hose and use water sparingly (Lake County Stormwater Management, 2002B⁵).

For a residence, it may be practical to use permeable or porous paving for new or replacement driveways, walkways, and patios. Some types of permeable paving blocks are made with openings to be filled with soil, which can then be planted with vegetation. Paving blocks and porous pavement can also be used for some parking areas for nonresidential uses (Ewing, 1996:109, Lake County Stormwater Management Commission, 2000:240, 292).

Additional examples of BMPs and the advantages of using them are discussed in the Stormwater Management section of this chapter.

Conservation Development

The goal of conservation development is to protect open space and natural resources while allowing development to continue. Conservation developments allow the same density (residential) and intensity (non-residential) of development as is allowed under standard zoning, subdivision, and site design regulations but the buildings are clustered to protect natural resources and maximize open space. The principles of conservation development can be utilized in designing residential subdivisions and also for mixed-use developments (Lake County Stormwater Management Commission, 2000:255).

Using conservation development in a mixed-use context is especially important since it encourages putting jobs and housing close to each other (Ewing, 1996:17-51). In a conservation development clustering takes place in the less sensitive areas of the site, preserving the remainder for open space. The preserved open space helps protect surface waters and promotes aquifer recharge.

⁵ The Lake County Stormwater Management Commission has a selection of BMPs on its website: www.co.lake.il.us/smc/bmps.htm.

Figure 5.4
VOC Contaminants Detected in Lake County CWS Wells

CWS NAME (WELL ID NO. ¹)	SAMPLE DATE	VOC CONTAMINANTS IN SAMPLE	VOC AMOUNT in ug/L ²	VOC AMOUNT T in mg/L ³	GWQS in mg/L ⁴	WELL DEPTH (feet)	CONTAMINANT ON SUSCEPTIBILITY ⁵	CONFINED or UNCONFINED AQUIFER ⁶
Fox Lake (00220)	3/27/1997	1,1-Dichloroethane	1.50	0.0015	0.005	115	A2 - High	Unconfined
		1,1,1-Trichloroethane	2.60	0.0026	0.2			
Fox Lake (20006)	11/29/1988 ⁸	Benzene	9.00	0.009	0.005	135	A2 - High	Confined
		Dichloromethane (Methylene Chloride) ⁷	10.00	0.01	0.005			
Fox Lake Hills Subdivision (20009)	10/24/1988 ⁵	Tetrachloroethylene	1.00	0.001	0.005	126	E - Low	Confined
		1,1,1-Trichloroethane	10.00	0.01	0.2			
Holly Hoek Hill MHP (20228)	4/8/1987	1,1,1-Trichloroethane	2.00	0.002	0.2	126	B1 - High	Unconfined
		Methyl Tert-Butyl Ether (MTBE)	4.00	0.004	0.07			
Island Lake (00614)	5/17/1999	Methyl Tert-Butyl Ether (MTBE)	1.00	0.001	0.07	146	A2 - High	Confined
		Methyl Tert-Butyl Ether (MTBE)	3.00	0.003	0.07			
Rand Estates Subdivision (20229)	3/30/1987	1,1,1-Trichloroethane	1.00	0.001	0.2	365	E - Low	Confined
		Dichloromethane (Methylene Chloride)	1.00	0.001	0.005			
Tower Lakes (01144)	6/15/1999	Toluene	0.60	0.0006	1.00	280	E - Low	Confined
Towners Subdivision ⁸ (20244)	1/11/1999	Dichloromethane (Methylene Chloride)	6.80	0.0068	0.005	280	E - Low	Confined

¹ Well identification numbers are assigned by IEPA and are used in the Source Water Assessment Program (SWAP). The SWAP was removed from the IEPA web site after September 11, 2001.

² The amount of VOCs in raw water samples are in micrograms per liter (ug/L). A microgram is .000001 of a gram.

³ Since Groundwater Quality Standards - GWQS - are given in mg/L, the amount of contaminant has been converted from micrograms per liter to milligrams per liter. A milligram is .001 of a gram.

⁴ The maximum amounts of contaminants in the Groundwater Quality Standards are in Title 35: Environmental Protection; Subtitle F: Public Water Supplies; Chapter I: Pollution Control Board; Part 620, Groundwater Quality, Subpart D: Groundwater Quality Standards for Class I: Potable Resource Groundwater

⁵ "Susceptibility Code" is from "Potential for Contamination of Shallow Aquifers in Illinois," Illinois State Geological Survey Circular 532, and is based on the geology of the well's location.

⁶ From IEPA Source Water Assessment Program Mapper (SWAP).

⁷ Dichloromethane (Methylene Chloride) can be found as a contaminant due to lab error. Generally if there are no confirmation samples it is considered lab error (Konecnyk, 2002, April 25): No confirming samples have been reported.

⁸ This is the only well with VOC contamination that is in the CWS Network

In the built areas, the natural drainage system is retained as much as possible. Swales and natural depressions are used in stormwater management. This “green infrastructure” is landscaped with native species. The amount of impervious surface is limited. Permeable and porous paving materials are used for residential and nonresidential components. In nonresidential areas, parking lots should be designed to be shared between two or more users. Street widths are kept to a minimum. The setback requirement for homes is reduced so driveways can be shorter (Lake County Stormwater Management Commission, 2000:241-244).

An especially strong effort should be made to use best management practices in brownfields redevelopment and community revitalization projects. Even a vacant brownfield site can be expected to be relatively impervious (since the ground surface would have been altered for some earlier use) and a contributor of nonpoint source pollution for urban runoff. The importance of redeveloping brownfields is discussed in Chapter 6, Community Revitalization, of the *Plan*.

Conclusion

Lake County receives its water from two main sources: Lake Michigan and the shallow aquifers. Both sources are needed to support the current population and provide for future growth.

The amount of water withdrawn from the shallow aquifers will have to be increased significantly by 2020. Though detailed research is lacking, and greatly needed, the shallow aquifers are expected to be able to supply water to meet this demand. The Illinois Department of Natural Resources is confident that the 2020 population growth it forecasts for the Lake Michigan service area can be supplied from the lake without exceeding the allocation limits. After 2020, mining of the shallow aquifers should be expected unless the allocation of water from Lake Michigan is increased.

Mining of the deep bedrock aquifers is taking place, and additional growth in the region, including Lake County, should not take more water from this source. However, it must be kept in mind that in Illinois there are no state laws that regulate or restrict new wells from being drilled into this (or any other) aquifer, and the amounts withdrawn by existing wells can be freely increased (Meyer, 2001E).

Unless the amount of water Illinois can use from Lake Michigan is increased, future growth in Lake County (and the region) is dependent upon increasing the amount of water taken from shallow aquifers (Meyer et al., 2000:1). Unfortunately, an accurate accounting of the amount of water currently being removed, and the amount remaining (if any) before the sustainable limit is reached are unknown. The Central Great Lakes Geologic Mapping Coalition has begun the geologic mapping needed to obtain some of this information. However, the geologic mapping and groundwater flow modeling will take many years to complete, and at present there is no dedicated funding for this work (Berg et al., 1999).

The deep bedrock aquifers were over pumped in the 1960s and 1970s, causing water levels to drop and pumps to be lowered. The negative impacts of the Chicago area's intensive mining of the bedrock aquifers were felt in northeastern Illinois and southeastern Wisconsin. Illinois and Wisconsin jointly agreed that the amount of water being withdrawn from the deep bedrock aquifers had to be reduced. Consequently, Illinois asked the U.S. Supreme Court to modify the 1967 decree to permit a more efficient utilization of the 3,200 cfs diversion from Lake Michigan, by allowing more of the lake water to go for domestic uses. The request to amend the decree, thereby changing the way the 3,200 cfs was allocated, was approved by the Supreme Court in 1980, and is still in force today. As a result of the amended decree, the pumpage of the deep

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bedrock aquifers decreased, which enabled water levels in these aquifers to partially recover (Burch and Hlinka, 1994:77,83).

Today, if the shallow aquifers are pumped beyond their (presently unknown) sustainable practical yield, there is no backup. Caution is needed:

If historical precedent is any guide...decisions regarding development of the shallow aquifers will be made without an accurate understanding of the consequences of that development for nearby wells, for surface waters, and for the sustained large-scale viability of the resource.

Failure to consider the hydrologic consequences of groundwater development has historically led to depletion of both the deep bedrock aquifer system in northeastern Illinois (Visocky, 1997) and the shallow bedrock aquifer in DuPage County (Sasman, *et al.*, 1981). Both of these overdraft situations were partially corrected only after the inland communities substituted Lake Michigan water for their declining groundwater supplies (Meyer et al., 2000:1).

It is imperative for Lake County to join with other governments that share the surface and groundwater resources of the area, obtain the services and research capabilities of the agencies that study these resources, and, as rapidly as possible, discover how much water is available and determine how it can best be used to ensure its long term availability.

Goals and Policies⁶

5.1 Goal: Assure an adequate, sustainable supply of safe water.

- 5.1.1 Policy: Lake County supports expediting aquifer mapping in all ways possible including financial assistance to complete the aquifer assessment within five (5) years to provide a sound data base for future water protection.
- 5.1.2 Policy: Petition local, state, and federal delegations for funding of the research, mapping, and assessment projects needed to plan for an adequate, sustainable supply of safe water.
- 5.1.3 Policy: Petition the Illinois General Assembly to create a state water law to require a consumptive use permit for high capacity wells that produce 100,000 or more gallons per day or 70 gallons per minute and for wells supplying community water systems as currently defined, which criteria must include water conservation and protection of the local water supply.
- 5.1.4 Policy: In the best interest of all Lake County residents, the County and municipalities will adopt ordinances to require a community water resources plan.
- 5.1.5 Policy: Local governments should prepare aquifer recharge area and groundwater protection plans and ordinances that will consider, among other factors, land use and zoning, open space preservation, and Best Management Practices.
- 5.1.6 Policy: Incorporate aquifer protection objectives into public land acquisition decisions.

⁶ As stated in Chapter 1, Introduction, a Goal is “the desired result to be achieved by implementing the *Plan*,” and a Policy is “a general method or action designed to achieve a goal.”

- 5.1.7 Policy: Local governments should require that the capital costs for future water supply projects will be wholly supported financially by the users.
- 5.1.8 Policy: The Lake County Health Department will adopt a regulation that will require that any new private water well system be able to provide an adequate supply of water for the sanitary needs of the dwelling or use.

5.2 Goal: Protect ground and surface water supplies from contamination.

- 5.2.1 Policy: Promote federal and state legislation that would 1) establish a fee system to discourage polluting water sources, including pollutants that enter surface waters from the air; 2) provide fines and other appropriate measures when violations occur; and 3) enforce state permits through annual inspections.
- 5.2.2 Policy: Identify and reduce point and nonpoint sources of pollution to surface and groundwater quality. These sources include but are not limited to urban stormwater runoff, road runoff, agricultural runoff, septic wastes, surface waste disposal, and air deposition.
- 5.2.3 Policy: Join with other governments and academic institutions to develop a water quality research program on the distribution, fate, transport, and treatment of natural chemicals and contaminants in ground and surface water.
- 5.2.4 Policy: Identify and map groundwater contamination potential throughout the region around public water wells.
- 5.2.5 Policy: Incorporate aquifer protection objectives into land acquisition decisions.

5.3 Goal: Emphasize conservation and the wise management of water resources.

- 5.3.1 Policy: Lake County and the municipalities outside the Lake Michigan service area should implement the Lake Michigan Water Conservation Program which includes: 1) plumbing code requirements for metering water service, restricting lawn sprinkling, and water efficient plumbing fixtures; and 2) limit unaccounted for flow to no more than 8% of a water system's total pumpage.
- 5.3.2 Policy: Encourage the use of Best Management Practices and conservation development principles (as described in the text) for all new development including individual sites, residential and mixed-use subdivisions, and brownfield redevelopment/community revitalization projects.
- 5.3.3 Policy: Lake County will organize and hold periodic meetings of the owners/operators of the region's water distribution systems to exchange information on conservation, and encourage implementation of the efficient use of water, and good management practices.

5.4 Goal: Promote the wise use of Lake Michigan as a public resource.

- 5.4.1 Policy: Lake County will ensure that the community water systems under its control that use Lake Michigan water use the water efficiently and distribute it equitably to meet the County's current and future needs.

- 5.4.2 Policy: The County will work with federal, state, regional, and local agencies and groups to identify and then reduce sources that contaminate Lake Michigan.

Definitions

Aquifer: A saturated, permeable geologic unit that can transmit significant quantities of water under ordinary hydraulic gradients (Burch and Hlinka, 1994:75, citing Freeze and Cherry; 1979). Saturated (with groundwater) soils and geologic materials which are sufficiently permeable to readily yield economically useful quantities of water to wells, springs, or streams under ordinary hydraulic gradients [415 ILCS 55/3(b)]. Sand, gravel, other geologic materials capable of storing and transmitting significant quantities of water. In Illinois, aquifers are commonly found in bedrock (such as sandstone, dolomite, and limestone) and/or overlying unconsolidated deposits (such as sand and gravel) (NIPC, 2001:59). A body of earth materials that contains sufficient saturated permeable material to conduct groundwater and to yield significant quantities of water to wells and springs—includes (1) confined aquifers, in which flow of groundwater in subsurface units is restricted by low hydraulic conductivity of overlying units, and (2) unconfined aquifers, in which groundwater extends upward to the water table that marks the water pressure (head) of the groundwater (Berg et al., 1999:38).

Aquifer, Confined: An aquifer is confined when it exists between two formations of lower permeability such that the water in the aquifer is under pressure. Because of the pressure within a confined aquifer, water levels in a well drilled into the aquifer rise above the top of the aquifer. Wells in this type of aquifer are often called artesian wells. The water level in a well in a confined aquifer rises to a level above the top of the aquifer (Burch, 2002B).

Aquifer, Unconfined: Unconfined aquifers are those which are open to atmospheric pressure and may also be termed "water table" aquifers. Water levels in wells just penetrating the very top of an unconfined aquifer form what is termed the water table. Groundwater levels in unconfined aquifers occur within the aquifer body. These aquifers often recover after a heavy rainfall. Wells in unconfined aquifers are usually shallow and are at a greater risk for contamination, compared to those in confined aquifers (Burch, 2002B).

Aquifer System: A heterogeneous body of intercalated permeable and less permeable material that acts as a water-yielding hydraulic unit of regional extent—in surficial aquifers, a body of earth materials that includes an aquifer and lateral and overlying connected materials of the unsaturated (vadose) zone that contributes water to the aquifer within the surface—and groundwater drainage basin (Berg et al., 1999:38).

Shallow Aquifer: As used in the *Plan*, the label "Shallow Aquifer" will include the sand-and-gravel and shallow bedrock aquifers. This usage is consistent with that used in the Illinois State Water Survey's *A Plan for Scientific Assessment of Water Supplies in Illinois* (2001). While in general for northeastern Illinois the shallow aquifer is considered to be up to 749 feet below ground surface, in Lake County the deepest shallow aquifer well reported in the IEPA/SWAP program is 400 feet deep.

Shallow Bedrock Aquifer System: The shallow bedrock aquifer consists of an interval of weathered, principally dolomite, bedrock occurring roughly within 100 feet of the bedrock surface. Whereas the water-yielding capacity of the deep bedrock aquifer system is a function of intergranular porosity, the shallow bedrock aquifer system owes

its water-yielding capacity to weathering and dissolution of the rock material before glaciers entered the area (Meyer, 2001D).

Deep Bedrock Aquifer System: The deep bedrock aquifer system consists of a sequence of various rock types, but is principally sandstone and dolomite. The sandstones are the principal water-yielding units (Meyer, 2001D). Wells obtaining water from the deep bedrock system in northeastern Illinois would generally be between 750 and 1549 feet deep (Meyer, 2001C). In Lake County, wells in the deep bedrock aquifer reported in IEPA/SWAP are between 925 and 1517 feet deep.

Elmhurst–Mt. Simon Aquifer: Water in the Elmhurst–Mt. Simon Aquifer contains high concentrations of dissolved minerals and is essentially too salty for ordinary uses in the Chicago area. In northeastern Illinois, the Elmhurst–Mt. Simon is considered to begin about 1550 feet below the surface (Meyer, 2001C). The Lake County wells reported in IEPA/SWAP in this aquifer are between 1870 and 1926 feet deep.

Surficial or Unconsolidated Aquifer System: The unconsolidated system contains aquifers consisting mainly of sand and gravel deposits of glacial and post glacial origin which are interbedded in a very complex fashion with impermeable non-water-yielding clays, silts, and glacial tills (Meyer, 2001D).

Best Management Practices: Practices or programs that are used to prevent or reduce damage to natural resources, reduce flooding, conserve water, and protect water quality. BMPs used in urban areas may include stormwater detention ponds, restored wetlands, vegetative filter strips, porous pavement, and using native vegetation (based on Lake County Stormwater Management Commission, 2000:371).

Community Water Resource Plans: These plans would include a description of the available water sources, the impact of future growth on the supplies, conservation techniques to reduce water use, and strategies to protect aquifer and watershed areas (Tarlock, 1999:19, 22).

Community Water System (CWS): A public water system that serves at least 15 service connections used by residents or regularly serves at least 25 residents for at least 60 days per year (415 ILCS 55/9).

Groundwater: Any precipitation on the land surface that percolates down through the soil and reaches the water table or the zone of total saturation near the land surface (Burch and Hlinka, 1994:75). Underground water that occurs within the saturated zone and geologic materials where the fluid pressure in the pore space is equal to or greater than atmospheric pressure [415 ILCS 55/3(g)].

High Capacity Well: A well that produces 100,000 gallons or more per day; or 70 gallons or more per minute (Burch, 2002B).

IEPA/SWAP: The Illinois Environmental Protection Agency, Source Water Assessment Program Mapservers. The purpose of the IEPA/SWAP is to “assist with wellhead and watershed protection of public drinking water supplies” (IEPA, undated). Information collected through the IEPA/SWAP program includes the names and identification numbers of the community water systems (CWS), well identification numbers, well status, well depth, and the pumpage of the well. This information has been removed from the IEPA web site due to security concerns following September 11, 2001 (IEPA/Interagency Coordinating Committee on Groundwater, 2002). Information describing the program and contact information for the IEPA, Bureau of

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Water, Groundwater Section is on the IEPA web site and can be found at www.epa.state.il.us/water/groundwater/source-water-quality-program.html.

Mining Water: Extraction of groundwater at a rate exceeding recharge (NIPC, 2001:61). For any specific aquifer system, annual use that exceeds average annual recharge over a prolonged period (Illinois Department of Natural Resources, 1994:3).

Non-community Water System: A public water system which is not a community water system, and has at least 15 service connections used by nonresidents, or regularly serves 25 or more nonresident individuals for at least 60 days per year (415 ILCS 55/9).

Nonlithified Materials: Loosely aggregated, soft, or liquid mineral or organic substances, such as loose gravel, sand, silt, and plastic clay, commonly unconsolidated materials, that have not been cemented to form solid rock (Berg et al., 1999:39).

Nonpoint Source Pollution: Pollution that enters a water body from sources that cannot be defined as discrete points, such as rain, runoff from adjacent lands, or air deposition (NIPC, 2001:61).

Practical Sustained Yield: The amount of average annual recharge is the practical sustained yield of the aquifer (Burch, 2001B).

Private Water System: Any supply which provides water for drinking, culinary, and sanitary purposes and serves an owner-occupied single-family dwelling (415 ILCS 55/9).

Public Water System: A system for the provision to the public of piped water for human consumption, if the system has at least 15 service connections or regularly serves an average of at least 25 individuals daily at least 60 days per year. The term "public water system" includes any collection, treatment, storage, or distribution facilities under control of the operator of such system and used primarily in connection with such system and any collection or pretreatment storage facilities not under such control, which are used primarily in connection with such system (415 ILCS 55/9).

Rain Garden: A landscaped area planted with wild flowers and other native vegetation that replaces part of a lawn. A rain garden receives water coming mainly from a roof and then allows the water to slowly filter into the ground. Compared to the conventional lawn, a rain garden allows about 30% more water to be absorbed into the ground (Lake County Stormwater Management Commission, 2002).

Recharge: Replenishment of aquifers by water seeping from the land's surface down into the groundwater. Groundwater is recharged from rainwater and snowmelt or from water that seeps through the bottom of some lakes and rivers (NIPC, 2001:62).

Recharge Area: Location where the soil and geology permit rain and surface waters to infiltrate and thus replenish the groundwater (NIPC, 2001:62).

Semi-private Water System: A water supply that is not a public water system, yet which serves a segment of the public other than an owner-occupied, single-family dwelling (415 ILCS 55/9).

Surficial Materials: Nonlithified earth materials, such as loose gravel, sand, silt, and plastic clay, commonly unconsolidated materials, that overlie the solid bedrock surface—includes materials produced by chemical weathering (residuum) and surficial deposits produced by wind, water, gravity, and glaciers (Berg et al., 1999:40).

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Chapter 5

Infrastructure and Services

Sewage Treatment Systems

Significance

Safe treatment and disposal of human waste is essential for protecting public health and the environment. A variety of sewage treatment systems are used in Lake County, ranging in size and complexity from a “septic tank system” serving one, single-family home to publicly owned, central sewage treatment systems that treat waste water from hundreds of homes as well as businesses. An essential component in managing the County’s future growth is matching future land use designations with the appropriate type of sewage treatment system. Land use planning (including residential and nonresidential land uses), sewage treatment infrastructure planning, and environmental concerns have to be afforded equal importance in the consideration of sewage disposal.

Issues and Opportunities

- Most publicly owned, central sewage treatment plants in Lake County have capacity or can be enlarged to accommodate the forecast growth through 2020.
- It is more difficult to replace existing sewer pipes with larger ones when necessary than it is to enlarge or build a new sewage treatment plant.
- Experts disagree as to whether central sewer systems or onsite wastewater treatment systems (commonly referred to as “septic tanks”) protect public health and water resources better:
 - Publicly owned, central sewage treatment systems are regularly inspected by the Illinois Environmental Protection Agency to ensure that they are functioning properly.
 - Critics of publicly owned, central sewage treatment systems point out that these systems are expensive to build and maintain; if they malfunction they can release large amounts of untreated or insufficiently treated sewage; they produce large point source discharges of effluent; and they frequently take water out of one source and discharge it into a different one.
 - The Lake County Health Department considers properly managed and maintained onsite wastewater treatment systems (OWTS) as a desirable element of infrastructure planning that provides long term wastewater options to less densely developed areas, facilitates open space preservation, and helps recharge aquifers.
 - There is no regular inspection program for OWTSs for single-family residences. The cumulative impact to lakes and streams from a large number of improperly functioning systems can significantly harm water quality.

Analysis

Environmental Impacts of Sewage Treatment

Sewage disposal is one of the most important, complicated, and expensive issues that confronts urban governments. Malfunctioning sewage treatment systems endanger public health and cause environmental damage. Perfectly working sewage treatment systems can also be problematic.

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Sewage treatment involves removing solids from liquids. In one of the marvels of nature, microorganisms consume the organic waste solids, excreting what they can't digest as carbon dioxide. The liquid portion of the sewage is cleansed (which includes removing the bodies of the dead microorganisms). The treated liquid, called effluent, is discharged from a sewage treatment system in one of three ways: It can be released underground, sprayed onto the ground surface, or discharged into a surface body of water. The effluent from sewage treatment systems can be tested to ensure that it has been sufficiently cleansed to meet current health and environmental standards.

Malfunctioning sewage treatment systems can contaminate potable water supplies and water resources used for recreation. Improperly treated sewage containing human wastes can have viruses, bacteria, and parasites that cause disease. These pathogens can make well water unsafe to drink or cause beaches to be closed. Sewage can also put excessive amounts of phosphorous and nitrogen into surface waters where they promote algae growth. The algae remove oxygen from the water, which can stress or kill aquatic life. Sewage treatment systems that serve non-residential uses can have wastewater that contains toxic chemicals.

Sewer lines transporting raw sewage to a treatment plant spread contamination whenever they leak. Leaking sewer lines also allow floodwater to enter and mix with the sewage. The mixture of floodwater and sewage can back up into houses. If the volume that reaches a treatment plant exceeds the plant's capacity, partially treated and raw sewage can get discharged into surface bodies of water.

For all sewage treatment systems, solids remain after the effluent has been eliminated. There are health and environmental issues associated with the disposal of these sewage residue solids, which are called sludge in large sewage treatment systems and septage in septic tanks and other types of small volume household systems.

The septage that is removed from septic tanks and similar systems can be treated in large sewage treatment plants. However, this is not commonly done because it can disrupt the functioning of the plant. Most of the septage produced in Lake County is spread on agricultural fields in neighboring counties or Wisconsin. Thus the main problem is finding nearby agricultural fields where septage can be deposited and remain undisturbed until any pathogens have died off and chemical contaminants have been broken down. (Septage cannot be field applied in the winter.) As long as the amount of waste does not exceed what the field can handle, and the septage does not contain chemicals that cannot be broken down by natural processes, field application of septage is considered safe (Rezek, Henry, Meisenheimer and Gende, Inc., 1991).

Large sewage treatment systems using the best technologies produce the purest effluent. This is good because the effluent from the major sewage treatment plants in the County is discharged into the Chicago, Des Plaines, and Fox Rivers and their tributaries. However, there is a trade off, and this is that the contaminants that are removed during treatment are left behind in the sludge. The sludge from the major sewage treatment plants in Lake County is either taken to a landfill or applied to agricultural fields outside the County. Unlike effluent, sludge is not tested before disposal. Figure 5.6 has information on the rivers and tributaries that receive effluent and sludge disposal.

Types of Sewage Treatment Systems Used In Lake County

Several types of sewage treatment systems are used in Lake County:

Central Systems: As used in the *Regional Framework Plan*, central sewage treatment systems are only publicly owned. These are the largest systems in operation within the County. All the central systems in Lake County discharge their effluent into a surface water body.

Community Systems: A community system serves relatively large, residential, or mixed-use developments. All the community systems in Lake County are privately owned. The system is owned by the property owners in the development, and only properties within the development can connect to it. Effluent can be discharged into a water body or it can be land applied by spray irrigation. Lake Barrington Shores, a development within the Village of Lake Barrington, has a privately owned, community system that discharges into a water body; Saddlebrook Farms, in the Village of Round Lake Park, is served by a privately owned, community system that uses a land application, spray irrigation system.

In the future, there could be new, community sewage treatment systems that are owned publicly or by a publicly regulated agency (i.e., a regulated utility). These systems could be built in areas that have a high number of failing, single-family home septic tanks. Public community sewage treatment systems could also be built to serve new, relatively large residential or mixed-use developments.

Decentralized Systems: The County's existing decentralized systems serve non-residential uses that function as a single site (though a site can have more than one component, i.e., a gas station and restaurant). The decentralized systems are both publicly and privately owned. Examples of existing, publicly owned, decentralized systems include three public schools, a village hall, two golf courses, and a post office. Uses currently served by privately owned, decentralized systems include restaurants, truck stops and gas stations, a pharmaceutical manufacturing company, and a nursing home. The decentralized systems in operation discharge effluent into a water body or use soil absorption. One, Banner Day Camp, uses land application. In the future, it is possible that publicly or privately owned decentralized systems will be built to serve small residential developments.

Onsite Wastewater Treatment Systems: As used in the *Plan*, the term onsite wastewater treatment system (OWTS) refers only to a sewage treatment system used by one, single-family house.⁷ The most common type of OWTS is the familiar septic tank system.

Today, however, the majority of new OWTSs being installed in Lake County are not standard septic systems. Some new systems still use the basic anaerobic septic tank, but the discharged effluent receives additional treatment by being passed through peat or sand filters, or introduced into a constructed wetland. Another alternative is an aerobic treatment unit in which air is pumped into the collection tank where aerobic bacteria digest the organic matter (Montgomery, 1990:3-8; Smithson, 2002A).

⁷ There are a small number of cases in Lake County in which two or more detached, single-family homes have their sewage disposal systems connected, and use a shared septic tank and/or drain field. This arrangement is a decentralized system using the terminology presented here. A small, attached-unit, residential complex, such as a duplex or triplex, using a shared sewage disposal system would also be considered a decentralized system under this terminology.

Most septic tanks, and the newer types of OWTs, discharge effluent into the ground to undergo soil absorption; but a small number discharge effluent into a water body.

Figure 5.5 shows the types of systems used in Lake County and the range of effluent disposal methods.

**Figure 5.5
Sewage Treatment Systems in Use in Lake County**

Type of System and Ownership	Effluent Disposal Method		
	Surface Water	Spray Irrigation/ Land Application	Soil Absorption
Central—Public	Yes		
Community—Private	Yes	Yes	
Decentralized—Public	Yes		Yes
Decentralized—Private	Yes	Yes	Yes
OWTS—Private	Yes		Yes

Permitting and Inspections of Sewage Treatment Systems

Effluent Discharge to Surface Waters: Among other requirements, the 1972 Federal Clean Water Act (CWA) requires sewage to be treated to meet specific standards before the effluent is discharged into surface waters (Copeland, 1999A:3; Copeland, 1999B:1). Enforcement of the standards is done through a permitting system, which is called the National Pollutant Discharge Elimination System (NPDES). All publicly and privately owned sewage treatment systems that receive more than 1,500 gallons of sewage per day, with effluent discharge into a water body, must have an NPDES permit.

The Illinois Environmental Protection Agency inspects sewage treatment plants annually to ensure they are operating in accordance with the requirements of their NPDES permits. The items checked during these inspections include the amount of sewage processed during the reporting period, the remaining capacity of the plant, quantity or quality violations, the water body receiving the effluent, and sludge disposal.

Sewage treatment systems that handle less than 1,500 gallons per day and discharge effluent into a surface water body receive their permits from, and are regulated and monitored by, the Lake County Health Department. LCHD conducts inspections, which includes effluent sampling, of the approximately 75 systems it has located two times per year. As additional systems are discovered, they become subject to the Health Department’s inspection program (Lake County Health Department, 2002A:no page numbering; Smithson, 2002C).

Figure 5.6 identifies the water bodies that receive treated effluent from public and private sewage treatment plants. After the liquids are discharged, solid material known as “sludge” remains and has to be disposed of.

Figure 5.6
Sewage Treatment Plants: Receiving Water Bodies, Watershed, and Sludge Disposal

Plant Name	Public or Private	Receiving Water Body ¹	Watershed ²	Sludge Disposal ³
Clavey Road—NSSD	Public	Skokie River (Ditch)>Chicago River System	Chicago River	NSSD Owned Landfill, City of Zion
Deerfield WRF	Public	West & Middle Forks of the North Branch of the Chicago River	Chicago River	Agricultural Land Application
Des Plaines STP—LCDPW	Public	Aptakisic Creek>Des Plaines River	Des Plaines River	Agricultural Land Application
Diamond Lake STP—LCDPW	Public	Indian Creek>Des Plaines River	Des Plaines River	Agricultural Land Application
Eastwood Amoco STP	Private	Des Plaines River	Des Plaines River	No Information
Ferrite International Company	Private	Des Plaines River	Des Plaines River	No Information
Gurnee STP—NSSD	Public	Des Plaines River	Des Plaines River	NSSD Owned Landfill, City of Zion
IL State Toll Highway—Plaza 21	Public	Tributary>Des Plaines River	Des Plaines River	No Information
Libertyville STP	Public	Des Plaines River	Des Plaines River	Agricultural Land Application
Lindenhurst Sanitary District	Public	Hastings Creek>North Mill Creek>Des Plaines River	Des Plaines River	Agricultural Land Application
Lou Perrine's Gas and Groceries STP	Private	Des Plaines River	Des Plaines River	No Information
Maple Hill Nursing Home STP	Private	Tributary of Buffalo Creek>Des Plaines River	Des Plaines River	No Information
Mill Creek STP—LCDPW	Public	Mill Creek>Des Plaines River	Des Plaines River	Agricultural Land Application
Mundelein STP	Public	Des Plaines River	Des Plaines River	Agricultural Land Application
New Century Town STP—LCDPW	Public	Tributary>Des Plaines River	Des Plaines River	Agricultural Land Application
Wadsworth Commercial Development STP	Private	Des Plaines River	Des Plaines River	No Information
Waukegan STP—NSSD	Public	Des Plaines River	Des Plaines River	NSSD Owned Landfill, City of Zion
Antioch WWTP	Public	Sequoit Creek>Lake Marie>Chain-O-Lakes>Fox River	Fox River	Agricultural Land Application
Barrington STP	Public	Flint Creek>Fox River	Fox River	Agricultural Land Application
Fox Lake NW Regional WRF	Public	Pistakee Lake>Fox River	Fox River	Agricultural Land Application
Fremont School District #79 STP	Public	Slough area>Squaw Creek>Fox River	Fox River	Mundelein WWTP
North Barrington Elementary STP	Public	Flint Creek>Fox River	Fox River	Agricultural Land Application
Wauconda WWTP	Public	Slocum Lake>Tributary of Fox River>Fox River	Fox River	Agricultural Land Application
Barrington Hills Country Club STP	Private	Drainage ditch>water hazard at hole 15>Flint Creek>Fox River	Fox River	Wet Hauled to Fox River Grove Treatment Plant
Baxter Healthcare Corporation WWTP	Private	Tributary>Mud Lake>Long Lake>Fox Lake>Pistakee Lake>Fox River	Fox River	Landfill in Wisconsin
Glenkirk Campus North STP	Private	Ditch>Squaw Creek>Fox River	Fox River	Agricultural Land Application
Lake Barrington Shores STP	Private	Fox River	Fox River	Licensed Septage Hauler
Mt. St. Joseph Shelter Care Home STP	Private	Slough area>Flint Creek>Fox River	Fox River	Removed by Septic Hauler
Fox Lake—Tall Oaks STP	Public	Not Reported	Not Identified	Agricultural Land Application
Camp Henry Horner STP	Private	No Information	Not Identified	No Information
Camp Hickory STP	Private	No Information	Not Identified	No Information
Fireplace Restaurant	Private	Unnamed Wetland	Not Identified	No Information
St. Mary's of the Lake Seminary STP	Private	Small Creek>St. Mary's Lake	Not Identified	Agricultural Land Application
Toor Car & Truck Plaza STP	Private	No Information	Not Identified	No Information
Travel Centers of America WWTP	Private	No Information	Not Identified	No Information
Wadsworth Crossing STP	Private	No Information	Not Identified	No Information

¹ Information on Water Bodies is from IEPA Inspection Reports.

² 1994 *Lake County Framework Plan*, Figure 8-C, Lake County Drainage Basins, page 8-18.

³ Information on Sludge Disposal is from IEPA Inspection Reports.

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Most of the sludge is applied to agricultural fields, with the major exception of the North Shore Sanitary District that owns a landfill in the City of Zion where the sludge from its three plants is deposited.

Land Application/Spray Irrigation Systems: These systems are permitted and inspected by IEPA. Treated effluent is discharged into lagoons and from there used for spray irrigation. Sludge accumulation is minimal.

Soil Absorption Systems: OWTS for single-family homes and decentralized soil absorption systems discharge treated effluent below ground surface. All these systems receive permits from the Lake County Health Department. There is no regular inspection program for OWTS or decentralized soil absorption systems. The Health Department will investigate when problems are noticed or suspected.

Facility Planning Areas (FPA)

For sewer planning purposes, Lake County has been divided into 18 facility planning areas (FPAs) or sub-FPAs.⁸ Each FPA is controlled by one or more treatment authority/management agencies. For property within an FPA, publicly owned, central sewer service can only be obtained from the FPA's treatment authority. However, there is no requirement for a treatment authority to provide sewer service to the unsewered property within its FPA. If a property owner makes a request to the treatment authority to have sewer extended to a particular property, and the sewer authority denies the request, no other provider is allowed to enter the FPA to provide publicly owned, central sewer service to the property.

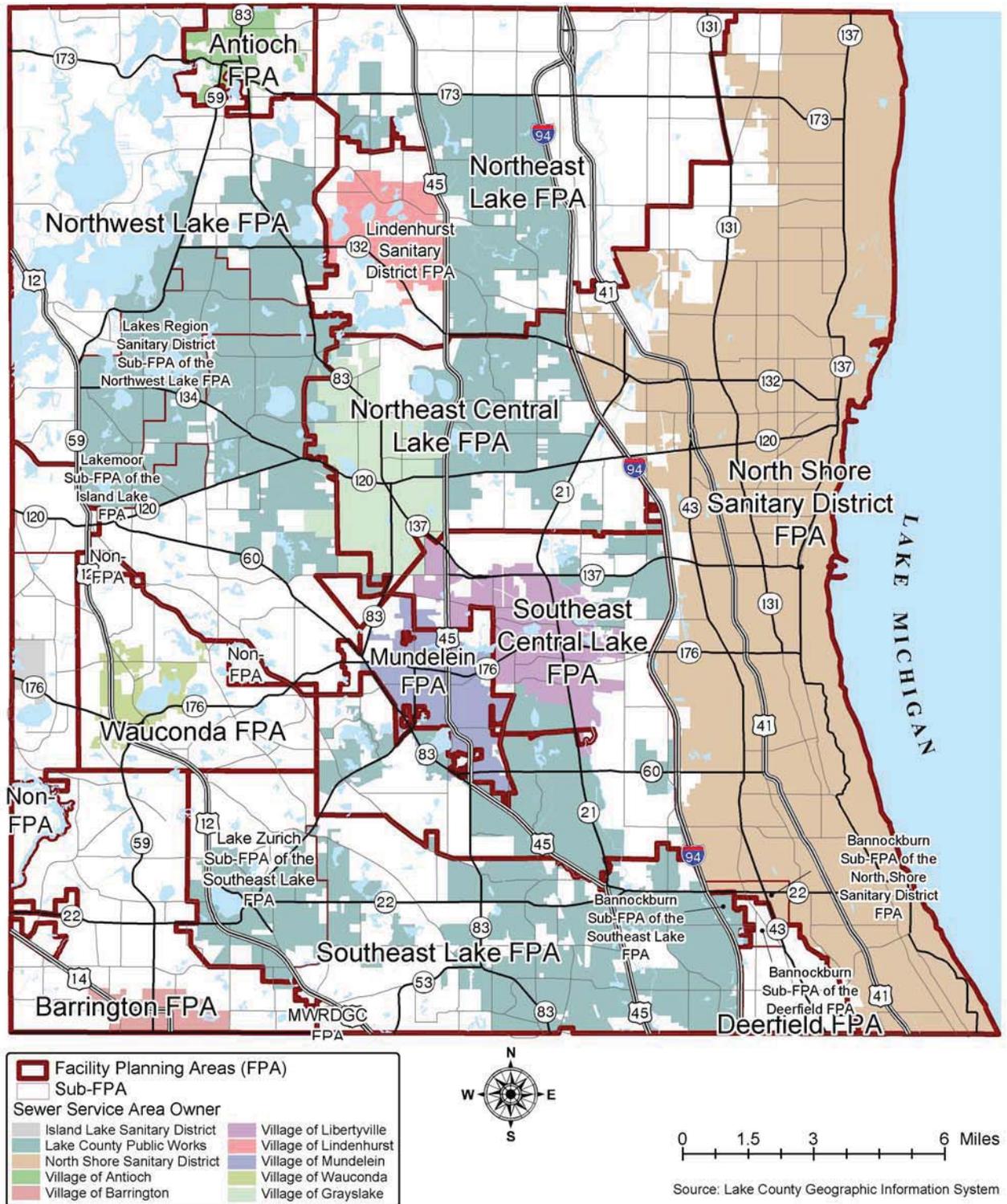
There is a procedure for amending FPA boundaries that allows property within an FPA to be transferred (through an FPA boundary amendment) to an adjoining FPA. Requests to amend the boundaries of facility planning areas are first presented to the Northeastern Illinois Planning Commission (NIPC) for its review. NIPC's reviews and recommendations are advisory, with the final authority over amendments remaining with IEPA (NIPC, 1996:v; 1999:1).

Another approach to getting a sewage treatment system when the FPA management authority will not provide service for either 1) a non-residential development, or 2) a residential subdivision where an OWTS for each house is either not possible or desirable, is to construct a privately owned, community or decentralized system. Approval to build one of these systems requires amending the "Illinois Water Quality Management Plan." Proposed amendments to the WQMP for the expansion of an existing sewage treatment plant or the construction of a new one are first presented to NIPC for its review. Several privately owned and operated, community and decentralized sewage treatment systems currently exist within Lake County, in municipalities and unincorporated areas.

FPA boundaries and areas of existing sewer infrastructure within the FPAs is shown on Figure 5.7.

⁸ With the exception of two small areas in Wauconda Township and one in Cuba Township, all land in Lake County is within an FPA. FPA boundaries do not follow city or village limits, so some cities and villages are in more than one FPA.

Figure 5.7
Sewage Service Areas



Publicly Owned Sewage Treatment Plant

The publicly owned, central sewage treatment plants that serve Lake County are listed in Figure 5.8:

**Figure 5.8
Publicly Owned, Central Sewage Treatment Plants**

1. Antioch WWTP	10. New Century Town
2. Barrington STP	11. Libertyville STP ¹
3. Deerfield WRF Village of Fox Lake	12. Lindenhurst SD STP
4. Fox Lake Northwest Regional STP ¹	12. Mundelein STP North Shore Sanitary District (3)
5. Fox Lake Tall Oaks STP	14. Clavey Road STP
6. Island Lake SD WWTF ² Lake County Department of Public Works (4)	15. Gurnee STP ¹
7. Des Plaines River STP	16. Waukegan STP
8. Diamond Lake/Sylvan Lake ³	17. Wauconda WWTP
9. Mill Creek	

Source: IEPA (McSwiggin, 2001)

¹Lake County Department of Public Works (LCDPW) has a contract to use these three sewage treatment plants

²The Island Lake WWTF is not located in Lake County

³Future plans of LCDPW include closing this plant

An important element of land use planning is knowing the location and available capacity of sewage infrastructure. For compact development served by publicly owned, central sewer, it is necessary to know what the treatment capacity of the sewage treatment plants is, how much unused capacity is available for future growth, and the location and capacity of the existing collection system.

For this update to the *Plan*, NPDES sewage system inspection reports from IEPA were obtained in August 2001. Most of these inspection reports have an analysis of the available capacity of the sewage treatment facilities.

When the IEPA inspection finds that a sewage system is nearing its capacity, thereby necessitating “close scrutiny” by IEPA to ensure that the issuance of additional connection permits will not cause a violation, the system is placed in the “Critical Review” category (35 Illinois Administrative Code 392.102). A facility may be placed on Critical Review when it is operating at 80% or more of capacity (35 Illinois Administrative Code 392.302).

When the IEPA determines that a plant has reached Critical Review status, the authority in charge of the sewage treatment plant is notified by the IEPA. The plant is then included in the Illinois Pollution Control Board Critical Review List, which is published in the *Environmental Register*, and updated quarterly. The Critical Review List is helpful for identifying plants that will need expansions or improvements in the near future. An amendment to the *WQMP* may be needed to expand an existing sewage treatment system (Ristau, 2002). Unless timely expansions or required improvements are begun, the plant could be placed on “Restricted Status.”

Restricted Status means that a sewer system has reached capacity and additional sewer connection permits cannot be issued because to do so would be a violation of the Clean Water Act (35 Illinois Administrative Code 392.102). Reasons a sewage treatment plant/sewage system may be placed on Restricted Status include: overloading, violations of the permitted effluent limitations, operational neglect, to prevent overflows of manholes or the plant's overflow devices, or to prevent basement backups (35 Illinois Administrative Code 392.202). Like Critical Review, facilities on Restricted Status are published in the *Environmental Register*.

The most recent edition of the *Environmental Register* with the quarterly Critical and Restricted Status Lists for sewage treatment plants is June 2003 (No. 588). Lake County facilities on these lists are shown in Figure 5.9.

Figure 5.9
Sewage Treatment Plants on Critical Review or Restricted Status

Facility Name	System Authority	Remaining PE ¹ Capacity	Status
Diamond Lake/ Sylvan Lake	Lake County Public Works Department	0	Critical Review
Antioch	Village of Antioch	1,539	Critical Review
Lindenhurst	Village of Lindenhurst	785	Critical Review
Wauconda	Village of Wauconda	Not Provided	Critical Review
Lake Barrington Shores (Private)	Lake Barrington Shores Homeowners Association	80	Critical Review

¹PE stands for Population Equivalent. One PE is 100 gallons of sewage per day.
Source: IPCB *Environmental Register* No. 588, June 2003

Figure 5.10 has information on the capacity of the publicly owned, central sewage treatment plants.

Publicly Owned, Decentralized Sewage Treatment Systems with Effluent Discharge into Water Bodies

In addition to the publicly owned, central sewage treatment plants there are three single-user public systems that discharge into water bodies and so are required to have NPDES permits. These are Fremont Secondary School, including the District #79 office in Mundelein; North Barrington Elementary School; and Illinois State Toll Highway Authority Plaza 21.

Publicly Owned, Decentralized Sewage Treatment Systems Using Soil Absorption

The largest publicly owned facility that is served with a decentralized, soil absorption septic tank system is Big Hollow School. The sewage treatment system for the school can treat 13,000 gallons per day. Other publicly owned systems include Emmons and Oakland Schools, Shepherd's Crook and Thunderhawk Golf Courses, the Fox River Preserve and Marina, the

**Figure 5.10
Rated and Existing Capacity of Lake County Owned and Contracted
Sewage Treatment Plants**

Name of Treatment Plant	Lake County Owned or Used by Contract	Design Average Flow (DAF) in MGD	Existing Average Flow or Hydraulic Loading MGD	Remaining MGD Capacity Based on DAF	Percent Capacity Used Based on DAF	Percent Capacity Available Based on DAF	IEPA Listed Status IPCB June 2003
Des Plaines River ¹	Owned	16.0	9.51HL	6.31	59%	41%	No
Diamond Lake/ Sylvan Lake ²	Owned	0.34	0.336HL	0.004	98.8%	1.2%	Critical Review
New Century Town/ Vernon Hills ³	Owned	4.0	2.71HL	1.29	68%	32%	No
Mill Creek ⁴	Owned	1.0	0.37AF	0.63	37%	63%	No
Fox Lake– Northwest Regional ⁵	Contract	9.0	6.1AF	2.9	68%	32%	No
Gurnee–NSSD ⁶	Contract	23.6	16.2AF	7.4	69%	31%	No
Libertyville ⁷	Contract	4.0	3.85AF	0.6	96%	4%	No

Rated and Existing Capacity of Municipality and NSSD Owned Sewage Treatment Plants

Municipality or North Shore Sanitary District (NSSD) Owned Name of Treatment Plant	Design Average Flow (DAF) in MGD	Existing Average Flow or Hydraulic Loading MGD	Remaining MGD Capacity Based on DAF	Percent Capacity Used Based on DAF	Percent Capacity Available Based on DAF	IEPA Listed Status IPCB June 2003
Antioch ⁸	1.6	1.567 AF	0.033	97.9%	2.1%	Critical Review
Barrington ⁹	3.68	2.27 HL	1.41	67.0%	33.0%	No
Clavey Road—NSSD ¹⁰	17.8	13.95 HL	3.85	78.0%	22.0%	No
Deerfield ¹¹	3.5	3.4 AF	0.1	76%	24%	No
Fox Lake—Tall Oaks ¹²	0.5	0.213 HL	0.287	42.6%	57.4%	No
Island Lake	2.0	N/A	1.1	55.0%	45.0%	No
Lindenhurst ¹³	2.0	1.0 HL	1.0	50%	50%	Critical Review
Mundelein ¹⁴	4.95	3.66 AF	1.29	74%	26%	No
Wauconda ¹⁵	1.4	1.107 HL	0.293	86%	14%	Critical Review
Waukegan—NSSD ¹⁶	22.0	18.6 AF	3.4	84.5%	15.5%	No

Source: IEPA Compliance Inspection Reports of Various Dates

¹ 2/23/01

² 7/17/97

³ 12/19/00

⁴ 3/01/00

⁵ 4/4/01

⁶ 7/18/00

⁷ 12/27/00

⁸ 7/20/01

⁹ 3/19/01

¹⁰ 8/3/00

¹¹ 9/17/99

¹² 1/28/99

¹³ 11/16/00

¹⁴ 12/21/00

¹⁵ 11/30/00

¹⁶ 6/15/00

Chain O’ Lakes State Park, the Waukegan Fire Department on North Greenbay Road, U.S. Post Office in Wadsworth, and the North Barrington Municipal Center (Smithson, 2002D; Smithson 2002E).

Privately Owned Sewage Treatment Plants

Privately Owned, Community and Decentralized Sewage Treatment Plants that Discharge Effluent into Surface Waters

There are 18 privately owned, community and decentralized sewage treatment plants that discharge into water bodies and therefore are required to have NPDES permits and be inspected by IEPA. Most of these are in unincorporated areas, but some are located within municipalities. The privately owned systems with NPDES are included in Figure 5.6.

The largest privately owned, sewage treatment plant belongs to the Lake Barrington Shores Homeowners Association. This community sewage treatment plant has a design average flow of 455,000 gallons per day, which has a population equivalent of 4,550. This system is on Critical Review (see Figure 5.9).

A diverse assortment of mixed-use developments, industries, businesses, and service providers also have private, decentralized, sewage treatment plants that discharge into surface waters. Examples include a country club and golf course (Barrington Hills Country Club 15,000 gpd DAF⁹); a pharmaceutical manufacturing company (Baxter Healthcare which processes sewage and wastewater associated with pharmaceutical manufacturing and plastic molding and forming); a combination gas station, “adult entertainment,” and motel establishment (Eastwood Amoco); a nursing home (Maple Hill Nursing Home); a full service truck stop with a 160 seat restaurant, gas station, 26 bay service station, eight showers, and a trailer dumping station (Travel Centers of America 30,000 gpd DAF); a manufacturer of electronic components (Ferrite International 375,000 gpd DAF); a center providing programs for infants, adults, and seniors with developmental disabilities (Glenkirk); and a seminary (St. Mary's of the Lake Seminary 30,000 gpd DAF).

Privately Owned, Community and Decentralized Wastewater Land Application/Spray Irrigation Systems

There are six wastewater land application facilities in Lake County, all of which are privately owned. Some are within municipalities and others are in the unincorporated County. The effluent is stored in sewage lagoons, and then is usually used for irrigation. Since there is no discharge to water bodies, NPDES permits are not required. IEPA inspects these facilities and requires that they be properly operated. IEPA considers this type of sewage treatment system to be as good as any other. These systems do not produce residual solids requiring disposal (Fellman, 2001). Wastewater land application systems cannot be used on some clay soils and some sandy/gravelly soils. They also cannot be used in areas with shallow, fractured limestone (Fellman, 2002B).

With the exception of Banner Day Camp, the privately owned, wastewater land application facilities in Lake County serve residential uses, including golf course communities. Elsewhere in Illinois this type of system is used for a variety of non-residential uses including a combined

⁹ Design Average Flow (DAF) is given in gallons per day (gpd) when this information is included in the IEPA Sewage Treatment Plant Inspection Reports.

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restaurant/truck stop/retail/motel facility, wastewater from a vegetable packing operation, and wastewater from a meat packing plant (Fellman, 2002B).

As shown in the table below, the size of the land application/spray irrigation systems in the County ranges from 25,000 gpd to 321,000 gpd (3,210 PE). However, one facility can be expanded to 492,000 gpd and another to 595,000 gpd (5,950 PE). Land application is probably not cost effective for systems larger than 500,000 gpd (Fellman, 2002B).

Figure 5.11
Land Application/Spray Irrigation Facilities

Facility Name	Location: Municipality or Unincorporated	Current Capacity in Gallons per Day	Potential Expanded Capacity GPD
Banner Day Camp	Lake Forest/ Unincorporated	25,000	N/A
Fields of Long Grove	Long Grove	33,000	N/A
Saddlebrook Farms Development	Round Lake Park	91,000	595,000
Sullivan Lake Development (Lakemoor Development Corp)	Lakemoor	321,000	492,000
Thorngate Country Club (Ivanhoe)	Ivanhoe/Unincorporated	87,100	N/A
Wynstone Property Owners Association	North Barrington	189,000	N/A

Source: Fellman, 2001

The effluent from these systems can be applied to most crops. In Illinois it has been used on turf and prairie grasses, hay fields, row crops grown for animal food, and trees and woodlands. The effluent has been used on a sweet corn field where the corn was grown for canning. This water is not recommended for crops for human consumption that are eaten raw, such as lettuce (Fellman, 2002A).

In some parts of the state, during droughts when farm ponds dry up, the water from the lagoons is commonly used for livestock watering (Fellman, 2002A).

Land application facilities are attractive to developers because they are easier to operate than other treatment systems. They may also be chosen when obtaining an NPDES permit will be difficult (Fellman, 2002B).

Privately Owned, Decentralized Sewage Treatment Systems Using Soil Absorption

There are no privately owned, decentralized sewage treatment systems using soil absorption currently operating in Lake County. A small residential development of 13 homes was approved for Lake Napa Suwe in Wauconda Township in April 2003. This development will be on a decentralized soil absorption system owned, operated, and maintained by the homeowners association (Smithson, 2002B).

Onsite Wastewater Treatment Systems

Unincorporated Lake County, and all municipalities within the County, allow the use of onsite wastewater treatment systems (OWTS). Onsite wastewater treatment systems, especially for single-family homes, are an important component of Lake County's sewage treatment infrastructure, treating about 10 million gallons of sewage per day (Lake County Health Department, 2002A). Though there are no accurate records, it is estimated that there are 30,000 OWTSs in Lake County, including those in municipalities and in the unincorporated County. About 650 new or replacement OWTSs are installed in the County every year (Lake County Health Department, 2002A:no page numbering).

The Lake County Health Department (LCHD) is the authority that regulates OWTSs countywide. The LCHD has to approve all new and replacement OWTSs installed in Lake County. Health Department approval is necessary for most repairs. In unincorporated Lake County, approval from the Engineering and Environmental Services Division of the Department of Planning, Building and Development is also required for new and replacement OWTSs and repairs.

The vast majority of the OWTSs in the County discharge the effluent below ground surface where it is absorbed by the soil. A small number of OWTSs release their effluent into surface water, either directly or through a conveyance structure such as a ditch. It is estimated that fewer than 10 new OWTSs that discharge into surface waters are permitted each year (Lake County Health Department, 2002B). The OWTSs that discharge into surface waters are inspected and tested semi-annually by the Lake County Health Department. There are about 75 of these systems in the County (Smithson, 2002C).

For some areas of Lake County, OWTSs are the only practical and desirable sewage disposal method for residential developments. Onsite wastewater treatment systems can be the best choice for low-density, residential communities when: 1) a central, community, or decentralized system is not economically feasible; 2) there is sufficient area for the absorption field(s) and there are no environmental concerns with the field(s); and 3) all other sewage treatment systems could increase pressure for higher density development that would change the desired character of the area.

There are many areas of the County where OWTSs are currently used and, in order to maintain the existing character of these areas, the residents oppose larger systems of any type because larger systems will allow, and probably encourage, development at urban level densities or intensities. For the areas that do not want to urbanize, OWTSs are a legitimate, desirable option that can help retain open space (some of which will be used for treatment and disposal)¹⁰ and conserve water resources, since the effluent will be discharged on site and can reenter the aquifer (Smithson, 2002G).

Factors that have to be considered before installation of an OWTS include the size of an individual parcel, slope, location in a floodplain, soil permeability, depth of the water table, distance to groundwater wells, and distance to surface water. Most, but not all, parcels that do not have access to some other type of sewage treatment system will be able to obtain approval from the LCHD to install an OWTS (Smithson, 2002F). However, there is no guaranteed right to an OWTS: If the LCHD determines that, because of a combination of the factors listed above,

¹⁰ In the case of a single-family house, the "open space" that is "used for treatment and disposal" is likely to be a "yard."

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installation of an OWTS may cause a public health problem, a permit to install the system will not be issued.

Unlike other sewage treatment systems there is no regular inspection program for OWTSs that use soil absorption. Onsite wastewater treatment system owners are responsible for the proper operation of their systems. It is unlawful for the owner of an OWTS to allow it to discharge improperly treated sewage or to emit offensive odors (Lake County Board of Health Ordinance, Article V, ISD-401.1). When an OWTS is not functioning properly and causing unsanitary conditions, the Executive Director of the Lake County Health Department (the Health Officer) or designated agent will issue an order that the problem(s) be corrected. Violations can be fined up to \$500 per day (Lake County Board of Health Ordinance, Article V, ISD-104.4; ISD-1501.1).

For a fee, the Lake County Health Department will evaluate the performance of an OWTS (Lake County Health Department and Community Health Center, 2000). These inspections are most commonly performed as a condition of obtaining a mortgage when property is purchased, but an inspection can be requested by a property owner at any time.

Maintaining a properly functioning septic tank, or other type of OWTS where solids collect in the bacteria processing chambers, requires periodic pumping to remove the septage. One of the difficulties that needs to be addressed is the disposal of the septage after it has been removed from these systems. The owners/operators of central sewage treatment plants are not required to accept and treat this septage, and most treatment plants in the County do not accept it. In addition, land application of OWTS septage in Lake County is nearly impossible. For OWTSs to continue to be a viable sewage treatment option for low-density areas, the County and municipalities need to develop a “Septage Management Program.”

Because OWTSs are going to continue to have a major role in Lake County, the Health Department is currently in the process of recommending significant changes to its OWTS permitting and inspection program.

The Health Department’s current permitting program is primarily based on a prescriptive code that emphasizes minimum distances and dimensions: a minimum thickness of soil between a drainfield and the water table is required; there is a minimum lot size; a minimum distance to nearby wells has to be maintained; there is minimum distance to a property line; a minimum distance to a surface body of water; a minimum size for the drainfield; etc. Other prescriptive items include construction requirements and material specifications.

The assumption underlying this type of code is that meeting the requirements will insure that a properly functioning OWTS will not contaminate water or soil or create risks to public health: “system performance is assumed as inherent with code compliance.” There is little, if any, testing of the prescriptive standards to determine if they provide the desired protection or, conversely, if they are excessive: “Actual or even expected performance is seldom defined, and rarely monitored” (Lake County Health Department, 2002A:no page numbering).

The approach being advocated by the Health Department is to adopt performance based standards that can be proven to be effective and offer these as an option along with the traditional prescriptive regulations. In performance based standards, the desired quality of the treated wastewater is specified. How an OWTS treats the wastewater so that it meets the standard is not rigidly required by a code, but is instead left up to system engineers and soil scientists to work out.

Performance based standards are founded upon the concept that a safe level of treatment can be scientifically determined, and that the technology available in advanced types of OWTS can

achieve these levels. Verifiable results are critical in performance based systems. A performance based program must therefore include mandatory inspections and testing of the systems after installation. Implementing mandatory inspections and testing is to be accomplished through a revocable operating permit.

Onsite wastewater treatment systems are already required to be inspected in certain situations. Health Department permits for advanced technology OWTs with mechanical pretreatment or treatment components (not merely a pump) presently require a maintenance agreement and proof that the system is regularly inspected by a qualified private sector technician. As already mentioned, the Health Department itself regularly tests OWTs that discharge into surface waters. In addition, mortgage companies commonly require inspections in order to obtain a loan.

The Health Department's proposed performance based program would include uniform inspection and testing requirements and standards. Health Department personnel would conduct the inspections, and there would be a certification process so that the inspections could be conducted by trained private service providers as well. The program would be financed by fees that would be collected when the initial permit is issued and each time it is renewed. Renewing a permit would require an on-site inspection and verification from an inspector that the system is functioning properly. The inspection and operational requirements of the permit would depend upon the complexity of the system, and an assessment of the health and environmental risks that would be created if the system were to fail. The permit to operate the system would be revoked if it is not renewed or if the system fails an inspection and the owner does not make the necessary repairs.

To reduce the number of failing septic tank systems, the permitting and inspection program should be applied to these systems as well. It is not practical to immediately include the 30,000 existing OWTs (mostly septic tank systems) in the program so a phasing approach is being suggested. Operating permits would initially be required when an existing septic tank system fails and is replaced with a new one, and for new septic tank systems installed for new developments. As soon as practicable, the operating permit program would be expanded to cover existing OWTs when property with an existing OWT is sold. Ultimately, after many years, virtually all OWT systems would be in the program.

The current prescriptive code can be used as a *de facto* zoning or land use tool. For instance, when minimum dimensions in the prescriptive code are large, small properties can't meet them. Soil types, distance to ground or surface water, or distance to a well could also be limiting factors that cannot be complied with on some "average" sized lots based on prescriptive requirements. Prescriptive codes can limit the development options for a site, including making the site unbuildable.

A comprehensive performance based code would expand sewage treatment options. The ability to have a sewage treatment system would be increased, with the major constraint likely being the cost of the system. Systems installed on more difficult sites, and in locations where failures pose greater health or environmental risks, will be expensive: The initial cost will be greater and there will be ongoing monitoring, maintenance, and inspection expenses. However, in exchange, a performance based code can allow development on sites that are unbuildable under prescriptive rules. Overall, the requirement for regular inspections, along with uniform testing standards, will better protect public health and the environment (Lake County Health Department, 2002A).

Planning Sewage Treatment Systems

The additional sanitary sewage generated in the County through the year 2020, and probably beyond, can be processed by the existing publicly owned, central sewage treatment plants, with

the understanding that most, if not all of them, will be expanded at some point. The greatest difficulty to increasing the area of the County served by publicly owned, central sewer is with the underground collection system. Installing new lines, or enlarging existing lines will be expensive, and likely controversial because expansions will expose new areas of the County to “high intensity” development pressures. Debate over which lines to extend/expand will have to include consideration of the impacts of the construction on community character and quality of life, public schools, the transportation network, and environmental resources.

There are privately owned, community and decentralized systems in the County that serve residential subdivisions and non-residential uses. The USEPA, IEPA, and Lake County Health Department consider community and decentralized systems equal to publicly owned systems in their ability to protect public health and the environment.¹¹ These privately owned, community and decentralized sewage treatment systems are inspected by IEPA, except for soil absorption systems that are under the jurisdiction of the Lake County Health Department. In some cases new community or decentralized systems may be preferable to either extending collection lines to connect properties to publicly owned, central sewage treatment plants, or having the residential development served by individual OWTs.

All sewage treatment systems safely process sewage when they are functioning properly. Unfortunately, when privately owned systems start to fail it can be difficult to get the responsible party to correct the problems. In a residential subdivision or private community, the owner of the sewage treatment system is likely to be the homeowners association. When the system begins to fail, the residents are collectively responsible for the repairs, which may be more expensive than they can afford. When these privately owned systems fail, legal, financial, and practical approaches to get the system fixed and properly functioning again in a timely manner are at best difficult to find, and may be nonexistent (Tindall, 2000:7). To avoid this problem of getting the responsible party to make repairs when they are needed, any new sewage systems built to serve a specific, new, relatively large residential or mixed-use development should be government owned or owned by a publicly regulated agency.

Community or decentralized systems should be investigated to see if they can be used in a retrofit role in areas with large numbers of failing septic tank systems. It may be possible to build new community or decentralized systems, which would be government owned or owned by a publicly regulated agency, to replace failing single-family residential septic tanks. The new systems would be paid for through “special assessments,” similar to how sewer extensions are funded. Fees (sewer bills) would be collected from the properties utilizing the system. Importantly, “the financial obligation applied to the sewage system would remain with the property as an assessment instead of becoming a personal obligation to the individual unfortunate enough to have been occupying a residence” when the septic tank system failed (Smithson, 2002G). Several types of community and decentralized systems are available which increases the possibility that retrofitting may be feasible.

These retrofit community or decentralized systems would be sized and located to serve specific, limited areas in order to correct or circumvent future problems with failing septic tank systems. Used in these situations, the community or decentralized systems solve the problem (existing or future) of failing septic tank systems in a way that does not invite additional growth. This is because the systems would be self-contained, and would not need long expanses of sewer pipe to attach them to a remote central sewage treatment plant. Proposals to build sewer pipes to reach distant areas can be strongly opposed by those who see these lines as magnets for development, constituting open invitations for development along their entire length.

¹¹ OWTs, community, and decentralized systems that discharge effluent into the ground may help recharge local aquifers; effluent discharged into surface water is transported outside the area.

Besides their retrofit roles, the *Plan* contemplates the construction of new community and decentralized sewage treatment systems under appropriate circumstances: 1) When in conformance with local planning objectives and the other provisions of the *Plan*, new community and decentralized systems could be used for residential and non-residential developments that cannot be served by the existing publicly owned, central sewage systems; and 2) Any newly constructed community or large decentralized systems should be government owned or owned by a publicly regulated agency.

Goals and Policies¹²

5.5 Goal: Promote the efficient utilization of, and plan for, the expansion of publicly owned, central sewage treatment systems.

- 5.5.1 Policy: Based on the Future Land Use designated in this *Plan*, the County will estimate the potential sewage generation from properties within the service areas of the publicly owned, sewage treatment systems to determine what types of infrastructure expansions will be needed to service these properties. These estimates will be based on land uses designated in this Regional Framework Plan for unincorporated areas and on obligations undertaken pursuant to intergovernmental agreement for municipal service areas.
- 5.5.2 Policy: For properties in unincorporated Lake County, publicly owned, central sewage treatment will not be extended into properties with a “low-density” or “low-intensity” future land use, as designated in this *Plan*, except that consideration may be given when a proposed development abuts an area that is already serviced; the proposed development is otherwise in full compliance with the density and land use assumptions of the *Plan*, and public sewer represents the best economic and environmental alternative for the provision of sewage treatment services to the proposed development; or when the extension is required pursuant to an existing contractual obligation.
- 5.5.3 Policy: For properties in unincorporated Lake County, the proximity of publicly owned, central sewage treatment will be considered a factor in determining zoning.
- 5.5.4 Policy: For properties in unincorporated Lake County, the County will provide sanitary sewer service within Facility Planning Areas (FPA) where the County is the management agency to new developments that meet the following guidelines:
- a. The County-owned system has existing capacity based upon current actual and committed flows into such system, or can be expanded at developer expense;
 - b. The proposed development can be adequately served by other types of public services and infrastructure with capacity, or that can be expanded at developer expense;
 - c. The proposed development protects and enhances the natural environment, and maintains community character; and
 - d. The proposed development is consistent with the local comprehensive plan and this *Plan*.

¹² As stated in Chapter 1, Introduction, a Goal is “the desired result to be achieved by implementing the *Plan*,” and a Policy is “a general method or action designed to achieve a goal.”

5.5.5 Policy: The County will only provide new sanitary sewer service to properties within a municipality or sanitary district to the extent that the County Board authorizes the allocation of available or contemplated resources for such services. Such determinations shall be memorialized in an intergovernmental agreement.

5.5.6 Policy: Encourage public agencies and institutions to locate new facilities where they can be connected to a publicly owned, central sewage treatment system.

5.5.7 Policy: The County will only support transferring land from a Facility Planning Area (FPA) where the County is the management authority to another FPA, or amendments to the “Illinois Water Quality Management Plan,” when contractually obligated or for developments which meet the following guidelines:

- a. The receiving FPA’s public central treatment system has existing capacity to serve existing development within the FPA and meet the obligation to serve existing special service areas and meet other legal contractual obligations, or can be expanded at developer expense;
- b. The proposed development can be adequately served by other types of public services or infrastructure with capacity, or that can be expanded at developer expense;
- c. The proposed development protects and enhances the natural environment, and maintains community character; and
- d. The development is consistent with this *Plan*.

5.6 Goal: Provide sewage treatment systems in a manner that best protects the public health, promotes the efficient utilization and appropriate allocation of public infrastructure investments, promotes desirable land uses, protects the natural environment, and maintains community character.

5.6.1 Policy: For properties in unincorporated Lake County, it is preferred that new development located within 500 feet of a publicly owned, central sewage treatment system utilize the system when the sewage treatment system has available capacity or is planned to be expanded and will have adequate capacity.

5.6.2 Policy: Allow “low-intensity” residential developments to utilize onsite wastewater treatment systems as permitted by the Lake County Health Department.

5.6.3 Policy: Allow new, government owned or owned by a publicly regulated agency, community or decentralized sewage treatment systems for developments that utilize creative designs consistent with 1) conservation subdivisions, 2) mixed-uses, or 3) clustering, provided that the proposed development is consistent with the local comprehensive plan and this *Plan*.

5.6.4 Policy: Discourage the installation of new, privately owned community or decentralized sewage treatment systems for new developments. Consideration may be given when the operation and maintenance of the system is adequately addressed through deed restriction, long-term maintenance agreements and bonds, or some other means that will ensure the safe operation of the system for the life of the development.

5.7 Goal: Reduce the failures, and limit the negative impacts from failures, of publicly and privately owned central and decentralized sewage treatment systems.

5.7.1 Policy: The County and municipalities should only approve developments utilizing new privately owned, community or decentralized sewage treatment systems when the sewage treatment systems are designed and built with adequate back up systems and a minimum redundancy treatment capacity of 100%.

5.8 Goal: Natural and cultural resources will be protected from any adverse effects created by expansions to the publicly owned sewage treatment infrastructure.

5.8.1 Policy: The County will review all applications for FPA amendments or amendments to the “Illinois Water Quality Management Plan,” regardless of the management authority submitting the request. The effects of urbanization on water quality, flooding, and the increase in the amount of effluent discharged into surface water bodies must be adequately considered in the application or the County will recommend that the application be denied.

5.8.2 Policy: The County and municipalities should appropriately protect, preserve, or mitigate all environmentally, culturally, and archaeologically sensitive areas, and agricultural preservation areas that would be impacted by sewer infrastructure expansions.

5.9 Goal: Eliminate existing, failing onsite wastewater treatment systems (OWTS).

5.9.1 Policy: Lake County will develop a strategy to identify and eliminate failing OWTS as required by the National Pollutant Discharge Elimination System, Phase II Program adopted by the United States Environmental Protection Agency and administered by the Illinois Environmental Protection Agency.

5.9.2 Policy: The Lake County Health Department will create a risk assessment model to identify areas with large numbers of failing OWTS and areas where large numbers of failures are likely to occur in the future.

5.9.3 Policy: Lake County will adopt “performance based design” standards for OWTS that protect public health and the quality of groundwater and surface waters.

5.9.4 Policy: The Lake County Board and other local governments will apply for Clean Water–State Revolving Funds (CW-SRF) to provide alternate sewage treatment options for areas with high concentrations of failing septic tanks.

5.9.5 Policy: Where environmentally sound and financially feasible, failing OWTS should be repaired, replaced on site, or connected to a publicly owned, central sewage treatment system.

5.9.6 Policy: A government owned or publicly regulated agency owned community or decentralized sewage treatment system will be considered for an area within the unincorporated County with failing OWTS when extending a publicly owned, central sewage treatment system would be: 1) technologically or economically impractical; 2) detrimental to the community character; or 3) not in conformance with other relevant provisions of the *Plan*.

5.9.7 Policy: The type of community or decentralized system will be determined on a case by case basis. The treatment capacity of any proposed government owned or publicly regulated agency owned community or decentralized sewage system will

be limited to serve the existing development and only additional desirable future development, if any, consistent with this *Regional Framework Plan* and the local comprehensive plan, as well as any pre-existing obligations of the County.

5.9.8 Policy: The County will establish a task force with membership to include elected County and municipal officials, Lake County Health Department, Lake County Public Works, municipal public works staff, and septic tank pumpers to develop a Septage Management Program for the County.

5.10 Goal: Reduce the failures of existing and future onsite wastewater treatment systems (OWTS).

5.10.1 Policy: The Lake County Health Department will establish an owner education, maintenance, and permit system that will include the issuance of a renewable, revocable operating permit for new and replacement OWTS.

5.10.2 Policy: Lake County will publicize the renewable, revocable operating permit system to be established by Policy 5.10.1. Information will be distributed to realtors and mortgage lenders so that a buyer of a property with an OWTS will be aware of the requirement for an operating permit.

5.10.3 Policy: The Lake County Health Department will develop a program to license OWTS inspectors and service providers.

5.10.4 Policy: The Lake County Health Department will certify interested municipalities to inspect their own OWTS, provided the municipality meets the minimum standards set by the County Health Code.

Definitions

Central Sewage Treatment System: Central sewage treatment systems are the public systems owned by Lake County, villages and cities, and the North Shore Sanitary District. All the publicly owned central sewage treatment systems in Lake County discharge effluent into surface waters and thus are required to have National Pollutant Discharge Elimination System permits from the Illinois Environmental Protection Agency.

Community Sewage Treatment System: The existing community systems are privately owned and serve relatively large residential or mixed-use developments. Community systems are installed as part of a specific development and are limited to serving only the properties included in that development. The community sewage treatment systems in use in Lake County include some that discharge into surface waters and some land application/spray irrigation systems. The existing community sewage treatment systems in Lake County are privately owned. We prefer future community treatment systems to be public: either government owned or owned by a publicly regulated agency (i.e., a regulated utility).

Decentralized Sewage Treatment System: Decentralized sewage treatment systems are defined by relative size: They are smaller than central and community systems but serve more than one single-family home. Decentralized systems can be publicly or privately owned. Existing decentralized systems discharge effluent into water bodies, use soil absorption, and land application/spray irrigation. In Lake County, existing decentralized systems serve a single site: In some cases the site has a single user, such as a post office, golf course, or public school; in other cases, the use has two or more components, a restaurant and a gas station, for instance.

Sharing any portion of a sewage treatment system by two or more detached homes is considered to be a decentralized system. All attached housing (two or more connected units) are considered to be on decentralized systems. Future decentralized systems, publicly or privately owned, could be built to serve small residential developments of detached, single-family homes.

Design Average Flow (DAF): The maximum amount of sewage a sewage treatment plant can process in a day without having to use overflow facilities.

Effluent: Any wastewater discharged, directly or indirectly, to the waters of the state or to any storm sewer, and the runoff from land used for the disposition of wastewater or sludge, but does not otherwise include nonpoint source discharges such as runoff from land or any livestock management facility or livestock waste handling facility (35 Illinois Administrative Code 301.275).

Facility Planning Area: “In Illinois, a facility planning area is the area where a designated management agency—frequently a municipality or sanitary district—may offer centralized sewer service” (Acker, 2001:1).

Hydraulic Loading: Sewage treatment plants are designed and engineered to process a certain maximum volume. Hydraulic loading refers to the gallons of sewage a treatment plant takes in during a specified amount of time, compared to the plant’s maximum capacity. Hydraulic loading is a measurement of “how full” a sewage treatment plant is at a particular time.

Onsite Wastewater Treatment System (OWTS): As used in the *Plan*, the term “onsite wastewater treatment system” refers only to the privately owned, sewage treatment systems that serve one single-family home. These systems are commonly referred to as “septic tank systems,” though other methods of sewage treatment can be used in onsite wastewater treatment systems.

Population Equivalent: A term used to evaluate the impact of industrial or other waste on a treatment works or stream. One population equivalent is 100 gallons (380 l) of sewage per day, containing 0.17 pounds (77g) of BOD₅ (five-day biochemical oxygen demand) and 0.20 pounds (91g) of suspended solids. The impact on a treatment works is evaluated as the equivalent of the highest of the three parameters. Impact on a stream is the higher of the BOD₅ and suspended solids parameters (35 Illinois Administrative Code 301.345).

Sanitary Sewer: A sewer that carries wastewater together with incidental land runoff (35 Illinois Administrative Code 301.375).

Septage: The liquid and solid material pumped from a septic tank, cesspool, or other primary treatment source (United States Environmental Protection Agency, 1999). Liquid and solid material removed from domestic septic tanks or other approved pretreatment systems, and specifically excluding wastes from portable toilets, holding tanks, grease traps and sewage treatment plant sludge material (Lake County Board of Health Ordinance, Article V, adopted November 12, 1996).

Sewage: The total organic waste and wastewater generated by residential and commercial establishments (Illinois Environmental Protection Agency 1999:30). Water-carried human and related wastes from any source (35 Illinois Administrative Code 301.385).

Sewer: A stationary means of transport or stationary system of transport, excluding natural waterways, constructed and operated for the purpose of collecting and transporting wastewater or land runoff, or both (35 Illinois Administrative Code 301.390).

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Sewerage: A system of pipes used for the collection of sewage from residential and commercial establishments (Illinois Environmental Protection Agency 1999:30).

Sludge: Any solid, semisolid, or liquid waste generated from a municipal, commercial, or industrial wastewater treatment plant, water supply treatment plant, or air pollution control facility or any other such waste having similar characteristics and effects (35 Illinois Administrative Code 301.395).

Wastewater: Sewage, industrial waste, or other waste, or any combination of these, whether treated or untreated, plus any admixed land runoff (35 Illinois Administrative Code 301.425).

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Chapter 5 Infrastructure and Public Services Stormwater Management

Significance

Before agriculture, and then urban development, the County's streams and floodplains served as a natural stormwater conveyance and storage system. Urban development converts the permeable ground surface of nature into impervious buildings, pavement, and landscapes dominated by yards of non-native turf grass, thereby increasing the volume of stormwater runoff. Due to this increase in the volume and rate of stormwater runoff, the modifications made to the natural drainage system, and unwise development in floodprone areas, Lake County is particularly vulnerable to flood damage and flood related economic disruptions.

Rain falls and snow melts but the urban environment has lost a great deal of its original ability to absorb the water. Instead the flow of surface water off the landscape is accelerated by collecting runoff from rooftops, parking lots, streets, and lawns and concentrating it in curb and gutter storm sewer systems that transport it—directly or indirectly—to lakes, rivers, and streams. As stormwater flows across the ground it picks up contaminants. Polluted stormwater runoff is the major cause of water quality problems in the United States today. Surface waters, as well as aquifers, are vulnerable to contamination from urban stormwater runoff.

The purpose of a stormwater management system is to manage surface drainage, minimize the pollutants that are deposited in surface and groundwater resources, and reduce the potential for flood damage. To do this, the natural drainage system, which includes streams, lakes, and wetlands, is used along with engineered, man-made structures.¹³ This complex stormwater system, with its natural and man-made components, should be recognized as being as much a part of the overall infrastructure network as are roads, sanitary sewers, and utility lines.

As development occurs, the amount of stormwater runoff will increase unless development standards that reduce impervious area, increase infiltration, and ensure that appropriately-sized stormwater storage structures are provided throughout the County. The County's stormwater management system has to cope not only with the runoff from new development, but also provide solutions to problems that began before the importance of managing stormwater was understood.

Issues and Opportunities

- Historically, agricultural development and urbanization have reduced the landscape's ability to absorb precipitation, degraded the water quality in streams and other surface waters, and caused flood damages.
- The Lake County Stormwater Management Commission, which was formed in 1989, is the agency with primary responsibility for developing and coordinating the countywide stormwater management program; SMC relies on local governments and other partners to implement most of the program.
- Flooding, which is a natural process under normal conditions, now creates public health and safety risks, causes property damage, and disrupts the economy. Annually, flooding causes millions of dollars in losses in Lake County. Comprehensive flood planning and

¹³ Water bodies, floodplains, and wetlands, are discussed and mapped in Chapter 4, Environmental Resources. Subsurface aquifers are discussed in the Water Supply section of this chapter.

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- response services, which include pre-flood mitigation, emergency flood response, and post-flood recovery, are lacking throughout the County.
- Impervious area inhibits infiltration and causes more stormwater to be converted to runoff. The pollutants that accumulate on impervious surfaces are washed into surface waters or are absorbed into the ground.
 - The amount of impervious area and runoff can be quantified and controlled through land use, zoning, and land development regulations.
 - As of March 2003, Lake County, and most of the townships, cities, and villages in the County are required by Phase II of the National Pollutant Discharge Elimination System (NPDES II), to have a permit for most small municipal separate storm sewer systems (MS4) (see **Definitions**). The purpose of NPDES II is to improve water quality in surface and groundwater resources by reducing pollution from urban stormwater runoff.
 - Many developments that were approved before adequate stormwater regulations were in place have no, or inadequate, stormwater management systems.
 - The stormwater management systems in many developments are failing due to lack of maintenance and repair.

Analysis

Stormwater management practices seek to reduce stormwater runoff pollutant loads, protect stream channels, maintain the amount and quality of groundwater recharge, prevent increased overbank and depressional area flooding, and safely direct and disburse flood water (Schueler and Holland, 2000A:131-132). A stormwater management system has both a natural and man-made component: It is the collection of natural features and man-made facilities through which stormwater is temporarily stored and then conveyed to the nearest receiving river or lake.

The Lake County Stormwater Management Commission

The need for comprehensive stormwater management planning to develop and implement an effective system in Lake County became apparent following the 1986 and 1987 floods. A Stormwater Management Planning Committee, the predecessor of the Stormwater Management Commission, was formed in 1987. The Committee successfully worked with state legislators for legislation that allowed the County to develop countywide stormwater management programs and regulations. The Stormwater Management Commission is an independent governmental entity, authorized by the state of Illinois (55 ILCS 5/5-1062). The SMC Board of Commissioners consists of six municipal representatives, either mayors or village presidents, and six Lake County Board members.

SMC's Mission Statement is to "Provide desired community services toward the primary goals of flood damage reduction and surface water quality improvement" (SMC, 2002B: 1-5). The SMC has the authority to adopt and enforce regulations for watershed management, including stormwater runoff controls; adopt and implement a countywide, comprehensive stormwater management plan, including sub-watershed plans; and levy an annual property tax to fund the development and implementation of the comprehensive plan (SMC, 2002B:1-4).

SMC's stormwater management regulations covering proposed developments are in the Lake County Watershed Development Ordinance (WDO). The WDO was adopted in 1992 and has been amended periodically. The purpose of the WDO is to establish reasonable rules and regulations for development to control impacts to water quality, flooding, and natural resources (SMC, 2001:1; SMC, 2002B:2-7). The WDO specifies the minimum requirements and standards that have to be met throughout the County—in unincorporated Lake County and within

municipalities. Municipalities and the County can adopt requirements more strict than those in the WDO.

Overall enforcement of the WDO is the responsibility of the Stormwater Management Commission. Municipalities and the County itself can become certified by SMC to administer and enforce the WDO, review development proposals, and issue watershed development permits within their jurisdictions. Lake County and 39 municipalities presently are Certified Communities (SMC, 2002C). However, even for Certified Communities, certain development applications must be approved by SMC (SMC, 2001:2-4).

In 2001 the WDO was amended to protect isolated waters and wetlands that are not under the jurisdiction of the U.S. Army Corps of Engineers. Isolated waters are surface water bodies that do not have surface water connections to other waters or wetlands (Tiner et al., 2002). SMC's definition of isolated waters includes lakes, ponds, streams, intermittent streams, farmed wetlands, and wetlands (SMC, 2001:65). The County and municipalities can obtain Isolated Wetland Certification by SMC that entitles them to review and permit developments that impact isolated waters (SMC, 2001:3-4). To date, Lake County and seven municipalities have obtained this certification.

SMC's first comprehensive management plan was adopted by the County Board in 1990. The Plan was revised in 2002, and adopted in 2003. The Comprehensive Plan contains SMC's goals, objectives, and policies and describes their implementation. The objectives adopted in the 2002 plan are:

- mitigate existing flood damages and prevent the occurrence of new damages;
- repair, restore, maintain and preserve natural and constructed drainage features and facilities in the County;
- improve surface water quality;
- promote awareness and understanding of stormwater management issues; and
- establish, maintain, and distribute stormwater management data and information (SMC, 2002B:1-5).

The objectives are to be accomplished through 28 policies (SMC 2002B:1-5 – 1-7). In addition, the 2002 Comprehensive Plan incorporates the 12 goals and 41 objectives of the 1990 Comprehensive Plan (SMC, 2002B:1-1; Appendix A). The complete Lake County Comprehensive Stormwater Management Plan is available from SMC's web page.

A major focus of SMC is to complete, then implement, comprehensive watershed management plans for the County's 26 sub-watersheds. The purpose of a watershed plan is to describe how to improve water quality, reduce flood damage, protect natural resources, and guide new development to minimize impacts. To be effective, upstream and downstream jurisdictions have to participate in the planning/consensus development process and agree to the provisions of the watershed plan and coordinate their activities to implement the plan (SMC, 2002D).

SMC has completed the comprehensive watershed management plan for the North Branch of the Chicago River and water quality plans for the Flint, Mutton Creek, and Third Lake sub-watersheds. The watershed management plan for the North Branch of the Chicago River has been adopted. The watershed management plan for the Des Plaines River watershed is underway, as are sub-watershed plans for Sequoit Creek and Little Silver Lake, Squaw Creek, Fish Lake Drain, Kellogg Creek/Dead River, Indian Creek, Newport Drain, Mill Creek, and Bull Creek.

The Stormwater Management Commission has completed a countywide Flood Hazard Mitigation Plan (FHMP) for Lake County, with adoption expected after an "All-Natural Hazards"

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component has been added.¹⁴ The FHMP includes an inventory, with mapping, of geographic areas that have been, or are likely to be, damaged by “heavy rains, extreme runoff or flooding” (SMC, undated-B). Over 300 problem areas with approximately 6,000 structures were identified in the County (SMC, 2002B: 3-2, 4-4).

The next step following the identification of problem areas is to prioritize them and develop site-specific mitigation plans that will eliminate future public safety threats and minimize economic losses (SMC, undated-B; SMC, undated-C; SMC, 2002B:3-2). Problem areas have initially been divided into two categories: The first, and highest priority, is for repetitive loss properties and “flood problem hotspots.” One hundred eight repetitive loss properties in 52 areas of the County have been identified. Flood problem hotspots, which are defined as “the areas with the greatest number of structures flooded and the highest frequency and severity of flooding,” contain 1,469 structures (SMC, 2002B:4.3). The non-hotspot flooding problems are in the lower priority category. This category has 4,400 structures that are flooded from a variety of causes including depressional flooding, local drainage patterns, and sewer backups (SMC, 2002B:4-3 – 4-4). A Flood Hazards map is shown in Figure 5.12.

There are many residential subdivisions in unincorporated Lake County, approved prior to 1992, that either do not have a stormwater management system; or, if there is one, it is failing due to a lack of maintenance and repair. Many of these older subdivisions have chronic, nuisance drainage problems and some have houses that have been flooded more than once. When these subdivisions were new, a homeowners association may have had the responsibility for stormwater infrastructure maintenance and repair. However, today the homeowners association may no longer exist; the homeowners may be unaware of their responsibilities to maintain the system; or, the homeowners may not have assessed themselves sufficiently to fund proper maintenance and repair.

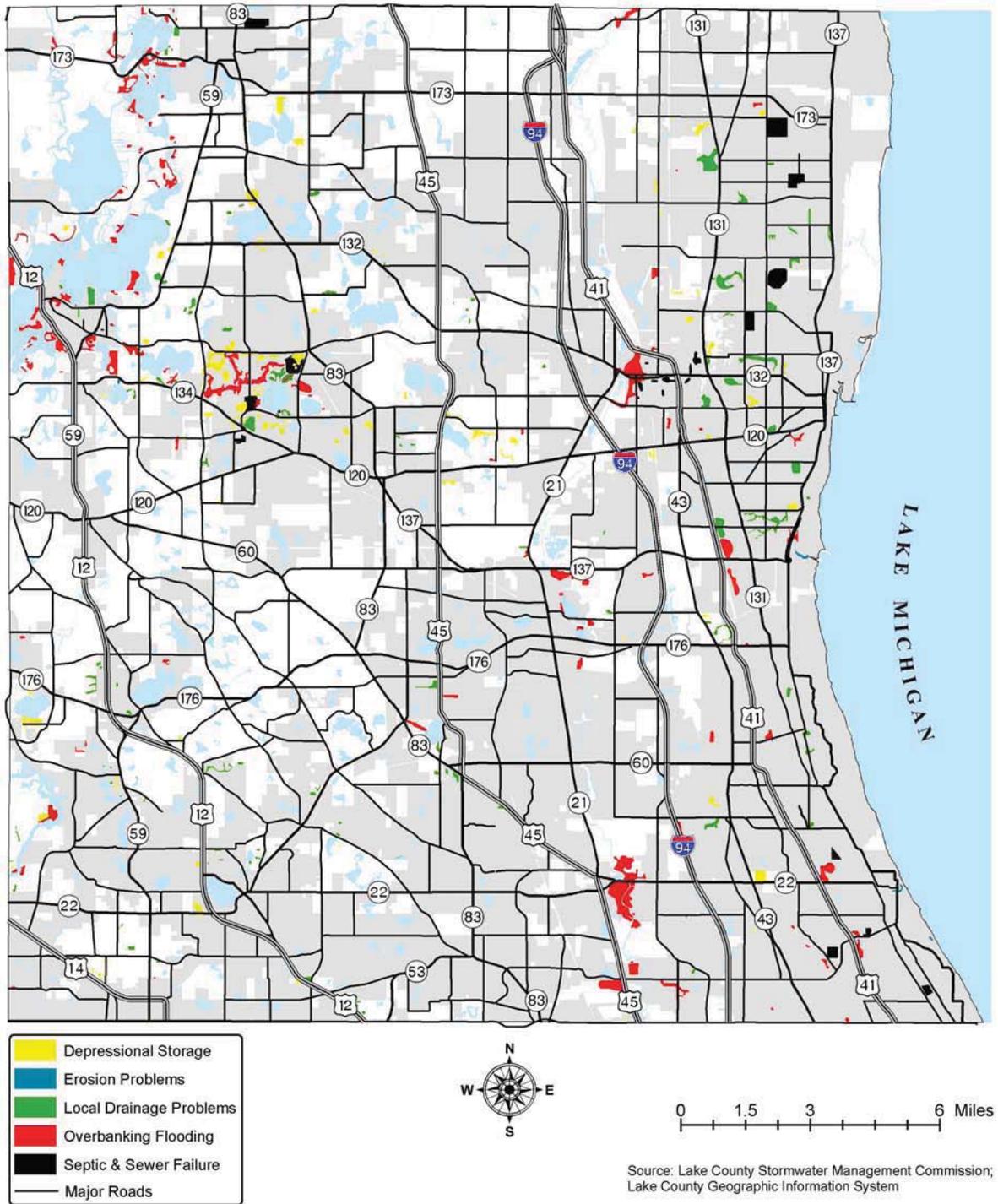
Cities and villages also have older residential subdivisions with drainage problems. According to information from the Cooperative Planning Areas, solving these drainage problems is usually handled by the city or village government. If a city or village does not have an in-house department for the engineering and construction, a private firm may be hired for the project. Usually these repairs are paid for from the municipality’s general revenue fund or by establishing a special improvement district.

The Lake County government does not have a department that handles stormwater management system construction, repair, or maintenance problems; nor does it have a funding source that allows it to hire private sector contractors. One of the policies in this section of the *Regional Framework Plan* is for the County to consider whether or not it should get involved in stormwater infrastructure problems, and if so, what its role should be. The *Plan* recommendation is for the County to organize a task force including but not limited to representatives from the County Administrator’s Office; Lake County Public Works Department; Lake County Health Department; Stormwater Management Commission; Lake County Emergency Management Agency; township highway commissioners; and Planning, Building and Development to study the issue and report its findings to the Lake County Board. The task force will define the problem, suggest the amount and type of County participation, and identify potential funding sources available to the County.

Lake County’s pre-flood mitigation, emergency flood response, and post-flood recovery services need to be improved. Areas where improvements are needed include flood planning, response, and recovery activities (SMC, 2002B:3.3). SMC is in the process of establishing a Flood Hazard

¹⁴ The County is currently preparing the All-Natural Hazards Plan as required by the federal Disaster Mitigation Act of 2000.

Figure 5.12
Lake County Flood Hazards



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Task Force to direct post-flood recovery activities and establish funding priorities to reduce flooding problems that have been identified (SMC, 2002B:4-6, 4-7). SMC is also assisting communities by developing guidelines that will coordinate flood damage reporting countywide, developing mutual aid agreements for flood recovery and clean-up activities, and developing and coordinating training procedures for building inspectors to assist with flood damage assessments. When this task has been completed, it will be incorporated in the “Emergency Operations Plan for Lake County” (SMC, 2002B:4-6).

Reducing and “Cleaning” Stormwater Runoff

Urban stormwater runoff typically will contain bacteria, pollutants from vehicles, pollutants released into the atmosphere that have settled on dry impervious surfaces, trash, pesticides, and fertilizers. Unless the stormwater is properly treated, contaminants in the runoff will get deposited in surface water bodies or in groundwater aquifers. Not surprisingly, studies show that increasing the amount of impervious area increases the amount of stormwater runoff, with a corresponding increase in contamination (Schueler and Holland, 2000B, C, and D; Schueler, 1995:62). Research has shown that significant degradation of surface water bodies due to stormwater runoff, in sub-watersheds with drainage areas of one to 10 square miles, can begin when the impervious area in the sub-watershed is between 10% and 15% (Schueler, 1995:37, 38, 41). When the impervious surface area in a sub-watershed exceeds 25%, pre-development water quality cannot be maintained or restored (Schueler, 1995:43).

Available information on sub-watershed water quality will be taken into consideration during the preparation of Chapter 9, Land Use, of the *Plan*. Through future land use designations, development can be limited in sub-watersheds where preservation of the existing surface water quality is important and feasible.

Regardless of the water quality and amount of development in a sub-watershed, Best Management Practices (BMPs) should be used to reduce the amount of contaminated stormwater runoff. Best Management Practices are “any practice that reduces the impacts of nonpoint source pollution” (SMC, 2002G). There are two general categories of BMPs in stormwater management: those that reduce the amount of impervious area of a development, and those that promote ways to filter and infiltrate (put back into the ground) the runoff that is produced (SMC, 2000:292; Lake County Stormwater Management Commission, 2000:225-228). It is more economical and effective to reduce pollution at the source through the use of BMPs than it is to try to restore water quality “downstream” (SMC, 2002B: A-5).

Examples of BMPs¹⁵ include:

- Use a cluster approach for subdivision design that leaves as much of a site as possible in large-area open space. Cluster developments allow the same density (residential) and intensity (non-residential) of development as is allowed under standard zoning, subdivision, and site design regulations but the buildings are clustered to protect natural resources, maximize open space, and reduce stormwater runoff. A cluster design, mixed-use development would not only help conserve natural resources and open space, it would also put jobs and housing close to one another (Ewing, 1996:17-51).
- Reduce set backs for houses to reduce driveway length, when appropriate.

¹⁵ “A Citizen’s Guide to Maintaining Stormwater Best Management Practices for Homeowners Associations and Property Owners” and other BMP examples and information are available through the Lake County Stormwater Management Commission’s website: www.co.lake.il.us/smc

- Review street width requirements and reduce widths where possible based on average daily trips (Schueler and Holland, 2000A:130).
- Use vegetated open channels instead of curb and gutter, where appropriate (Kwon, 2000:3).
- Use permeable or porous paving instead of asphalt or concrete where possible for residential and non-residential developments. Some types of permeable paving blocks are made with openings to be filled with soil that can then be planted with vegetation (Ewing, 1996:109, SMC, 2000:240, 292).
- Use natural landscaping that thrives in the local environment to reduce the need for pesticides, herbicides, fertilizer, and water not supplied through natural precipitation. Reduce the amount of turf grass and replace it with native species to increase the amount of precipitation that is absorbed into the soil and by the plants (Lake County Natural Resources/Economic Development Task Force, 1998:6; SMC, 2000:240). Local governments should review their ordinances to ensure native vegetation is allowed in appropriate circumstances.
- Use roof runoff to maintain a rain garden (SMC, 2002E).
- When washing a car at home, park the car on the lawn; use a non-toxic, low phosphate soap; put a nozzle on the hose and use water sparingly (SMC, 2002F; SMC, 2002G).
- Before applying lawn fertilizer, have the soil tested to see what (if any) is needed; apply according to directions.
- Minimize the impervious area at every stage of parking lot design. Study parking requirements to make sure that excessive spaces are not being built. Provide a maximum as well as a minimum. Encourage shared parking, where appropriate. Build parking areas in phases as additional spaces are needed. Reduce stall size and narrow driving aisles where possible. Use pavers for spillover parking areas (Kwon, 2000:3,4; Schueler and Holland, 2000A:130; Zielinski, 2000:25,33).
- Precipitation that is captured by downspouts and other pipes should be discharged over vegetated areas before it enters a storm sewer, street, or other hard-surface, conveyance structure.

Stormwater Management Facilities and NPDES II

All new developments approved in Lake County after October 1992 have been required to have a management and maintenance plan for stormwater facilities. A management plan should include an inventory of the stormwater conveyance and storage structures; an inspection schedule; a program for routine and non-routine maintenance; an education program for the residents on the importance of a properly functioning stormwater management treatment system for flood control and water quality; and a maintenance, repair, and replacement budget.

According to the Lake County Stormwater Management Commission, as a “rule of thumb,” routine maintenance costs for mowing, weed control, fertilization, and debris removal will be a minimum of \$3,000 per acre per year (SMC, 2002A:14). Dredging and sediment removal and disposal from swales, dry ponds, and wet ponds are the primary, non-routine costs that should be anticipated.

Stormwater discharges released from stormwater conveyance or storage systems are considered point sources of pollution (USEPA, 2000F). As of March 2003, publicly-owned, small stormwater management systems are required to have a National Pollutant Discharge Elimination System Phase II permit (NPDES II) (SMC, undated-A). The purpose of NPDES II is to reduce the pollutants in stormwater that is captured, transported, and ultimately discharged from a constructed stormwater system. The pollutants that are in the water that is expelled from these

systems eventually end up in surface or groundwater resources. Since it is difficult and expensive to restore degraded surface or groundwater resources, the NPDES II program utilizes a management system intended to remove pollutants from stormwater runoff before this water reaches its destination (USEPA, 2002).

In order to comply with the NPDES II requirements, the owner of a public separate storm sewer system (MS4) has to adopt and implement a program that will reduce the pollutants in discharged stormwater to the maximum extent practicable. MS4 is a “term of art” (USEPA, 2000B) that includes not only storm sewers but also ditches and overland conveyance systems when they are owned by a public entity. The NPDES II program has six required control measures that are listed in Figure 5.13.

**Figure 5.13
NPDES II Six Required Control Measures**

Control Measures	Activity
1. Public Education and Outreach	Inform citizens about the impacts of polluted stormwater runoff on water quality (<i>Countywide service provided by SMC</i>)
2. Public Participation and Involvement	Provide citizens the opportunity to help develop and implement the program (<i>Countywide service provided by SMC</i>)
3. Illicit Discharge Detection and Elimination*	Develop a plan to find and eliminate illegal discharges to the storm sewer system
4. Construction Site Runoff Control	Develop, implement, and enforce an erosion and sediment control program for construction activities that disturb one or more acres (<i>This is already a requirement of SMC's WDO</i>)
5. Post-Construction Runoff Control	Develop, implement, and enforce a program to address stormwater runoff from new development and redevelopment (<i>This is already regulated through SMC's WDO</i>)
6. Pollution Prevention & Good Housekeeping	Develop and implement a program to reduce pollutant runoff caused by municipal/public agency operations; including for example street sweeping, pesticides, salt, and the maintenance of stormwater storage facilities

*Effluent from onsite wastewater treatment systems with soil absorption is illicit discharge if it enters a storm sewer or above ground conveyance system (USEPA, 2000D; *Federal Register*, 1999:68758)

Sources: Lake County Stormwater Management Commission (SMC, undated-A) USEPA, 2000A

It is the intent of the USEPA that the local programs developed to meet the NPDES II requirements be based on Best Management Practices used in conjunction with measurable goals for the six required control measures (USEPA, 2000A). The owner or operator of the MS4 can choose the BMPs and measurable goals to address the six required control measures that are most appropriate for the system. The selected BMPs and goals have to be submitted in the permit application, and they then become the stormwater management program (USEPA, 2000F).

Most of the BMPs for the NPDES II permit are intended to reduce the amount of runoff and clean the runoff that is created, like the examples provided in Figure 5.13. But in addition, the NPDES

II permit requires BMPs for activities such as: public participation in planning, which includes writing, adopting, and implementing comprehensive planning and zoning ordinances that promote water quality; providing education on the importance of managing stormwater runoff; encouraging volunteer monitoring of stormwater management structures and natural water bodies; and organizing community cleanups (USEPA, 2000C; USEPA, 2000,E).

The USEPA has provided a menu of BMPs to assist permittees in the design and implementation of the program. The “Storm Water Phase II Final Rule Fact Sheet Series” that has the BMPs for Control Measures and examples of measurable goals can be obtained from the Internet—www.epa.gov/npdes/stormwater, or by contacting the USEPA Regional Stormwater Office for Illinois (Region 5) by phone at (312) 886-0236. These new regulations are administered and enforced by the Illinois Environmental Protection Agency.

Summary

Lake County is fortunate in the number and diversity of its water-related natural resources. Unfortunately, the natural character of many of these resources has been altered by agriculture and urban development. While the County has been improving its preparation for, and ability to respond to, future floods, the existing programs and procedures need to be expanded.

The greatest threat to the condition of the County’s surface water bodies is contaminated, urban and agricultural, stormwater runoff. As Lake and the neighboring counties that share the watersheds grow, the amount of impervious area will increase, producing more stormwater runoff. Even if Best Management Practices were to be required on all new development within the region, the amount of contaminated stormwater runoff will continue to increase. The increased volume of runoff will require the stormwater management system to be enhanced. The goals and policies for this section reflect the County’s commitment to an intergovernmental approach to stormwater management that integrates the natural and man-made drainage system into the overall infrastructure network.

Continuing to reduce the potential for flood damage while maintaining or improving water quality in surface water resources as the County grows through 2020 will be difficult due to limited funding. One of the primary objectives of Chapter 4, Environmental Resources, Open Space, and Farmland, of this *Plan*, “is to identify and map areas that should be considered priorities for maintaining as open space and low intensity land uses” (Chapter 4). A resource point system was used to rank the County’s environmental resources. Scores for resource areas were aggregated to quarter-quarter sections, which are about 40 acres in size. The quarter-quarter sections were then assigned to one of three categories based on their score: High Priority Open Space, Moderate Priority Open Space, and Limited Priority Open Space. The County is equally divided among the categories so that one third is High, one third is Moderate, and one third is Limited Priority Open Space (Chapter 4). This is shown on the Priority Open Space Map in Chapter 4.

The *Plan*’s Future Land Use Map provides guidance for wise development located in a manner that will minimize the negative impacts on the watershed’s resources and potential for flood damage. The Future Land Use Map is one tool that can be used to direct new development to appropriate areas within sub-watersheds where the increased volume of stormwater runoff will have the least impact, with respect to both flooding and the degradation of surface and groundwater quality.

Goals and Policies¹⁶

5.11 Goal: Enhance the Stormwater Management system to reduce flood damages and improve surface water quality.

5.11.1 Policy: The *Plan's* Future Land Use Map will provide guidance for directing new development to areas within sub-watersheds where flooding and negative impacts to the watersheds' resources will be minimized.

5.11.2 Policy: Support the Stormwater Management Commission (SMC) in completing sub-watershed plans for the 26 sub-watersheds in Lake County.

5.11.3 Policy: Develop a coordinated process of information sharing among the Forest Preserve, park districts, municipalities, and the Stormwater Management Commission so that lands purchased for environmental protection or recreation can also be used to enhance the water quality and quantity components of the stormwater management system.

5.11.4 Policy: Develop a coordinated process so that lands purchased for infrastructure improvements or expansion, such as but not limited to road projects, can also be used to enhance the water quality and quantity components of the stormwater management system.

5.11.5 Policy: The County Board is encouraged to create a Floodplain Property Acquisition Fund to leverage state and federal grants for the countywide voluntary sale and removal of buildings repeatedly damaged by floods.

5.11.6 Policy: Convene a task force of County agencies to study and make recommendations for mitigating neighborhood flooding problems in unincorporated Lake County, including implementation funding.

5.12 Goal: Encourage the use of stormwater Best Management Practices (BMPs) to reduce point source and nonpoint source pollution and stormwater runoff volume.

5.12.1 Policy: The County and municipalities are encouraged to support amendments to the WDO that would strengthen the use of BMPs for new developments.

5.12.2 Policy: Governmental units that fall under the new National Pollutant Discharge Elimination System Phase II program are encouraged to go beyond the minimum permit requirements.

5.13 Goal: Local governments should work together, with each other, and with County and state agencies to be better prepared for the next damaging flood event.

5.13.1 Policy: The Lake County Emergency Management Agency and the Stormwater Management Commission are encouraged to write a Flood Annex for the adopted "Emergency Operations Plan for Lake County."

¹⁶ As stated in Chapter 1, Introduction, a Goal is "the desired result to be achieved by implementing the *Plan*;" and a Policy is "a general method or action designed to achieve a goal."

- 5.13.2 Policy: The County is encouraged to provide sufficient funding to the Lake County Emergency Management Agency to enable the LCEMA to effectively obtain, monitor, and utilize advance warning information on flood events.

Definitions

Best Management Practices (BMP): A practice or combination of practices that is an effective, practicable means of preventing or reducing the amount of pollution generated from nonpoint sources (SMC, 2002A). The NPDES II program also addresses point source pollution from separate storm sewer systems through the use of BMPs.

Floodplain: The area of land that is inundated with water during a 1% per year probability or “100 year flood” event (Chapter 4, Environmental Resources, Open Space, and Farmland).

Impervious surface: Any surface in the urban landscape that cannot effectively absorb or infiltrate rainfall, including roads, parking lots, gravel pads, rooftops, driveways, and sidewalks (Schueler, 1995:185).

Infiltration: “A technique to treat both the quality and quantity of urban runoff in which runoff is diverted into the ground in an attempt to replicate the normal hydrological cycle whereby most rainfall infiltrates into the soil” (Pitt, 2000:8).

Maximum Extent Practicable (MEP): A standard for water quality that applies to all MS4 operators regulated under the NPDES Phase II Storm Water Program. “Since no precise definition of MEP exists, it allows for maximum flexibility on the part of MS4 operators as they develop and implement their programs” (USEPA, 2000G:A-3).

Municipal Separate Storm Sewer System (MS4): A system designed and used for collecting and transporting stormwater that is owned by a state, county, township, city, village, drainage district, or other public body. The system can include underground pipes, roads with drainage systems, municipal streets, curbs, gutters, ditches, man-made channels, and storm drains (USEPA, 2000B).

Stormwater Detention Facility: A man-made structure for the temporary storage of stormwater runoff with controlled release during or immediately following a storm (SMC, 2001:62). The fundamental purpose of a detention pond is to reduce the peak flow of stormwater runoff (Natural Resources Defense Council, 1999: Chapter 5, page 11).

Stormwater Management: A set of actions taken to control stormwater runoff with the objectives of providing controlled surface drainage, flood control, and pollutant reduction in runoff (SMC, 2001:68).

Stormwater Management System: The collection of natural features and man-made facilities that control and treat stormwater.

Stormwater Retention Facility: A facility designed to completely retain a specified amount of stormwater runoff without release except by means of evaporation, or infiltration (SMC, 2001:68).

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Urbanized Area: A U.S. Census Bureau determination of a central place and the adjacent densely settled surrounding territory that together have a minimum residential population of 50,000 people and a minimum average density of 1,000 people/square mile (USEPA, 2000G:A-5).

Waters, Waters of the State, Receiving Water: All accumulations of water, surface and underground, natural and artificial, public and private, or parts thereof, which are wholly or partially within, flow through, or border upon the state of Illinois... Pollution Control Board Regulations, Section 301.440 of Title 35: Subtitle C: Chapter I (General NPDES Permit No. ILR40, Illinois Environmental Protection Agency).

Watershed: The land that contributes stormwater runoff to a particular point along a waterway; an area of land confined by topographic divides surrounding a stream, river, wetland, or lake (waterbody) that drains to that waterbody (Chapter 4, Environmental Resources, Open Space, and Farmland).

Watershed Based Zoning: A zoning technique in which the intensity of development within a watershed or sub-watershed is at least partially based on the total amount of impervious area to be allowed within the watershed/sub-watershed, and the desired level of stream protection (Schueler, 1995:187).

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Chapter 5 Infrastructure and Services Solid Waste

Significance

The solid waste generated in Lake County is currently disposed of in three landfills, all of which have finite capacity: The Countryside Landfill near Grayslake in unincorporated Lake County is expected to close in October 2016; the Onyx-Zion Landfill in the City of Zion is expected to close in January 2012; and the Pheasant Run Recycling and Disposal Facility (RDF) in Bristol, Wisconsin is expected to close by 2009 (SWALCO, 2002C:2-2 – 2-3).

Alternatives for handling solid waste include expanding one or more of the existing landfills; making a new landfill; building an incinerator; or building one or more solid waste transfer stations. Expanding the capacity of the three landfills currently being used could extend their use, but would not be a long term solution. A new landfill is not likely in part because at least 400 acres of land would be needed—200 for the landfill and 200 for buffering. With the present technology and quantity of solid waste generated, incinerators are not financially affordable.

The County's draft *2004 Solid Waste Management (SWM) Plan Update*, includes recommendations for source reduction, recycling, household chemical waste management, landfilling, and emerging technologies. References to the future possible use of Waste To Energy technology and Solid Waste Transfer Stations, which had been included in the *1999 SWM Plan*, are not included in the draft *2004 SWM Plan Update*.

Issues and Opportunities

- The Lake County Board designated the Solid Waste Agency of Lake County (SWALCO) as the solid waste planning agency for the County, delegating to it the authority to prepare the County's comprehensive waste management plan, the *Lake County Solid Waste Management Plan (SWM Plan)*. The Illinois Solid Waste Planning and Recycling Act requires this Plan to be reviewed and updated every five years, with the revisions submitted to the Illinois Environmental Protection Agency for review and comment.
- The three landfills currently being used for Lake County's solid waste are all expected to be closed by 2017.
- Any future federal laws that would restrict transporting solid waste across state boundaries could pose difficulties.

Analysis

As used in the *Regional Framework Plan*, the term "solid waste" refers to garbage, general household and commercial waste, landscape/yard waste, and construction and demolition debris. The solid waste generated by Lake County residents and businesses is about 7.13 pounds per capita per day. In 2000, 765,580 tons of solid waste were generated.¹⁷ By 2020, 1,053,463 tons of solid waste are forecast to be produced (SWALCO, 1999:2-7 2-8, 2-9; Tables 2-5, 2-6). Industrial waste, agricultural waste, and other types of waste that are not similar to general

¹⁷ The solid waste is from a population of 586,846. The SWALCO planning area includes all Lake County except for Barrington, Buffalo Grove, and Wheeling, which are members of a Cook County solid waste planning group.

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residential or commercial waste are not classified as solid waste as the term is used in the *Plan*. The generation rate in Lake County for these other wastes is about 1.27 pounds per capita per day. In 2000, 134,081 tons of these wastes were generated. In 2020, 161,584 tons are forecast to be generated in Lake County.

The total waste generation in Lake County, including solid, industrial, and agricultural wastes, is 8.40 pounds per person per day.

State policy, as expressed in the Illinois Solid Waste Management Act, establishes a “waste management hierarchy” for reducing and disposing of solid waste which in descending order of preference is:

1. volume reduction at the source
2. recycling and reuse
3. combustion with energy recovery [commonly called waste-to-energy which is the production of electricity and steam from solid waste combustion (SWALCO, 1999:3-22)]
4. combustion for volume reduction
5. disposal in landfill facilities [415 ILCS 20/2(10)(b)]

The Solid Waste Agency of Lake County (SWALCO), a unit of local government, is “responsible for initiating programming and policies to establish and maintain a comprehensive solid waste management system for Lake County” (SWALCO, 1999:3-2). SWALCO addresses all the items in the solid waste management hierarchy as part of its state required solid waste management plan. Of the three techniques listed for actually disposing of solid waste after it is produced—combustion with energy recovery, combustion for volume reduction, and disposal in landfill facilities—only the last is used in Lake County.

The Illinois Solid Waste Planning and Recycling Act

The Illinois Solid Waste Planning and Recycling Act (415 ILCS 15/) gives the counties primary responsibility for solid waste management planning, but recognizes that intergovernmental cooperation is necessary for these plans to be effective. The Act requires local governments to create a 20 year plan to handle their solid waste, and update that plan every five years. The *Lake County Solid Waste Management Plan (SWM Plan)* update was updated in 1999 and in 2004.

Among other requirements, a waste management plan must describe the origin, content, and weight or volume of solid waste generated within a county’s boundaries and estimate what will be generated during the next 20 years; provide a description of the facilities that are currently being used to manage solid waste along with the remaining capacities; and describe the facilities and programs proposed to handle solid waste for the next 20 years following plan adoption or revision [415 ILCS 15/4(c)].

The Act also requires a county’s plan to include a recycling program to recycle at least 25% of the solid waste generated in the county, “subject to the existence of a viable market for the recycled material” [415 ILCS 15/4(a); 5(e); 6(3)]. In 2000, Lake County recycled 358,362 tons of solid waste, which is a recycling rate of 42.7% (IEPA, 2002:R2.7).

While Lake County’s recycling rate is well above the state mandated minimum of 25%, some types of waste are not being adequately recycled, especially construction and demolition debris and junk or abandoned cars, boats, and trailers. Collecting and recycling these wastes is discussed in the “Types of Solid Waste for which Improvements in Collection and Recycling Are Needed” subsection.

The Solid Waste Agency of Lake County

To help it comply with the Solid Waste Planning and Recycling Act, the Solid Waste Agency of Lake County (SWALCO) was established by 35 Lake County municipalities and the Lake County government in 1991 (SWALCO, 1999:ES-1). Today SWALCO's membership is 37 municipalities, the Great Lakes Naval Training Center, and Lake County (Quigley, 2002D). SWALCO's planning area includes its members plus non-member Lake County communities. Barrington, Buffalo Grove, and Wheeling are members of another solid waste planning group (SWALCO, 1999:2-2). SWALCO annually adopts a state legislative program for presentation to the General Assembly.

The purpose of the Solid Waste Agency of Lake County, Illinois is to implement a regional approach to solid waste management that addresses the economic, political, and environmental issues in Lake County as follows:

- Implement the *Lake County Solid Waste Management Plan*.
- Facilitate an efficient, reliable, and environmentally sound solid waste disposal system.
- Advise and assist SWALCO members regarding solid waste management issues.
- Educate the public regarding implications of solid waste management options. Identify, evaluate, and disseminate information regarding techniques to reduce, reuse, and recycle the amount of solid waste generated (Quigley, 2002D; SWALCO web site).

Reduce, Reuse, Recycle, Recover

A priority for SWALCO is educating the residents and business owners of Lake County about the "4R's" of solid waste reduction: Source Reduction, Reuse, Recycling, and Recovery (Buying recycled):

Source Reduction: This is the preferred method of waste management in the Solid Waste Management hierarchy "because it prevents the initial generation of waste by reducing the volume and toxicity at the source." Source reduction concepts include "the purchase of products with the least amount of packaging and the use of non-disposable products in lieu of disposable ones (e.g., using a sponge rather than paper towels). These are classified as "front end" source reduction techniques because they reduce the amount of waste generated. "Back end" source reduction means to "reuse or recycle materials instead of disposing of them in the landfill stream." Home composting of food and landscape materials is a form of back-end source reduction (SWALCO, 1999:3-6 – 3-7). "The most significant source reduction technique used in Lake County is the onsite management of landscape waste" (SWALCO, 1999:3-8).

SWALCO recommends raising the public's awareness of the cost of solid waste removal (i.e., source reduction) by adopting volume based pricing for residential waste collection (SWALCO, 1999:3-6, 3-8, 3-9). Volume-based, or "pay-as-you-throw," payment systems are based on stickers that the residential customer purchases. Each container that is put out to be picked up by the garbage company has to have a sticker attached to it. Diverting solid waste from the landfill stream, such as through reuse or recycling, reduces the number of stickers purchased, which saves the customer money, and reduces the amount of waste ending up in a landfill. The only municipality in Lake County currently offering a pay-as-you-throw system is the City of Highland Park. This system, which is strongly supported by the city council, is used by about half the residents (Quigley, 2002A).

Reuse: Reuse (which often overlaps with reduce) includes choosing reusable rather than single-use items, such as using a ceramic coffee mug rather than a disposable cup (SWALCO,

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undated:4). The concept also includes: “Reusing items by repairing them, donating them to charity, or selling them. Use a product more than once, either for the same purpose or for a different purpose [for example, save empty jars and use them to store left over food]” (USEPA, 2001A).

Recycling: “Recycling is the process of recovering a waste material for processing into another usable product. This behavior helps conserve landfill space by diverting materials that may not be reusable in their current form and converting them into useful products” (SWALCO, 1999:3-10). Successful recycling requires: 1) recyclable materials have to be collected; 2) the materials have to be processed and made into a product; 3) the products have to be purchased (SWALCO, 1999:3-10).

Lake County adopted a recycling ordinance which requires all residential waste haulers or municipalities to offer curbside recycling to all residential buildings that have four units or less (SWALCO, 1999:3-13, Table 3-3). This ordinance also licenses residential waste haulers.

A model commercial licensing ordinance was adopted by SWALCO in 2002 that would require refuse haulers to offer recycling services to commercial customers as a license condition. However, there is no implementation through SWALCO and the decision of whether or not to adopt and follow this ordinance is left up to the individual members. As of March 2003, none of the members of SWALCO had adopted the ordinance.

Recovery (Buying Recycled): Buying goods and packages made from recycled materials is the key to developing and sustaining the recycling industry (SWALCO, undated:4). For recycling to be successful, “consumers need to look for and purchase goods made from materials they put in the recycling bin” (SWALCO web site, “Buying Recycled Goods”).

Landfills are businesses. Owners and operators of these facilities earn profits based on the amount of waste they take in. Reducing the amount of waste generated locally through the 4R’s won’t necessarily extend the life of the existing landfills. If the amount of solid waste from one source (customer) decreases, a landfill owner/operator must find another source (new customers) unless he or she is willing to except a reduction in income. If the amount of Lake County solid waste reaching the landfills in use were to decline appreciably, the landfill owners/operators could compensate for the loss of local business by accepting more waste from outside the County.

No matter how successful the 4R’s become, solid waste will still be produced and, inevitably, the existing landfills are going to reach capacity and have to be expanded, and eventually closed.

The Current Landfills Are Running Out of Space

Solid waste generated in Lake County is deposited in three landfills. The two landfills inside Lake County are the Countryside Landfill in Grayslake, and the Onyx-Zion Landfill in Zion. These two landfills take in approximately 85% of the County’s solid waste, in addition to waste hauled in from neighboring counties. The balance of Lake County’s solid waste is transported north into Wisconsin to the Pheasant Run Recycling and Disposal Facility near Bristol. All three landfills are expected to be closed by 2017 (SWALCO, 2002C: 2-2 – 2-3).

After the Existing Landfills Are Closed

There presently are three options for disposing of solid waste after the existing landfills used by Lake County close (expanding one or more of the existing landfills is a possibility which could delay its/their closing dates):

1. Establish one or more new landfills in the County
2. Build one or more transfer stations in the County or use transfer stations outside the County
3. Incinerate: waste-to-energy or volume reduction

Landfills: Landfilling “is expected to remain the predominant waste disposal method within Illinois, and Lake County, for the next five years” (SWALCO, 2004:3-34). The recommendations in the current SWALCO plan regarding landfilling are: “landfill all waste which is not reduced at the source, recycled or composted”; “disposal in privately owned and operated landfills”; “pursue the availability of land for future solid waste disposal needs” (SWALCO, 1999:3-28); and “acquire land for future solid waste disposal needs” (SWALCO, 1999:3-2). One of the implementation strategies in the current SWALCO plan is to identify and screen sites for “landfill and other solid waste facilities; field-investigate candidate sites; and appoint a land acquisition team consisting of a Realtor (sic) and legal counsel to pursue purchasing options” with the SWALCO board of directors having final responsibility for site selection (SWALCO, 1999:4-5). The current SWALCO plan makes it possible to expand an existing Lake County landfill or open a new landfill in Lake County. It is unlikely that a new landfill option will be pursued (Quigley, 2002B).

The draft *2004 SWM Plan* does not include references to the possible development of Waste To Energy or Solid Waste Transfer Stations, that had been included in earlier versions of the *SWM Plan*. However, the draft *2004 SWM Plan* does not preclude using a transfer station located outside Lake County. Currently some solid waste is being taken from Lake County to transfer stations in Wheeling and Northbrook. However, for most of the County, a more centrally located transfer station would be more practical. The time it takes for a collection truck to unload and return to its route to continue making pick ups would be reduced, as would the number of vehicle miles/trips that the collection trucks would have to make on the roads of the County.

New Technology: In addition to the three alternatives above, it is possible that something new could appear that is environmentally safe and economically feasible. In anticipation of such a development, the *SWM Plan* has a component requiring SWALCO to “[m]onitor and evaluate emerging technologies that appear to be effective on a waste stream which is similar in quantity and composition to the Agency’s waste stream” (SWALCO, 1999:3-30). In addition to waste-to-energy, potential innovations in solid waste management include improvements in landfilling technologies; solid waste composting systems; and generating energy from biomass waste products (SWALCO, 1999:2-12; 3-39; and 4-8).

Types of Solid Waste for which Improvements in Collection and Recycling Are Needed

Construction and Demolition Debris: There is no countywide monitoring process to ensure construction and demolition debris get disposed of in licensed landfills. There is also no policy encouraging the recycling of this waste. Recycling of demolition debris may be complicated because of asbestos and lead paint.

A tracking process for construction waste could be developed by combining the building permit process with the existing requirement that companies transporting solid waste must be licensed to

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operate in Lake County. As a condition for obtaining a building permit, a contractor would have to agree to keep a record of the amount of solid waste removed from the site. When a roll-off container is full and needs to be emptied, the contractor contacts the hauler. The hauler picks up the container and gives the contractor a receipt for the size of container being emptied. The hauler gets a receipt at the landfill verifying that the container has been dumped, a copy of which is sent back to the contractor. The contractor shows these receipts to the building inspector as the construction project progresses.

The solid waste hauler would also be accountable. It may be sufficient to notify a hauler that failure to obtain the necessary landfill receipts, and provide copies to the contractor, could result in a fine or loss of the license to operate in Lake County. The current licensing process could be modified to include posting a bond, if this approach would result in better compliance.

Information about recycling building materials would be given to the contractor when the building permit is applied for. This information would include what materials can be recycled and what companies in the area will accept them. Another step that could be taken would be to require by ordinance that at least one construction product be recycled, with the permittee stating what product will be recycled on the permit.

Policy 5.15.6 encourages the County and municipalities to cooperate in developing and adopting ordinances to track construction and demolition debris. The potential approach outlined above would be modified when the issue is considered in detail in order to accomplish the policy.

Junk and Abandoned Cars, Boats, and Trailers: Cars, boats, and trailers are not included in the definition of “solid waste” as this term is defined at the beginning of this section. However, the County and municipalities have recognized the importance of the collection, recycling, and disposal of these large items as part of a comprehensive program for all wastes produced, countywide. In cooperation with the private sector, which currently processes junk and abandoned cars and other large items having scrap value, the County and the municipalities should work together to insure that these items are collected and recycled or otherwise disposed of in an environmentally safe and economical manner. Public awareness about the various locations that accept and process these wastes should be fostered to insure that cars, boats and trailers that have reached the end of their life cycles don’t become public nuisances, marring the landscape. Knowing what businesses accept these kinds of waste may reduce the quantities that are illegally abandoned.

Conclusion

All three landfills currently being used by Lake County for its solid waste are expected to be closed by 2017 (SWALCO, 2002C:2-2 – 2-3).

Any future planning for a transfer station should emphasize the possibility of using rail to transport solid waste from a transfer station to a landfill. Including rail in the transportation process would keep trucking on the roads within the County to a minimum.

Goal and Policies²⁰

5.14 Goal: Expand innovative recycling programs.

5.14.1 Policy: Support expansion of the Lake County Recycling Ordinance to include commercial recycling.

5.14.2 Policy: Encourage residential yard waste composting, according to the Health Department's guidelines, and local programs for brush chipping for use as mulch.

5.14.3 Policy: The recycling of construction and demolition waste should be required.

5.15 Goal: Lake County will be served by an efficient, reliable, convenient, and environmentally sound solid waste disposal system that includes marketing of products made from recycled materials.

5.15.1 Policy: Encourage SWALCO to expand its public education programs on how to safely dispose of household hazardous wastes and consumer products that require special handling.

5.15.2 Policy: SWALCO should assist with and develop programs that insure that Lake County residents can dispose of *all* consumer goods in a timely, relatively convenient, and environmentally sound manner.

5.15.3 Policy: Encourage SWALCO to increase the frequency, and expand the locations, of special collection programs for household hazardous waste, electronics, tires, and all other hard-to-dispose-of consumer items.

5.15.4 Policy: Encourage Lake County DOT and other agencies with the responsibility to construct or repair roads, and the owners and operators of landfills, to use recycled scrap tires whenever possible.

5.15.5 Policy: Encourage the County and municipalities to initiate a program to collect and recycle junk or abandoned automobiles, boats, and trailers.

5.15.6 Policy: Encourage the County and municipalities to adopt ordinances that require verification that debris and waste from construction projects, including home repairs and alterations, have been disposed of properly.

5.15.7 Policy: SWALCO should work with the business community to develop a convenient and economical program for disposing of low quantities of hazardous waste materials.

5.15.8 Policy: The possibility of using rail in the process of transporting solid waste from transfer stations to a landfill should always be considered.

5.16 Goal: Ensure SWALCO continues to maintain and implement innovative programs and policies.

²⁰ As stated in Chapter 1, Introduction, a Goal is "the desired result to be achieved by implementing the Plan;" and a Policy is "a general method or action designed to achieve a goal."

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- 5.16.1 Policy: Support SWALCO's recommendation for a volume based payment system to encourage source reduction, recycling, and reuse and to educate County residents on the amount they are paying for solid waste management.
- 5.16.2 Policy: Encourage SWALCO to retain the policy of monitoring and evaluating emerging technologies that are reliable, environmentally sound, and financially feasible for the Lake County waste stream.
- 5.16.3 Policy: Support SWALCO's environmental education program that provides information to consumers about commonly used products that are hazardous when thrown away in ordinary household waste and gives directions on how to dispose of these products safely.

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Chapter 5

Infrastructure and Services

Energy: Electricity and Natural Gas

Significance

Reliable sources of electricity and natural gas are critical to Lake County. Natural gas is used to generate electricity for industrial uses and for home heating. Successfully providing for future energy needs requires elected County and municipality representatives and citizens of all backgrounds and interests to examine energy comprehensively and objectively, thoroughly considering costs and benefits.

Issues and Opportunities

- Base load and peak load power plants need to be studied from the perspective of meeting future energy demands and protecting the environment.
- While electric generation presently is adequate, additional generation will be needed in the future. For the region that includes Illinois, the predicted annual growth in electric demand is 2% annually, which is about 1000 megawatts (MW)²¹ per year.
- There is no guarantee that the power that is generated locally (e.g. Midwest Generation in Waukegan) will be sold locally. Similarly for Illinois as a whole, there is no guarantee that power generated in the state will be used by the communities in the state.
- Lake County is a "premier" area for power plants because of its location adjacent to Chicago and Cook County, and Wisconsin; the existing transmission grid built for the (now closed) Zion Nuclear Power Plant; and the existing natural gas lines.
- Improvements to the transmission system are needed to increase its ability to bring electricity into and take it out of Illinois.
- Power system design always involves a tradeoff between generation versus transmission.

Analysis

The current uncertainty on availability and cost of electricity in Illinois is due to the Illinois Electric Service Customer Choice and Rate Relief Law of 1997 (the Illinois Customer Choice Law). The purpose of the law was to restructure the state's electric utility industry and provide customers with choices in electric providers and competitive prices (Illinois Commerce Commission, 2001). The energy market had to be reorganized because of the law, but it became "re-regulated," not "de-regulated." The wholesale portion of the market was able to act "much like a free market," but the retail market remained "very regulated" (Elam, 2000). The law has led to the "emergence of peaker plants" (Winstanley, 2000A:1).

Wholesale electricity is a commodity, and the price moves based on supply and demand (Elam, 2000). Wholesale electricity can be moved anywhere in the transmission system where it can be

²¹ A megawatt is one million watts.

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sold at the highest price. There is a cost to "rent" the transmission system(s) needed to transport the electricity from the source of generation to the buyer (Elam, 2000).

While the state currently has adequate amounts of generated electricity, additional generating plants will be needed in future years (Mathias, 2001:3, 5). The future need will be "modest"; Illinois is not facing a "crisis" situation with regard to generation (Overbye, 2000:607-608). For the region that includes Illinois, the predicted annual growth in electric demand is 2% annually, which is about 1000 megawatts (MW) per year. In Illinois, approximately 22,000 MW of new generation has either been permitted by the IEPA or is under IEPA review. Of the new generation, about 14,000 MW would be from peakers. The amount of generation being proposed greatly exceeds the need (Hiskens, 2001). According to Commonwealth Edison (ComEd), which is the electric distribution company for all of Lake County, "a megawatt is equal to the power it takes to provide the electrical needs for about 900 average residential customers during the peak summer months" (ComEd, 2001:b.2-1, Table 23 footnote).

Electricity produced in Lake County need not be consumed in Lake County. The electricity can be economically transported large distances and profitably sold in other states. The location, resources, and infrastructure in Lake County, coupled with the state's relatively loose regulations (especially with regard to obtaining and using groundwater) makes the County a very attractive area for the construction of power plants (Carter, 2000; Cole, 2000; LaBelle, 2000). There is no way to guarantee that generation facilities (including base load and peak load facilities) built in Lake County would be the source for the electricity used in the County or state. Even if there were to be a local or statewide shortage of electricity in the future, the electricity made in Lake County could be sold in a distant state if that is where the seller chose to sell it, provided there was capacity on the transmission grid to convey the power to the desired destination.

A proposal in 1998 to build a base load power plant on land that would be annexed into the Village of Island Lake sparked the Lake County Board to begin educating itself on the impacts of both base load and peaker plants (Carter, 2000). The Board was concerned with noise, lighting, and the impacts to air quality. However, the major concern was with water: the amount of water needed to operate a plant; and how the water discharged from a plant might affect the water quality of groundwater and surface waters. The water for the Island Lake plant would have come from the aquifer. It is possible that a plant located within the Lake Michigan water service area could use Lake Michigan water.

Peak-Load Electrical Power Generating Facilities: Peaker Plants

While peaker plants are not new in Illinois (Romaine, 2000:2, 30), development proposals began to proliferate in the state following the deregulation of the electrical utility industry by the Customer Choice Law of 1997 (Romaine, 2000:3, 30; Winstanley, 2000A:1). In Lake County, only the peaker plant project in the City of Zion has obtained local approval.

Like base load power plants, peaker plants raise concerns with noise, air quality, and water use. Noise is controlled through the design and construction of the peaker housing, combined with setbacks and buffers (Zak, 2000:3-4). Even though the potential for excessive noise from peakers is "greater...than most other types of state regulated facilities" (Zak, 2000:3), as of August 2000, the IEPA had not had any noise complaints on existing peaker plants (Zak, 2000:6).

The IEPA uses "air quality models to simulate the effects of...[peaker plants] and to evaluate whether the operation of these sources threatens the attainment or maintenance of relevant air quality standards" (Kaleel, 2000:2). Based on the regulations and guidelines of the U.S. Environmental Protection Agency, peaker plants do have the potential for significant air quality

impacts (Kaleel, 2000:6). However, through its modeling, testing, and permitting processes, the IEPA has determined that the gas-fired peaker plants it has permitted do not exceed the limits and standards of applicable regulations (Kaleel, 2000:8; Romaine, 2000:13-17, 25-27). Although peaker plants "can be expected to cause increased levels of ozone within the Chicago metropolitan area, in areas of high density" (Kaleel, 2000:14); and even though they are most likely to be operating on hot summer days when the formation of ozone is greatest (Romaine, 2000:14); the impact is not considered excessive (Kaleel, 2000:13-14).

The amount of water used by peaker plants varies depending upon the design of the plant and the number of days of operation (Winstanley, 2000B:153). Assuming that peaker plants will operate from 20 to 90 days a year, and that water use will be from about 100,000 gallons per day to 2 million gallons per day, gives a range of 1.4 to 180 million gallons per year. A base load power plant will use between 5 and 20 million gallons per day, for an annual total of 1,500 million (1.5 billion) to 6,000 million (6 billion) gallons. Peaker plants consume less than 1% to 3% of the amount of water used by a base load plant.

Comparing water use of peaker plants to municipal water use: The population of Champaign-Urbana is about 120,000. The City uses 20 million gallons of groundwater per day, which is 7,300 million (7.3 billion) gallons per year. The amount of water used in a year by a peaker plant would be equivalent to that used by between 25 and 3,000 people (Winstanley, 2000B:154-155).

Because of the apparent limits to the amount of water available in Lake County and northeastern Illinois (see the section on Water Supply in this chapter), the need for new peaker plants (or base load power plants or any other use that requires large amounts of water, e.g., a golf course) should be carefully evaluated against other types of uses that are "competing" for the same water.

Lake County Board Legislative Programs Regarding Power Plants

The concerns and questions raised by the Lake County Board as it educated itself on both the power plant permitting process at the state level and the local impacts caused by these plants became part of the impetus behind Governor Ryan's initiation of hearings in 2000 before the Illinois Pollution Control Board (IPCB) to consider the issue of peaking power plants (LaBelle, 2000). Its work on power plants led the County Board to include this topic in its legislative programs in 2000 and 2001.

Lake County's 2000 Legislative Program recommended that IEPA "delay action on all pending peaker plant permits until appropriate guidelines can be established" (Lake County Board, 2000). Suggested guidelines included addressing air emissions, groundwater usage, surface water discharge, lighting, noise, property values, and emergency response procedures. A siting program similar to that currently used for landfills was also suggested. In its 2001 Legislative Program, the County Board recommended that the IPCB report (dated December 2000) be "supplemented by additional regulations requiring (1) that the cumulative effect of air emissions from all surrounding facilities, existing and proposed, [be] incorporated within any modeling conducted, and (2) that the siting of any facility be addressed on a regional basis by a regional authority since the environmental impacts of a peaker plant affect more than just the immediate local area" (Lake County Board, 2001).

The Lake County Board recommended a moratorium on permitting new peaker plants until the regulations were developed.

The Lake County Board continues to make recommendations for federal and state legislation to better control the negative impacts of electricity generating plants. At the federal level, the Board is supporting legislation to tighten emission controls to reduce air pollution.

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Large quantities of water are used in electricity generation. The Board is reviewing approaches the state of Illinois could adopt to help ensure that the water used in new power plants will not deplete the aquifers, lower connecting surface water bodies, and impact existing wells.

Electric Power Interruptions

The Illinois Commerce Commission has adopted rules on electric service reliability as required by the Illinois Public Utilities Act. These rules require the Commonwealth Edison Company (ComEd), the electric distribution company for all of Lake County, to prepare and file with the ICC an annual electric service reliability report.²² Under the ICC Reliability Rules, electricity interruptions (power outages) that result in the loss of power to one or more customers for a period of longer than one minute have to be reported (ComEd, 2002:G-8). The most recent ComEd report available is for the year 2001.

In Lake County in 2001 there were about 1600 interruptions in which at least one customer did not have electricity for a duration of at least one minute (ComEd, 2002: Appendix 2). The top five causes of interruptions were: weather related (344), followed by underground equipment problems (341), trees (287), planned interruptions (165) [planned interruptions are interruptions scheduled by the power company to perform routine maintenance and repair work or to install new, or upgrade existing, equipment (ComEd, 2002:C-1)], and animal related (usually squirrels) (149).

Even though peak demand records were set on three separate summer days (ComEd, 2002:1), none of the outages in 2001 was due to a lack of electricity.

Natural Gas

Natural gas is used to generate electricity, for other industrial uses, and for heating residential and non-residential structures. Intrastate pipelines and their related gas delivery infrastructure are privately owned and operated by two utility companies (local distribution companies or LDCs): Nicor and Northshore Gas. Both companies have sufficient infrastructure to serve their existing customers.

In 2002 the 36" diameter Horizon Pipeline, was completed. This pipeline, which is in McHenry County near the border with Lake County, increased the amount of natural gas that can be delivered to the Nicor Gas network serving northern and northeastern Illinois (*Pipeline and Gas Journal*, 2002).

Nicor Gas currently has a large diameter high-pressure gas line that runs into the Village of Volo from McHenry County to the west. From Volo, another large diameter line runs northeast to Round Lake Beach, and then east to Waukegan. A large portion of Nicor Gas' transmission system in Lake County is closely aligned with Commonwealth Edison's existing electric transmission lines (see Figure 5.14). Nicor Gas' existing large diameter piping and the new Horizon Pipeline would both be capable of delivering natural gas for electric generating plants (Buckles, 2001).

Renewable, Alternative, and Green Energy

²² The ICC places these reports in the Electricity Issues section on its web page: <http://www.icc.state.il.us>.

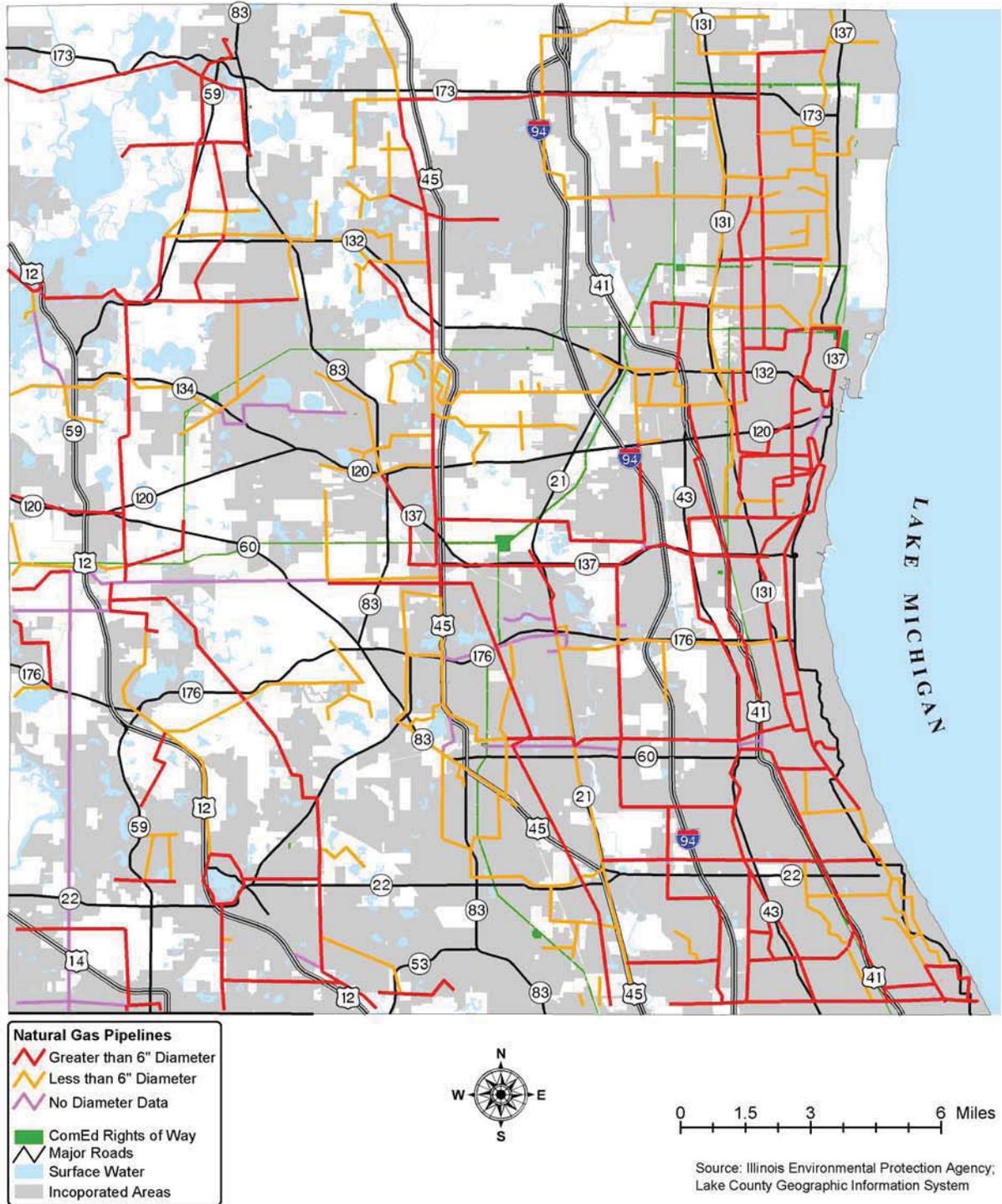
Several alternatives to electricity generated by traditional fossil fuel or nuclear power plants have been developed. Alternative, “green energy” resources include wind; solar–solar thermal energy which can be used to heat water or space and photovoltaic “solar cells” which produce electricity; biomass, which includes trees, agricultural crop residue, energy crops that are specifically grown for use as fuels, and forestry residues; biogas (primarily methane) which is produced in landfills and sewage treatment plants; and fuel cells. Compared to traditional fuels, renewable alternatives provide benefits such as reduced emissions of greenhouse gases and particulate air pollutants, less noise pollution, a reduced dependency on imported oil, and no radioactive wastes.

The Illinois Department of Commerce and Economic Opportunity (formerly the Department of Commerce and Community Affairs (DCCA)], Bureau of Energy and Recycling, sponsors programs intended to “bring energy efficiency and renewable energy strategies and solutions to homes, businesses and communities in Illinois” (DCEO, 2003). DCEO administers the Renewable Energy Resources Program “in order to foster investment in and the development and use of renewable energy resources within the state of Illinois.” The program provides grants for alternative energy projects that involve wind, solar thermal and photovoltaic systems, dedicated crops grown for energy production, biomass from organic wastes, and stationary fuel cells that utilize biogas (DCEO, 2002).

A detailed examination of which alternative energy sources are best suited for use in Lake County is beyond the scope of this *Regional Framework Plan*. Because this complex issue is of great interest to residents and the Lake County Board, a task force should be formed to study the various possibilities and prepare recommendations on what can be done to increase the use of alternative energy within the County (see Goal 5.3 and its policies, especially Policy 5.3.1). The potential for obtaining a DCEO grant through the Renewable Energy Resource Program could be considered.

The Alternative Energy Task Force should explore opportunities and obstacles to connecting small-scale (less than 100 kilowatts in capacity) renewable energy generation systems to the electric transmission and distribution system (U.S. Department of Energy, 2002). It would also examine opportunities for energy and resource conservation. This would include the use, onsite recovery, and reuse of the water involved in electricity generation, and opportunities for cogeneration (for example, using the “waste heat” that is produced during electricity generation to heat buildings) (U.S. Department of Energy, 1995). The topic of conservation would include a consideration of green buildings, which utilize more resource-efficient design and materials. Green buildings are designed to be energy efficient and to use renewable sources of energy (USEPA, 2002).

Figure 5.14
Natural Gas Pipelines and ComEd Rights of Way



Goals and Policies²³

- 5.17 Goal:** Participate with state government to produce a statewide strategic plan to coordinate all electricity infrastructure.
- 5.17.1 **Policy:** Petition the Illinois General Assembly to adopt an electricity plan that considers the need for future generation and transmission infrastructure, assures that all regions of the state have reliable power, and minimizes the impacts to local areas that will be the sites of generation or transmission infrastructure.
- 5.17.2 **Policy:** If the state government declines to develop a statewide plan, the County should analyze the need for new capacity based on forecasts of base load and peak load demand.
- 5.18 Goal:** Within Lake County, ensure that any new power generation plants are properly located (based on existing infrastructure, land use, zoning, and natural resource protection), minimize noise, and use best available control technology (BACT) and water conservation and protection measures.
- 5.18.1 **Policy:** The Lake County Unified Development Ordinance should be amended to require new generating plants to minimize noise, employ BACTs, use the minimum amount of water necessary, reuse water, clean the water that is discharged, and ensure that the water that is discharged will be available for aquifer recharge.
- 5.18.2 **Policy:** The County will consider supporting legislation to ensure that any companies that build new generation plants in Lake County will give priority to serving County residents and will sell electricity to customers in Lake County at a just and reasonable price.
- 5.19 Goal:** Lake County should encourage alternative, renewable energy sources and advanced conservation measures to reduce the County's use of, and reliance upon, electricity produced from coal, natural gas, or nuclear energy.
- 5.19.1 **Policy:** Form a task force or committee to research alternative, renewable energy sources and conservation techniques that can be used to reduce the use of electricity and natural gas.
- 5.19.2 **Policy:** Obtain funding through federal or other grants to construct an electricity generation demonstration project utilizing non-polluting, sustainable, techniques.
- 5.19.3 **Policy:** Consider establishing a center for electric generation education to provide information on non-polluting, alternative, renewable energy sources and conservation techniques.
- 5.19.4 **Policy:** Lake County should consider developing and adopting an "energy efficiency building code."
- 5.20 Goal:** Lake County will study alternative approaches to supplying the electricity and natural gas used in the County for possible cost savings.

²³ As stated in Chapter 1, Introduction, a Goal is defined as "the desired result to be achieved by implementing the *Plan*;" and a Policy is defined as "a general method or action designed to achieve a goal."

- 5.20.1 Policy: Explore the possibility of the County owning an electricity generating facility, giving consideration to alternative energy resources as well as fossil fuels.
- 5.20.2 Policy: Periodically contact municipal governments to evaluate interest in forming a purchasing consortium for buying electricity or natural gas.

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Chapter 5 Infrastructure and Services Telecommunications

Significance

Consumers, in their homes and for their businesses, consider access to modern telecommunications²⁴ as much a necessity as electricity. The market is responding and cable, fiber optics, and wireless infrastructure providers are active in Lake County.

An important consideration in business location is the availability of telecommunications infrastructure for voice, cable television, and Internet. In order to help attract targeted types of businesses, the *Regional Framework Plan* will contain policies that encourage the expansion of the *physical* telecommunications transmission infrastructure (cellular communication towers, copper cable, and fiber optic cable). Besides being important for business, the availability of modern voice, television, video, and access to digital network infrastructure is also a quality of life issue impacting residents, the educational system, and government.

Issues and Opportunities

- Broadband, high speed Internet connectivity from an Internet service provider is available in some areas and access is expected to increase.
- An increase in the availability of broadband connections may increase opportunities for distance learning and telecommuting.
- Except for height, setbacks, and landscaping, telecommunications towers are exempt from County zoning regulations.
- The Chicago metro area, which includes Lake County, ranks first in the nation in high-technology jobs,²⁵ which includes telecommunications jobs.
- High technology businesses and industries find areas where connections to the most advanced telecommunications network are established to be more attractive.
- Businesses and industries now require connections to the most advanced telecommunications networks.

Analysis

The Chicago metro area, which includes Lake County, ranks first in the nation in terms of the number of telecommunications and high-technology jobs available (Markusen et al, 2001).

Lake County government and the municipalities should review their ordinances and policies to ensure that they do not unnecessarily restrict the expansion of the telecommunications network.

²⁴ Telecommunication includes transmission and reception of information of any nature by copper cable, fiber optic cable, wireless (radio waves, cellular, satellite, and microwave), visual, or other electromagnetic systems (adapted from Attitude Long Distance, undated; and Telecommunications Industry Association, 2002).

²⁵ A “high-tech” industry is defined as one that employs three times the national average of scientists, engineers, and computer professionals within that particular industry (Markusen et al, 2001).

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Factors that could impact the growth and expansion of the telecommunications infrastructure are discussed below.

Planning for Telecommunications Infrastructure

Telecommunication systems are a type of infrastructure that must be taken into consideration in land use planning, zoning codes, and development regulations. As telecommunication technology becomes more critical in everyday matters, access to this infrastructure becomes increasingly important.

Fiber optic cable is currently “state of the art.” In fiber optics, communication data are transmitted as beams of light through strands of glass. The individual strands are capable of carrying large amounts of data at extremely high speed. Bundling fibers together increases the amount of information that can be carried in one cable. Fiber optics can carry many times more data than copper cable can. This technology is still evolving, and the theoretical capacity of optical fiber has yet to be determined (Newton, 2001:276).

The actual fiber optic cable installation and operation will be completed by the private sector. The role of local government is to create an environment that makes it inviting for a private company to expand its fiber optic network into new areas. Local governments will need to be a participant in a fiber optic distribution network because the three primary ways fiber optic cables are located are: 1) underground, along existing railroad, utility, or street rights-of-way, 2) aerially along telephone poles or other structures which may require easements on governmentally owned properties, and 3) through sanitary sewer systems, the last of which is a relatively new technique and still somewhat experimental (Evans-Cowley, 2002:3).

Lake County presently does not have a major fiber optic network. Fiber optic cable has been installed in some areas of the County. There is also some fiber optic cable located in undisclosed locations of the County, under the control of private companies. The County and municipalities need to prepare for the eventual expansion of such a network by ensuring rights-of-way are accessible and also by being sure that zoning codes and ordinances do not unduly restrict the location of structures needed for this infrastructure as it grows.

For instance, it may be necessary for providers to construct “telecommunications hotels” (telecom hotels, also called carrier hotels) at major fiber optic cable intersections, which is where information gets transferred from one fiber optic line to another.

Telecom hotels operate in much the same manner as a traditional office park where space is leased to various tenants. However, rather than leasing space for employees of companies, space is leased for the equipment of telecommunications providers and companies (Evans-Cowley, 2002:3).

While the type of building that is used as a telecom hotel can vary, the most common type is an older, multistory, industrial or office building in a downtown area. Examples of this type of facility can be found in nearby Chicago. Adaptive reuse of existing buildings could be an economic development tool for disinvested commercial areas.

Telecom hotels are also being built in suburban areas with high concentrations of office space. Suburban locations are sometimes preferred for security reasons (Evans-Cowley, 2002:4). Telecom hotel facilities can be classified in zoning codes in various ways. Some cities see these as utilities; some add them as a permitted use in selected zoning districts (industrial, for instance); some require conditional use permits; still others classify them as a unique use to make it easier

for them to locate near the fiber optic lines that they serve (Evans-Cowley, 2002: 15, 19). A recent study of zoning codes found that only eight of the 50 largest cities in the U.S. had regulations specifically addressing telecom hotels (Evans-Cowley 2002:14).

Parking is also an issue associated with telecom hotels. Although telecom hotels can be relatively large buildings housing a great deal of equipment, they tend to have few employees. Many zoning ordinances require parking spaces based on the floor area of a building. However, in the case of telecom hotels, this ultimately produces many more parking spaces than are actually needed. Development regulations need to be reviewed to ensure that an excessive amount of parking is not required (Evans-Cowley, 2002:16).

The appearance of telecom hotels has also been a cause for concern. Because of the unique requirements of such a facility, different needs must be met. This is especially true in terms of the HVAC and electrical systems. Because these facilities often require the installation of additional equipment, this equipment is often placed either on the roof of the building, or on the ground outside of the building. Some communities have decided that this equipment can be unsightly and therefore require screening of various types. It may be desirable to require some architectural detailing on the exterior so that the buildings will not just display blank walls and appear to be vacant (Evans-Cowley, 2002:18).

Mixed-use ordinances can also be beneficial by requiring at least part of a larger facility be dedicated to retail purposes. This helps maintain the amount of pedestrian traffic at street level, thereby reducing the “deadening” effect that a mostly unoccupied building can potentially contribute to (Evans-Cowley, 2002:18).

Telecommunication Regulations

Illinois Commerce Commission

Utility companies are regulated at the state level through the Illinois Commerce Commission (ICC). The ICC provides analytical, technical and policy support for issues such as tariffs, rules, federal requirements, and other items under its jurisdiction. The ICC is also responsible for regulating the rates of telecommunications companies and ensuring both reasonable prices for consumers, and the opportunity for utility companies to earn a reasonable profit (ICC: 2002).

State of Illinois Statutes

The County’s authority to regulate telecommunications facilities comes from the Illinois State Statutes (55 ILCS 5/5-12001.1). However, County government’s ability to regulate these facilities, and especially cell towers, is limited. The following sections will describe in greater detail these limitations.

The Facility Location Hierarchy

The ILCS states that a telecommunications carrier shall consider the following hierarchy when selecting a location for a new facility:

1. A non-residentially zoned lot is the **most desirable**.
2. A residentially zoned lot that is not used for residential purposes is the second most desirable location.

3. A residentially zoned lot that is 2 acres or more in size and is used for residential purposes is the third most desirable location.
4. A residentially zoned lot that is less than 2 acres in size and is used for residential purposes is the **least desirable** location.

Aesthetic Considerations for Facilities

The ILCS also contains guidelines that must be considered by telecommunications carriers to maintain the aesthetic qualities of the areas within proximity of a new telecommunications facility, including cell towers. In summary, these measures include:

- Low maintenance landscaping to provide partial screening near residential areas.
- Shielding of lights to prevent glare from extending substantially beyond facility boundaries (except lighting required by FCC and FAA).
- Fencing installed around a facility.
- No facility should encroach onto an existing septic field.
- Materials and colors to be reasonably compatible with surrounding residential character.
- Meeting all flood hazard area and wetland area requirements.
- Preserving (where feasible) all trees with a diameter in excess of three inches.

The County encourages the use of innovative cell tower designs that will minimize visual impact. This would include the use of camouflaged cell tower equipment or equipment that is disguised so as to not readily resemble a cell tower. Co-location of cell towers could also have a positive visual impact.

Development Standards

The ILCS limits the regulation of new telecommunications facilities established after 1997 in several ways. In summary, the code states that:

- A facility may be established on the same lot as other structures.
- No minimum lot area, width, or depth shall be required for a facility.
- No off-street parking spaces shall be required, unless the facility is to be manned on a regular, daily basis.
- No portion of a facility's supporting structure or equipment housing shall be less than 15 feet from the front lot line of the facility lot or less than 10 feet from any other lot line.
- No bulk regulations or lot coverage, building coverage, or floor area ratio limitations shall be applied to a facility.
- A county's review of a building permit application for a facility shall be completed within 30 days.
- For counties with a population greater than 180,000 persons, such as Lake County:
 - Unless a height variation is granted by the county board, the height of a facility shall not exceed 75 feet if located in a residential district. The height of a facility shall not exceed 200 feet if located in a non-residential zoning district.
 - If the supporting structure is an antenna tower other than a qualifying structure (see **Definitions**) then (i) if the facility will be located in a residential zoning district the lot line set back distance to the nearest residentially zoned lot shall be at least 50% of the height of the facility's supporting structure or (ii) if the facility will be located in a non-residential zoning district the horizontal separation distance to the nearest principal

residential building shall be at least equal to the height of the facility's supporting structure.

Radio frequency emissions have been a much-debated topic surrounding cell tower placement. However, the Telecommunications Act of 1996 states that "No State or local government or instrumentality thereof may regulate the placement, construction, and modification of personal wireless service facilities on the basis of the environmental effects of radio frequency emissions to the extent that such facilities comply with the Commission's [FCC's] regulations concerning such emissions" (Telecommunications Act of 1996). The Code of Federal Regulations also contains this same text.

Ability of Municipalities to Regulate Telecommunications Facilities

The state's only provision for the regulation of telecommunications carriers (by municipalities) is that "no municipality may exercise any power...outside the corporate limits of the municipality with respect to a telecommunications carrier" (65 ILCS, 5/11 – 13 – 1).

Therefore, municipalities have the ability to regulate telecommunications infrastructure through their standard zoning and development regulations. This allows municipalities to utilize land use tools such as (but not limited to) zoning ordinances, subdivision control ordinances, conditional use permits, special use districts and overlay zones to control the development of telecommunications infrastructure within their corporate limits. However, it is important to understand that telecommunications infrastructure cannot be completely prohibited within a municipality through such regulations and policies. Municipalities may even require that co-location of telecommunications facilities be considered as part of the permit review process.

The creation of a Land Use Facilities Matrix could encourage co-location. In such a matrix, opportunity areas (i.e., Industrial) and avoidance areas (i.e., Residential) are identified. After this has been done, the type of telecommunications facility is identified as one that is either encouraged, neutral, or discouraged in the opportunity and avoidance areas. As an example, the construction of a new cell tower in an established residential district might be discouraged, whereas such a facility would be encouraged in an industrial park. The Knoxville/Knox County metropolitan planning commission has a well-developed example of such a matrix for the regulation of wireless communications facilities. The purpose of this plan is to ensure that any proposed towers are in harmony with already adopted comprehensive plans. By developing such a matrix the County would be better able to control the placement of wireless communications towers.

In order to facilitate the development of advanced telecommunications facilities, the County should consider forming a public/private task force for several reasons. First, such a task force would be beneficial in helping providers expand their current networks as rapidly as possible, especially fiber optic cable networks. The task force would be responsible for handling rights-of-way issues associated with the expansion of such networks. The task force would also be responsible for the development of a Land Use Facilities Matrix, which could most likely be implemented through the Unified Development Ordinance. Additionally, the task force would be charged with planning for the next generation of telecommunications technology as that technology develops. Economic viability for many businesses depends on access to the latest telecommunications technologies. In order to accomplish this it would also be necessary for the task force to interact with the appropriate municipal, state, and federal regulatory authorities.

Goals and Policies²⁶

- 5.21 Goal:** Every area of Lake County will have access to the latest telecommunications infrastructure, services, and technologies by 2020.
- 5.21.1 Policy: The County is encouraged to form a public/private task force for guiding telecommunications advancement initiatives.
- 5.21.2 Policy: The County, municipalities, utilities, and private telecommunications companies are encouraged to cooperate in providing towers, pipes, poles, easements, and rights-of-way for telecommunications infrastructure in all parts of the County, including those not currently served by advanced telecommunications infrastructure.
- 5.21.3 Policy: The County and municipalities are encouraged to review their ordinances to ensure that telecommunications facilities are appropriately and uniformly regulated.
- 5.21.4 Policy: The County is encouraged to take a leadership role in developing a model ordinance to simplify the approval process while maintaining adequate standards. Standards for dismantling all types of telecommunications facilities (not just limited to cell towers) should also be considered.
- 5.22 Goal:** For economic purposes, the County will have an advanced telecommunications corridor.
- 5.22.1 Policy: The County, in partnership with interested communities, should identify and develop an advanced telecommunications corridor to assist in providing high-technology employment, and to assist in maintaining the region's high-technology prominence.
- 5.23 Goal:** Minimize the visual impact of telecommunications infrastructure throughout the County.
- 5.23.1 Policy: Encourage telecommunications infrastructure to be buried underground, or camouflaged within existing or new structures, as opposed to overhead installation.
- 5.23.2 Policy: Where feasible, co-location of facilities (particularly on towers) is encouraged, especially through the permitting process.

Definitions

Broadband: As used in the *Regional Framework Plan*, “broadband” refers to high speed/high capacity communications channels that provide homes and businesses with faster access to the Internet and improved performance and speed while on the Internet (National Research Council, 2002:43-44; 84).

²⁶ As stated in Chapter 1, Introduction, a Goal is defined as “the desired result to be achieved by implementing the *Plan*,” and a Policy is defined as “a general method or action designed to achieve a goal.”

Co-location: When the equipment of two different telecommunications carriers is physically located in the same facility, and is therefore shared by more than one carrier. (Newton, 2001: 159).

Digital network infrastructure: Services and equipment needed to move digitized (any information in a digital format) text, images, sound, and video over fiber optic cables, copper wires, coaxial cable, and wireless transmissions (MPC, “Metropolitan Chicago’s Strategic Position,” 2002).

Fiber optic: Refers to a type of cabling made of extremely pure glass. Optical fiber carries light wave signals as opposed to the electrical signals that copper carries. Fiber optic cable can send more information longer distances than copper cable (Newton, 2001: 276).

Qualifying structure: A supporting structure that is (i) an existing structure, if the height of the facility, including the structure, is not more than 15 feet higher than the structure just before the facility is installed; or (ii) a substantially similar, substantially same-location replacement of an existing structure, if the height of the facility, including the replacement structure, is not more than 15 feet higher than the height of the existing structure just before the facility is installed (55 ILCS 5/5 – 12001.1).

Telecom hotel: A shell building with utility hookups and connections to one or more fiber optic cable systems.

Telecommunications facility: “Facility” means that part of the signal distribution system used or operated by a telecommunications carrier under a license from the FCC consisting of a combination of improvements and equipment including (i) one or more antennas; (ii) a supporting structure and the hardware by which antennas are attached; (iii) equipment housing; and (iv) ancillary equipment such as signal transmission cables and miscellaneous hardware (55 ILCS 5/5 12001.1).

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Chapter 5 Infrastructure and Services Public Schools

Significance

A quality public education system is a major priority for residents of Illinois, the Chicago region, and Lake County. According to a recent report from the Metropolitan Planning Council, "Most Illinoisans believe education is the top issue facing the state. Three out of four Illinoisans support both increased funding for public schools and tax increases to pay for it" (Burns, 2000:2). In its community forums, Chicago Metropolitan 2020 found that the number one priority was educational achievement and opportunity (Chicago Metropolitan 2020, 2001:no page numbers).

In 2001 Lake County initiated a telephone survey to identify the quality of life factors most important to County residents. The largest percentage of respondents named public schools as the "top priority," with schools also receiving the largest percentage as one of the most important quality of life factors (Lake County Department of Communications, 2001:no page numbers).

The obligation for providing a high quality, public education lies primarily with the local school district, with oversight and standards set by the Illinois State Board of Education. The *Regional Framework Plan* does not attempt to usurp that responsibility. In the *Plan*, public education is approached from a regional planning perspective. The public school system is recognized and treated as a critical public service that must be coordinated with the land development process.

Through the analysis, goals, and policies, the Public Schools section attempts to present recommendations that ensure quality schools are present in the County to meet the demands of future growth; or conversely, prevent future growth from negatively impacting the public schools, thereby diminishing the quality of education available in Lake County.

Issues and Opportunities

- Lake County has many schools that have been recognized for excellence and innovative programs.
- The current system of supporting schools that relies so heavily upon local property taxes causes fiscal problems and inequities between communities and school districts.
- A quality education system is necessary to ensure the highly skilled labor force required to meet Lake County's employment needs is present.
- Many households choose to live in an area with high quality schools and/or moderate real estate taxes. This may encourage new residential development in greenfields areas, contributing to sprawl and discouraging revitalization of older communities.

Analysis

While a county comprehensive plan does not control the day-to-day operation of school districts, or directly contribute to the quality of the graduates, a plan, particularly its future land use component designating the distribution of residential and non-residential uses, can have a significant impact on the conditions within a school district. This point is elaborated on below.

The current combination of property taxes, state, and federal funding is seldom sufficient to build and support the schools required by the school age population. Areas with a large amount of

Lake County, Illinois

residential property usually have it especially difficult. These residential properties "supply" school children, which the lower taxes generated by these residential properties (compared to the property taxes on non-residential properties), cannot support. Local leaders increase their efforts to attract non-residential development to expand their tax base; but, in the meantime, they are forced to raise taxes or seek additional money through referendums in their attempts to keep up with the costs of providing the needed services.

A predominately residential municipality with a high tax rate is at a disadvantage when it comes to attracting new commercial/industrial development because the commercial/industrial uses tend to select locations with low tax rates [even though the "communities with the lowest tax rates tend to have the most valuable real estate" (Metropolitan Planning Council, 2001:4)]. Applied to the state as a whole, the "primary cause" of the difficult, in some cases desperate, financial situation being faced by some school districts "is the over-reliance on revenue from local property taxes to fund public schools" (Burns, 2000:1).

The situation only worsens when a commercial/industrial project locates near a predominately residential municipality because the new residents attracted to the jobs are likely to choose homes in nearby residential areas where, while the property taxes may be high, housing is affordable. So while the local government in which the commercial/industrial development locates benefits from an increase to its tax base, the areas that receive the new residents will see an increased need for infrastructure and public services that will only exacerbate the existing budget problems (Metropolitan Planning Council, 2000). Schools are one of the most immediate, important, and largest expenses associated with the residential growth. A deleterious cycle can start: To pay for the additional services may force a community to raise its property taxes. Doing this makes these communities less attractive to new, non-residential developments since the companies and industries tend to look for sites with lower taxes. The communities with the lower taxes get the non-residential development. This new development is followed by residential development that locates nearby. Taxes from the new residential development do not pay for the increased services needed, and so on.

Since the primary source of public school funding in Illinois is local property taxes, having quality schools depends upon property tax wealth (Chicago Metropolitan 2020, 2002:36-37). There is some correlation between the amount of spending per student and the quality of the education provided, but the relationship between spending and quality is not absolute (Chicago Metropolitan 2020, 2002:36). Nevertheless, a better-funded school is more likely to provide a better education than a poorly funded school.

Businesses rely heavily on the local public school system for a reliable supply of educated and trained employees (Chicago Metropolitan 2020, 2002:35, 38, 41) and so are more likely to locate in areas where the schools are adequately funded, and the graduates are prepared to enter the workforce.

One of the reasons for revising the 1994 *Framework Plan* is the amount of development and growth that has taken place in Lake County since 1994. The growth that has occurred and is forecast to occur by 2020 necessitates better planning cooperation and coordination among all forms of government in the County. Growth without forethought and intergovernmental communication can be especially damaging to the public education system. A child's academic years spent in low quality schools are difficult to recover.

It is essential for the future land use components in County and municipal comprehensive plans to **cooperatively** designate a countywide land use mixture that has the potential to generate sufficient taxes to support all the public schools in the County. The benefits provided to all the citizens through future land use cooperation, rather than competition, will be realized in other

areas as well, including more efficiency and less cost in providing parks and recreation, stormwater management, water, and sewer, as well as essential services such as law enforcement and fire protection.

Another basic land use and infrastructure planning issue related to public schools has come to be called “school sprawl.” School sprawl has been described as: “a large educational facility with huge sports fields located far from the town or city center, serviced by a fleet of buses hauling school kids over miles of roads” (Planning Commissioners Journal, 2001:1). The current acreage standards for new schools are difficult to meet in established neighborhoods, which is a major reason the new schools are built in remote locations, away from established population centers (National Trust for Historic Preservation, undated:3; Planning Commissioners Journal, 2001:1). Emphasizing the renovation and upgrading of existing, smaller, neighborhood schools is consistent with the principles of “Smart Growth” and would counteract school sprawl.

School Enrollment

In 1990, the County's population from the Census was 516,418 and the public school enrollment was 90,825 (Lake County Regional Office of Education, 2001:15). In 1990 about 18% of the population attended public schools. The County's population in 2000, as determined by the 2000 Census, was 644,356. The public school enrollment was 125,876 (Lake County Regional Office of Education, 2001:5), which means that about 19% of the County's population attended a public school. The public school enrollment in September 2002 was 131,239—an increase of 10,000 students from September 2000 to September 2002 (Lake County Regional Office of Education, 2001:5; 2003:5).

**Figure 5.15
Districts by Type and Enrollment for 2002**

District Type	6th Day Enrollment
Elementary Districts (29 total)	60,485
High School Districts (10 total)	25,840
Unit Districts (6 total)	44,677
Charter School	219
Alternative School	18
TOTAL ENROLLMENT	131,239

Source: Lake County Regional Office of Education, 2003:5

The number of private and parochial schools and their enrollment have also been increasing, as shown in the Figure 5.16.

The Northeastern Illinois Planning Commission (NIPC) expects the school and pre-school population in the region to "grow steadily" up to 2020. This growth will be due to "the overall growth in population, the higher birth rates of a growing minority population, and the arrival of the baby boomers' grandchildren" (NIPC, 2000:7).

**Figure 5.16
Lake County Private and Parochial Schools and Enrollment 1989-2002¹**

Year	Number of Schools	Number of Pupils
1989	55	11,789
1990	57	11,439
1991	57	12,503
1992	57	12,904
1993	65	13,721
1994	65	14,138
1995	66	14,503
1996	68	14,986
1997	69	15,106
1998	72	15,350
1999	73	15,563
2000	74	15,775
2001	77	15,974
2002	77	15,974

¹ Includes preschools and pre-kindergarten students

Source: Lake Co. Regional Office of Education, 2001, 2002, 2003

The Quality of Education

The Federal No Child Left Behind Act of 2001 (NCLB) requires the nation’s public schools to meet federal performance standards. The primary goal of NCLB is for all students to be proficient in reading and mathematics by 2014 (Illinois State Board of Education, 2003). In 2003 the Illinois State Board of Education approved modifications to the state’s existing educational accountability system in order to comply with NCLB. The basic scoring mechanism for ensuring adequate public school performance is known as “Adequate Yearly Progress,” or AYP.

Adequate Yearly Progress calculations in Illinois are based on three factors:

1. The percent of reading and math scores that meet or exceed standards;
2. At least 95% percent of the students in a school must take the required state tests;
3. The attendance rates in elementary and middle schools, and graduation rates in high school, must meet annual targets (Illinois State Board of Education, 2003).

Schools that do not make AYP for two consecutive years are placed in Academic Early Warning Status. Schools that do not make AYP for four consecutive years are placed in Academic Watch Status. Schools that are in either of these categories are required to submit improvement plans that contain measurable outcomes for improving student performance to meet the standards (Illinois Public Act 93-0470). Sanctions for schools that do not improve may include loss of state funds or the removal of school board members. Students at schools that do not improve may choose to be reassigned to other schools. School district personnel at failing schools may be reassigned or replaced (Illinois Public Act 93-0470).

The Lake County schools that are in Academic Early Warning or Academic Watch status are shown in Figure 5.17.

**Figure 5.17
Lake County Schools in Academic Early Warning or Academic Watch (2003-2004)**

District	Early Warning	Academic Watch
Zion Elementary 6	West Elementary School	Central Junior High Shiloh Park Elementary
Waukegan Consolidated Unit 60	H.R. McCall Elementary Jack Benny Middle Robert E. Abbott Middle Waukegan High School	Carmen-Buckner Elementary Clearview Elementary Glen Flora Elementary North Elementary Daniel Webster Middle East Middle
Round Lake Area 116	Round Lake Senior High	John T. Magee Middle
North Chicago 187	North Chicago Community High	

Source: Illinois State Board of Education, 2004A

The Financial Status of Lake County’s School Districts

In Lake County there are 45 school districts: 29 elementary (generally prekindergarten through 8th grade); 10 high school (generally grades 9 through 12); and 6 unit districts (generally prekindergarten through 12th grade) (Illinois State Board of Education, 2000; Lake County Regional Office of Education, 2000:5).

In 2003 the Illinois State Board of Education (ISBE) adopted a new system for assessing the financial health of all the school districts in the state. The system uses a number of factors to arrive at a score intended to be a measure of the financial health of the district. Depending upon the score, a district falls into one of four categories. From highest to lowest, these categories are Financial Recognition, Financial Review, Financial Early Warning, and Financial Watch (Illinois State Board of Education, 2004B). Figure 5.18 shows the financial designation of Lake County’s school districts.

Financial Recognition: This is the highest category of financial strength. Districts in this category receive little or no involvement or review by the ISBE. The scoring range in this category is from 3.54 to 4.00. As shown in Figure 5.18, 10 of Lake County’s 45 school districts are in this category, based on data from 2003.

Financial Review: Districts in this category are monitored by the ISBE, and their budgets are reviewed for downward trends. The scoring range in this category is from 3.08 to 3.53. Seventeen Lake County school districts are in this category.

Financial Early Warning: ISBE closely monitors the districts in this category and provides technical assistance, such as financial projections and cash flow analysis. The scoring range is from 2.62 to 3.07. Lake County has four districts in this category.

Figure 5.18
Financial Designation of Lake County School Districts

SCHOOL DISTRICT	DISTRICT FINANCIAL CATEGORY (2003)	DISTRICT SCORE
Adlai E. Stevenson 125	Review	3.20
Antioch Community Consolidated 34	Early Warning	3.00
Aptakisic-Tripp Consolidated 102	Recognition	3.65
Bannockburn 106	Recognition	3.55
Barrington Consolidated Unit 220	Review	3.35
Beach Park Community Consolidated 3	Watch	2.10
Big Hollow 38	Early Warning	2.90
Community High School 117	Watch	2.55
Deerfield 109	Review	3.25
Diamond Lake 76	Early Warning	2.90
Emmons 33	Watch	2.40
Fox Lake Grade School 114	Watch	2.55
Fremont 79	Recognition	3.80
Gavin 37	Watch	2.10
Grant Community High School 124	Review	3.45
Grass Lake 36	Watch	1.75
Grayslake Community Consolidated 46	Watch	2.10
Grayslake Community High 127	Recognition	3.60
Gurnee 56	Review	3.35
Hawthorn Community Consolidated 73	Review	3.45
Kildeer Countryside Community Consolidated 96	Review	3.45
Lake Bluff Elementary 65	Watch	2.40
Lake Forest 67	Review	3.20
Lake Forest Community High School 115	Review	3.30
Lake Villa Community Consolidated 41	Review	3.25
Lake Zurich Community Unit 95	Watch	2.40
Libertyville 70	Recognition	3.55
Libertyville Community High School 128	Recognition	3.90
Lincolnshire - Prairieview 103	Review	3.20
Millburn Community Consolidated 24	Review	3.45
Mundelein Consolidated High School 120	Review	3.45
Mundelein Elementary 75	Review	3.35
North Chicago 187	Watch	2.35
North Shore 112	Recognition	3.90
Oak Grove 68	Review	3.20
Rondout 72	Recognition	3.55
Round Lake Area Schools 116	Watch	2.50
Township High School 113	Recognition	3.55
Warren Township High School 121	Watch	1.95
Wauconda Community Unit 118	Early Warning	2.65
Waukegan Consolidated Unit 60	Watch	1.90
Winthrop Harbor 1	Watch	2.00
Woodland Community Consolidated 50	Review	3.45
Zion - Benton Township High School 126	Review	3.20
Zion Elementary 6	Recognition	3.55

Source: Illinois State Board of Education, 2004C

Financial Watch: ISBE closely monitors the districts in this category and offers assistance in financial analysis, budgeting, personnel, and enrollment projections. The point range is from 1.00 to 2.61. Lake County has 14 school districts in this category. Districts in this category may be certified as being in financial difficulty, and qualify for a Financial Oversight Panel. The only Lake County school district certified as being in financial difficulty is Round Lake Area Schools District 116. District 116 has a financial oversight panel that must approve the financial operations of the district.

With greater expenses, caps on property tax funding, and overall aid from the state not keeping up with the costs (Goldstein, 2000:1), many of the school districts in Lake County have attempted referenda to increase the educational tax rate and issue bonds to renovate, build, and equip schools. According to the records of the Lake County Clerk's Office, between 1995 and August 2001, there were 115 referenda related to schools in Lake County (this includes those four districts that were shared with other counties) (Lake County Clerk, 2001). Sixty-four referenda were for school buildings and 44 were to raise the educational fund tax rate (seven referenda were not in either of these categories). Out of the 115 total, 64 were approved (56%); and 51 were defeated (44%). In the building category, 47 out of the 64 were approved (73%); while 17 out of the 44 referenda for education tax increases passed (39%).

One potential approach to efficiently and economically providing quality education that should be investigated is the consolidation of districts. Consolidation is an option that should be used when it can be expected to improve education in a newly configured district but still allow the degree of local control desired.

In addition to intergovernmental coordination and cooperation on future land use designations, the Lake County school system would benefit from countywide cooperation in other areas as well. Uniform school impact fees adopted countywide and adhered to by the municipalities would eliminate any tendency for a developer to introduce this fee as a divisive factor during location negotiations in which two or more municipalities in effect have to compete. Intergovernmental coordination is also necessary for the school districts, the County, and the municipalities to develop a unified strategy for lobbying the state government for reforms in the way the schools are funded.

Agreements for inter-municipality review of development projects that will produce impacts that extend beyond the jurisdiction of the project location should be adopted, and representatives of affected school districts should also be participants at these reviews. A concept related to the joint review of development proposals is revenue sharing. Through revenue sharing, all the locations that have been identified as being impacted by a development, especially due to being likely residential locations for workers following the jobs, would get a share of the property tax revenue produced by the commercial/industrial project. Without revenue sharing, the municipality in which the project is located receives all the increase in taxes, while the nearby communities that are hit with impacts have to respond to the increased demands without any of the tax benefit.

The benefits of the types of intergovernmental cooperation and agreements mentioned above could go beyond the school system and be applied to other planning areas where municipalities and the County have common goals and interests.

Goals and Policies²⁷

5.24 Goal: Provide an adequate source of capital and operating revenue for all school districts.

- 5.24.1 Policy: Promote business development and redevelopment in school districts with lower per student Equalized Assessed Value or low percentages of non-residential Equalized Assessed Value, in a manner consistent with local planning objectives and this *Plan*, to reduce reliance on residential tax payers.
- 5.24.2 Policy: The County will consider building a coalition with school districts, other governmental entities, businesses, and civic organizations to promote school finance reform in the Illinois General Assembly including increasing the state aid for education and other innovative local financing options such as location option sales tax or income tax.
- 5.24.3 Policy: The County will support legislation to increase federal and state funds provided to the Lake County School Districts for military dependents, in order to cover the true cost of educating the children.
- 5.24.4 Policy: The County will consider supporting a state funding formula that would include indexing in which the foundation level of a district is increased based on special needs factors including special education, pupils from low income families, and free and reduced lunches.
- 5.24.5 Policy: The County will support a state funding formula that would provide additional funding for talented and gifted programs.
- 5.24.6 Policy: The County is encouraged to form a coalition to consider adopting a distinct school impact fee for each school district based on the unique capital improvement needs of the school district rather than the jurisdiction approving the development.
- 5.24.7 Policy: The County is encouraged to form a coalition to research and consider adopting special fees for new residential development to cover school district operating expenses based on the unique needs of the school district.

5.25 Goal: Minimize the negative impacts of new residential development on the ability of school districts to provide a quality, cost effective education to existing and future students.

- 5.25.1 Policy: Address potential impacts to the public school system as early as possible in the development review process for new developments.
- 5.25.2 Policy: The County is encouraged to consider supporting legislation to allow the timing and phasing of major residential subdivisions to match the availability of adequate public school capacity.

5.26 Goal: Provide opportunities for continuing education for residents in, entering, or reentering the workforce so that employees and employers can develop and maintain the skills needed.

²⁷ As stated in Chapter 1, Introduction, a Goal is defined as “the desired result to be achieved by implementing the *Plan*,” and a Policy is defined as “a general method or action designed to achieve a goal.”

- 5.26.1 Policy: Publicize and promote the courses, programs, and services offered by the College of Lake County, Lake County University Center, the Lake County High Schools Technology Campus, and other public and private educational institutions that are directed towards job training and career skills.
- 5.26.2 Policy: Encourage and promote an adult education program based on volunteering professionals and businesses that teach their skills and convey their work experience.
- 5.26.3 Policy: Publicize and promote the programs and services offered by the College of Lake County, Lake County University Center and other public and private educational institutions that are directed towards improving the practices and profitability of local businesses.
- 5.26.4 Policy: Encourage the College of Lake County, Lake County University Center, and other public and private educational institutions to meet the needs of local businesses for training new recruits, continuing development for existing employees, and organizational development.

5.27 Goal: Promote cost efficient provision of high quality public education.

- 5.27.1 Policy: The County will support the decisions of school districts regarding consolidation.
- 5.27.2 Policy: Encourage school administrators and teachers to pursue public and foundation grants to fund programs.
- 5.27.3 Policy: Encourage school administrators and teachers to work together to share programs and facilities across districts in a manner that makes efficient use of existing staff and facilities, include targeting distance learning/technology-based learning that would link schools in the wealthier districts with those in less wealthy districts.

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Chapter 5
Infrastructure and Services
Fire Protection and Emergency Management

Significance

Excellence in fire protection, emergency preparedness and response, and emergency medical services (EMS) are essential components of Lake County's quality of life. Ensuring this excellence in both personnel and equipment will be a challenge. The increase in the numbers of houses and non-residential structures that will be built in the County as it grows to 2020 will require an increase in the number of fire fighters and EMS personnel, additional fire stations, more fire trucks, and more ambulances. The fire districts and departments in Lake County are trained and equipped to respond to terrorist actions that include the use of weapons of mass destruction.

Issues and Opportunities

- The municipal fire departments and fire protection districts in Lake County plan and coordinate fire protection, emergency and disaster preparedness, and emergency medical services through the Lake County Fire Chiefs Association.²⁸
- Fire protection districts and fire departments have mutual aid agreements with each other assuring that the closest personnel and equipment will respond in an emergency.
- Specialized response teams are shared by all districts and departments.
- All of Lake County's municipal fire departments and fire protection districts participate in the Mutual Aid Box Alarm System (MABAS). When local personnel or equipment are not sufficient to handle an emergency, MABAS members are contacted and immediately dispatched to assist at the incident.
- New development will require fire protection districts and municipal fire departments to construct new stations and purchase new equipment.
- Fire fighting, emergency response, and emergency medical services could be improved throughout the County by:
 - improving the network of traffic preemption devices;
 - developing and implementing a drafting hydrant system when a central water system for fire fighting is not available;
 - expanding and improving the outdoor emergency warning (siren) system; and
 - adopting countywide, equivalent fire protection ordinances.

Analysis

Within Lake County, fire protection and emergency medical services are provided by 10 municipal fire departments, 14 fire protection districts, 10 combination fire departments/fire districts, three private fire departments, and the federal fire department at the Great Lakes Naval Training Center. Antioch and Lake Villa Fire Protection Districts have separate Emergency Services Departments. The 58 fire stations in Lake County are shown in Figure 5.19.

²⁸ The only fire department that is not a member is the City of Highwood.

Figure 5.19
Fire Protection Districts and Fire Station Locations

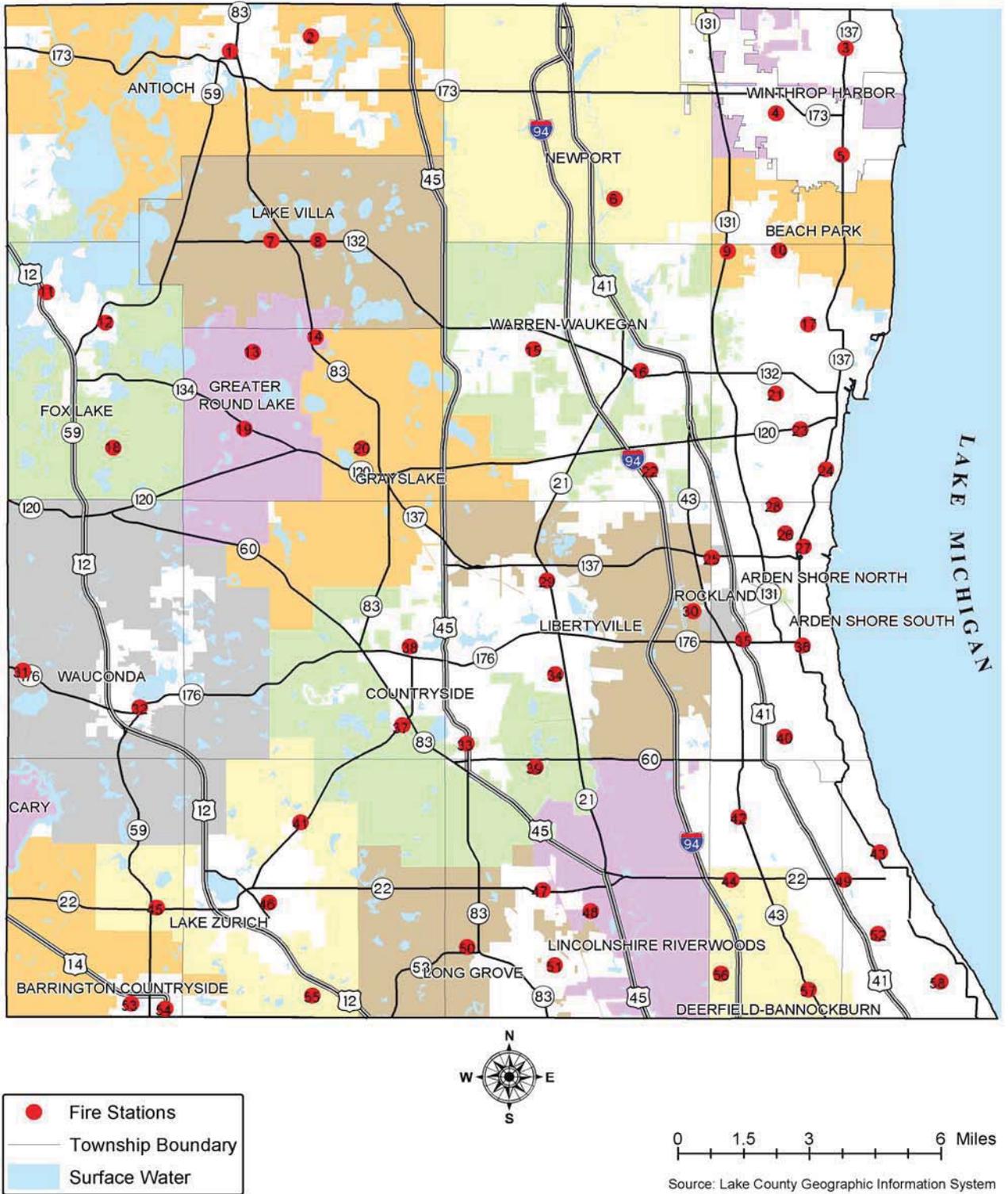


Figure 5.19 (cont'd)
Fire Protection Districts and Fire Station Locations

1. Antioch Fire Protection District
2. Antioch Fire Protection District Station #2
3. Winthrop Harbor Fire Department
4. Zion Fire and Rescue Department #2
5. Zion Fire and Rescue Department Station #1
6. Newport Township Fire Protection District
7. Lake Villa Volunteer Fire Department
8. Lake Villa Fire Protection District
9. Waukegan Fire Department
10. Beach Park Fire Department
11. Fox Lake Fire Department Station #1
12. Fox Lake Fire Department Station #2 (Main)
13. Greater Round Lake Fire Protection District Station
14. Greater Round Lake Fire Protection District
15. Gurnee Fire Department Station #2
16. Gurnee Fire Department Station #1
17. Waukegan Fire Department Station #4
18. Fox Lake Fire Protection District Station #3
19. Greater Round Lake Fire Protection District Station

20. Grayslake Fire Department
21. Waukegan Fire Department Station #3
22. Waukegan Fire Department Station #2
23. Waukegan Fire Department Station #1 (Main)
24. Abbott Park North Chicago Fire Department
25. North Chicago Fire Department #2
26. Great Lakes Fire Department Station #2
27. Great Lakes Fire Department Station #3
28. North Chicago Fire Department
29. Libertyville Fire Department Station #3
30. Libertyville Fire Department Station #3 and Abbott
31. Wauconda Fire Department
32. Wauconda Fire Department Station #1 (Main)
33. Mundelein Fire Department
34. Libertyville Fire Department Station #2
35. Knollwood Fire Department
36. Lake Bluff Fire Station
37. Countryside Fire Protection District Station #1
38. Mundelein Fire Department

39. Countryside Fire Protection District Station #2 (Main)
40. Lake Forest Fire Department Station #1
41. Lake Zurich Fire/Rescue Protection District Station
42. Lake Forest Fire Department Station #2
43. Great Lakes Fire Department Station #3 at Fort Sheridan
44. Deerfield-Bannockburn Fire Protection District Station
45. Lake Zurich Fire/Rescue
46. Lake Zurich Fire/Rescue Station #1 (Main)
47. Buffalo Grove Fire Department Station #27
48. Lincolnshire-Riverwoods Fire Protection District
49. Highland Park Fire Department Station #34
50. Long Grove Fire Department
51. Buffalo Grove Fire Department
52. Highland Park Fire Department Station #33 (Main)
53. Barrington Fire Department Station #3 (training station)
54. Barrington Fire Department Station #1 (Main)
55. Lake Zurich Fire/Rescue Station #4
56. Lincolnshire-Riverwoods Fire Protection District Station
57. Deerfield- Bannockburn Fire Protection District Station
58. Highland Park Fire Department Station #32

A municipal fire department typically provides fire or rescue services to only the areas within the corporate limits of the municipality. Municipal fire departments are funded through the general tax roles of the municipality. Municipalities may also levy impact fees for fire protection and EMS purposes.

Fire protection districts provide fire and rescue services to a geographic area that generally is larger than a single municipality. Fire protection districts usually include two or more villages plus unincorporated areas. Fire protection districts, which are a type of municipal corporation, are created when an individual municipality or unincorporated area cannot afford its own fire department. Districts are funded through property taxes—and only property taxes—that are shown as a line item on the tax bill. Fire district taxes can be raised through referendum. Fire protection districts cannot impose impact fees (Lake County Fire Chiefs Association, 2003).

Both municipal fire departments and fire protection districts can enter into automatic aid agreements to respond outside their geographic areas. Through automatic aid agreements, the closest available resources respond to an emergency, irrespective of municipal or fire protection district boundaries. Dispatching the closest available assistance reduces the time it takes for a fire truck or ambulance to respond to an emergency. Mutual aid agreements pertain to local emergencies.

Mutual Aid Box Alarm System (MABAS)

When a department or fire district does not have the resources needed for a disaster or emergency, MABAS assistance (a Box Alarm) can be requested through the Interagency Fire Emergency Radio Network (IFERN). The response to a Box Alarm can consist of additional equipment and personnel, including specialized response teams (see below).

MABAS was started by the Elk Grove Fire Department in 1968. Today, in addition to Illinois, MABAS' geographic coverage includes southern Wisconsin and portions of Indiana, Missouri, Iowa, and Kentucky (Illinois Homeland Security, undated). Through MABAS, Lake County's fire protection and EMS agencies provide assistance to and receive assistance from the Illinois counties of Cook, DuPage, McHenry, and Kane; and Kenosha County, Wisconsin.

MABAS is an excellent system that gives the nearest personnel and equipment the ability to respond to an accident or emergency. When a situation requires more personnel or equipment than the local fire department has, outside assistance will be supplied through the MABAS system.

Special Teams

The Lake County fire districts and fire departments cooperatively provide personnel and equipment for several specialized response teams (this information is from www.lakecountyfirechiefs.org). These teams are coordinated through the Lake County Fire Departments Specialized Response Teams.

- The Confined Space Rescue Team is called upon to rescue victims trapped or incapacitated in an area with a restricted entryway.
- The Dive Rescue Team responds to accidents in open or ice water. This team recovers the bodies of drowning victims and may assist law enforcement in retrieving evidence.

- The Hazardous Materials Team identifies hazardous materials, implements control procedures during an accidental release, confines and contains the material, and performs decontamination procedures.
- The High Angle Rescue Team responds to any rescue where rope and related equipment are necessary to reach and remove victims. Examples include rescues from water towers, tall buildings, ravines, and below grade structures.
- The Structural Collapse Rescue Team conducts search and rescue operations at the site of a structural collapse.
- The Trench Rescue Team responds when someone is trapped in a narrow excavation.

Emergency and Disaster Response

Examples of major emergencies that fire departments would respond to include urban fires; wild fires; mass transit accidents; hazardous materials, toxic waste, or radioactive material accidents; and aircraft disasters (Lake County Emergency Management Agency, 2002:78).

In the event of a disaster, the first response would be by the municipal fire department, fire district, or emergency medical services department where the incident occurred. Additional personnel or equipment would be provided through MABAS (Lake County Emergency Management Agency, 2002:32). The Lake County Fire Chiefs Association would be responsible for overall direction, management, distribution, and utilization of resources needed to reach and care for victims (Lake County Emergency Management Agency, 2002:78, 136). If the disaster requires activation of the Emergency Operations Center, the procedures discussed in the Law Enforcement section would be followed.

Preparing For The Future

The Lake County Fire Chiefs Association has actively participated in reviewing, identifying issues, and providing information for this section of the *Plan*. The Fire Chiefs Association recommends consideration of the following six items to help improve the ability of fire departments and fire protection districts to provide fire and emergency medical services through 2020 (Lake County Fire Chiefs Association, 2002; 2003).

Emergency and Disaster Response

In addition to their involvement with the Lake County Emergency Management Agency and the County's *Emergency Preparedness Plan*, the County's municipal fire departments and fire protection districts plan to organize the Lake County "Disaster Planning Committee." This committee's purpose is to plan for and prepare for "disasters of all origins and magnitudes" (Lake County Fire Chiefs Association, undated).

Locations for New Fire Stations

Additional fire stations will be needed as the County grows through 2020. Sites for these new stations should be designated in land use plans and shown on future land use maps. While people recognize and respect fire fighters, residents frequently object when a new station is planned to be built in their existing neighborhood. Selecting fire station locations and designating them on future land use maps before an area is built up can reduce future conflicts.

Traffic Preemption Devices

Lake County is forecast to continue to grow. Congestion on the roads is a problem now, and will get worse in the future. Traffic preemption devices, which can be used by an emergency response vehicle to change a traffic signal to green to let an emergency vehicle through an intersection, can help diminish delays in getting to the scene of an emergency. More importantly, the ability to change a traffic signal to green—eliminating the need to go through an intersection on a red light—enhances safety for response personnel and motorists. Preemption devices are critical in the event of natural or manmade disasters when numerous agencies, vehicles, and pieces of equipment are attempting to reach the scene as quickly as possible and casualties have to be evacuated.

In 2002 the Lake County Fire Chiefs Association and the Lake County Department of Transportation reached a basic agreement for the provision and maintenance of preemption devices on County controlled intersections. This agreement provides a foundation for the municipalities and fire protection districts as well, but the funding for design, installation, and maintenance of additional preemption devices is still negotiated on a case by case basis.

Drafting Hydrants When a Central Water System Is Not Available

There are many areas of the County that do not have a central water supply system for putting out fires. New development where a central water system is not available should have its own drafting hydrant system (also known as dry hydrants). Programs to retrofit existing built areas that do not have coverage with drafting hydrants also should be developed.

Like a hydrant connected to a central water system, a drafting hydrant is installed on the side of a road where it can be reached by a fire engine. Instead of getting its water from a central system, a drafting hydrant is connected to its own water source. This could be an open body of water, such as a pond, a cistern, or water storage tank. After connecting to the drafting hydrant, the fire engine then pumps water from the water supply source to put out the fire.

Existing ponds, or ponds dug expressly for the purpose, can be the source of water for a drafting hydrant system. The hydrant is connected by a pipe to the pond. The fire engine pumper pulls the water out of the pond through the hydrant for use on the fire. More than one pond may be needed if the area that needs the coverage is large or has fairly intense development. When a pond is not a practical source of water for firefighting, one or more below grade cisterns can be installed and connected to drafting hydrants. The size of the cisterns and their spacing would be determined by the area to be covered and the intensity of development.

Above or below ground water storage tanks can also be connected to drafting hydrants. These tanks are usually built to provide water for a building's sprinkler or other fire systems. They can also be connected to drafting hydrants enabling a fire engine to have access to the water they store.

The details on type of drafting hydrant system, size of water reservoirs needed, and spacing between hydrants should be left to the development review stage and individual needs of a project. For the *Plan*, the importance is to recommend that the County and municipalities that are permitting development where a central water system for firefighting is not available, work together to develop general, countywide guidelines for providing drafting hydrants. These guidelines should include a uniform marking system for drafting hydrant locations to help responding units from neighboring departments find the hydrants. One commonly used system is

to put blue markers in the pavement adjacent to the hydrant. Requirements for inspecting, testing, and maintaining drafting hydrants should also be included in the guidelines.

Emergency Warning Systems and Other Emergency Communications

Outdoor warning systems are used to notify the public of serious situations that may require them to seek shelter. The use of a warning system is most strongly associated with tornadoes, but they can also be important in conjunction with accidental or intentional releases of hazardous materials. Warning systems are capable of providing siren warning tones and public address (voice) broadcasts. The public address messages can be live or prerecorded.

There are significant areas of the County that do not have an outdoor, early warning system. For areas that do have systems, operating guidelines are usually not adequate, even for tornadoes. Typically a fire or law enforcement officer or trained weather spotter has to see a tornado before the alarm can be sounded, and this may not provide sufficient time for the warning to be heard, understood, and responded to by residents. The public would probably be less able to respond appropriately if an outdoor warning were sounded for an emergency other than a tornado.

This system should be improved. Gaps should be identified and a program initiated to install speakers where they are needed so the entire County is adequately covered. In addition, all agencies that own or have the responsibility for activating the warning system should cooperatively update and expand their operating guidelines. Areas to consider include tornadoes and other hazardous weather conditions, accidental hazardous material releases, and terrorism. The public will need to be educated about the conditions that can cause an emergency warning loudspeaker to be activated, and learn what should be done when an alarm is heard. If prerecorded voice messages are going to be used, they should be the same for all speakers.

Lake County's 911 system has reverse 911 and cell phone capabilities. The cell phone 911 system is limited because the present state of wireless technology does not identify the location of the caller. The person using a cell phone to report an accident or emergency has to be able to tell the 911 dispatcher where the problem is so that the dispatcher will know what emergency response agency to notify.

Through the fire departments' and fire protection districts' "911 Committee" the emergency services agencies of Lake County are kept informed about improvements in the communications field (Lake County Fire Chiefs Association, undated). As new communications technology becomes available this information can be quickly presented to the County's emergency providers to be considered for incorporation into the existing communications network.

For cell phones, until the technology that will allow dispatchers to identify the location of a person making an emergency cell phone call is available, it may be appropriate for the Illinois and Lake County Departments of Transportation to add roadway identification signage and mile posts on their roads, especially at locations where accidents are likely to occur. This kind of signage would make it easier for a motorist to give the dispatcher the location of an accident.

Impact Fees and Direct Developer Purchase of Specialized Equipment

Municipalities have the ability to charge impact fees and use them to purchase fire and emergency medical services facilities and equipment. Fire protection districts cannot require impact fees. The Fire Chiefs Association recommends that the County and the fire protection districts develop a strategy for requesting the authority to levy or negotiate impact fees,

understanding that this would require changes in state law. Impact fees for fire protection and emergency medical services needs should be as consistent as possible throughout the County.

Some types of new developments bring with them the need for specialized fire fighting or emergency medical services equipment. For example: A village that gets its first three-story building may not have a ladder truck capable of reaching people in case of a fire. An elderly housing development is probably going to require ambulance service fairly frequently, which may justify the developer's purchasing and donating a new ambulance to the EMS provider. For developments without access to a central water system, a direct contribution from the developer to establish a new, or improve an existing, drafting hydrant system would be beneficial.

When issues such as these come up, they are handled on a case-by-case basis. A municipality that strongly supports a development within its jurisdiction may be willing to forego having the developer purchase specialized equipment if it feels that requiring the equipment may cause the developer to seek a different site in a different municipality. To overcome this eventuality, all entities involved in providing fire and emergency medical services should be encouraged to cooperatively adopt a common set of guidelines for direct developer purchase of specialized equipment.

To ensure the long-term effectiveness of the County's emergency response system, special equipment needed within a department or district should be owned by that department or district. The guidelines for seeking direct developer donations of specialized equipment should be developed and agreed to by the County, cities, and villages.

Equivalent Fire Protection Ordinances

At the present time, fire protection ordinances vary among municipalities. Though all buildings are built "to code," code requirements throughout the County differ. This complicates the situation fire fighters face when responding to a fire emergency. The MABAS helps ensure the closest responder gets to a fire scene, but the inconsistency in codes can be a potential source of delay after the fire fighters reach the fire. Consistent fire protection ordinances would give fire fighters more certainty in knowing what to expect to find structurally in an emergency. Architects and builders would also have a consistent set of construction regulations to follow.

In 2000, the County Board adopted a fire prevention code that could serve as a model for the entire County. Fire districts and departments should be encouraged to consider following the County's fire prevention code as closely as possible. It may be appropriate for the Fire Chiefs Association to hold a workshop to bring all cities and villages together to work out a fire protection code, including recommendations for fire sprinkler systems in new homes, which can be adopted countywide.

Goals and Policies²⁹

5.28 Goal: Ensure that excellent fire protection, emergency and disaster response, and emergency medical services will be available throughout Lake County.

²⁹ As stated in Chapter 1, Introduction, a Goal is defined as "the desired result to be achieved by implementing the *Plan*;" and a Policy is defined as "a general method or action designed to achieve a goal."

- 5.28.1 Policy: Future fire station locations should be designated on the future land use maps of Lake County, the municipalities, and fire protection districts.
 - 5.28.2 Policy: Traffic signal preemption devices should be installed where needed on intersections throughout the County.
 - 5.28.3 Policy: The County and effected municipalities are encouraged to jointly develop and adopt a drafting hydrant water supply standard for areas where central water and hydrants are not available.
 - 5.28.4 Policy: The County is encouraged to coordinate with the Lake County Fire Chiefs Association to a) improve the emergency communications systems in the County including the emergency warning loudspeaker system and the cell phone 911 reporting system; and b) consider changes to the existing communications infrastructure in order to better protect the communications system in the event of a natural or manmade disaster.
- 5.29 Goal:** Ensure that Lake County and the municipalities will address fire protection, emergency response, and emergency medical services needs in a consistent and unified manner.
- 5.29.1 Policy: The County, fire protection districts, and municipalities are encouraged to develop a uniform, countywide, fire protection and emergency medical services impact fee and coordinate an effort to have state law amended to allow fire protection districts to participate.
 - 5.29.2 Policy: The County is encouraged to work with the municipalities about the possibility of agreeing to a uniform procedure for direct developer purchase of equipment needed to serve specialized uses.
 - 5.29.3 Policy: The County's and municipalities' ordinances that pertain to fire protection should be reviewed and amended to be consistent to the greatest extent possible.
 - 5.29.4 Policy: The County and municipalities are encouraged to include fire district and fire department personnel in the review of development proposals which fall under their jurisdictions.
 - 5.29.5 Policy: The County and municipality building departments are encouraged to work with the Lake County Fire Chiefs Association to develop guidelines for sprinkler systems in new residential construction.

Sources

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Lake County Fire Chiefs Association, 2002 (July), letter from the Fire Chiefs Association to the Lake County Regional Planning Commission with information and recommendations for the *Regional Framework Plan*.

Lake County, Illinois

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Chapter 5 Infrastructure and Services Law Enforcement

Significance

An excellent law enforcement system is essential to the quality of life in Lake County. Ensuring the highest quality in law enforcement personnel, buildings, equipment, and training as the County grows will be a challenge. The law enforcement agencies of the County not only protect residents from the traditional criminal, they also provide emergency services during natural or manmade emergencies.

Issues and Opportunities

- The County's population growth will necessitate expanding the jail.
- Designing new projects utilizing the concepts of "Defensible Space" and "Crime Prevention through Environmental Design" (CPTED) could help reduce the number of crimes throughout the County.
- Lake County and most of the cities and municipalities participate in a mutual assistance agreement for law enforcement and emergency response.
- Many of the city and village police departments are members of the Northern Illinois Police Alarm System (NIPAS).
- The Illinois Law Enforcement Alarm System (ILEAS) has recently been formed to organize specially trained law enforcement teams that can respond to acts of terrorism or disaster.
- The Lake County Emergency Management Agency, which operates under the day-to-day control of the Sheriff's Office, has an "Emergency Operations Plan for Lake County" which provides guidance on how the County will respond in a major emergency. This plan includes a terrorism annex and a chemical hazard annex.
- The Lake County Health Department has a "Bioterrorism Preparedness Plan" which is a component of the County's "Emergency Preparedness Plan."

Analysis

The law enforcement agencies in Lake County are the Sheriff's Office, 34 city and village police departments, the Great Lakes Naval Base police, and a police station at the Veterans' Administration Hospital. These are shown in Figure 5.20.

The Sheriff's Office is responsible for enforcing federal, state, and County laws and ordinances within unincorporated Lake County.³⁰ The Sheriff's Office has the authority to enforce federal and state laws within the villages and cities but does not do this within municipalities that have their own police departments, unless requested to do so by the municipality or federal or state authorities.

³⁰ To find out more about the Lake County Sheriff's Department, go to the web site: www.co.lake.il.us/sheriff. Most of the general information about the Sheriff's Department is from the web site.

Figure 5.20
Police Station Locations

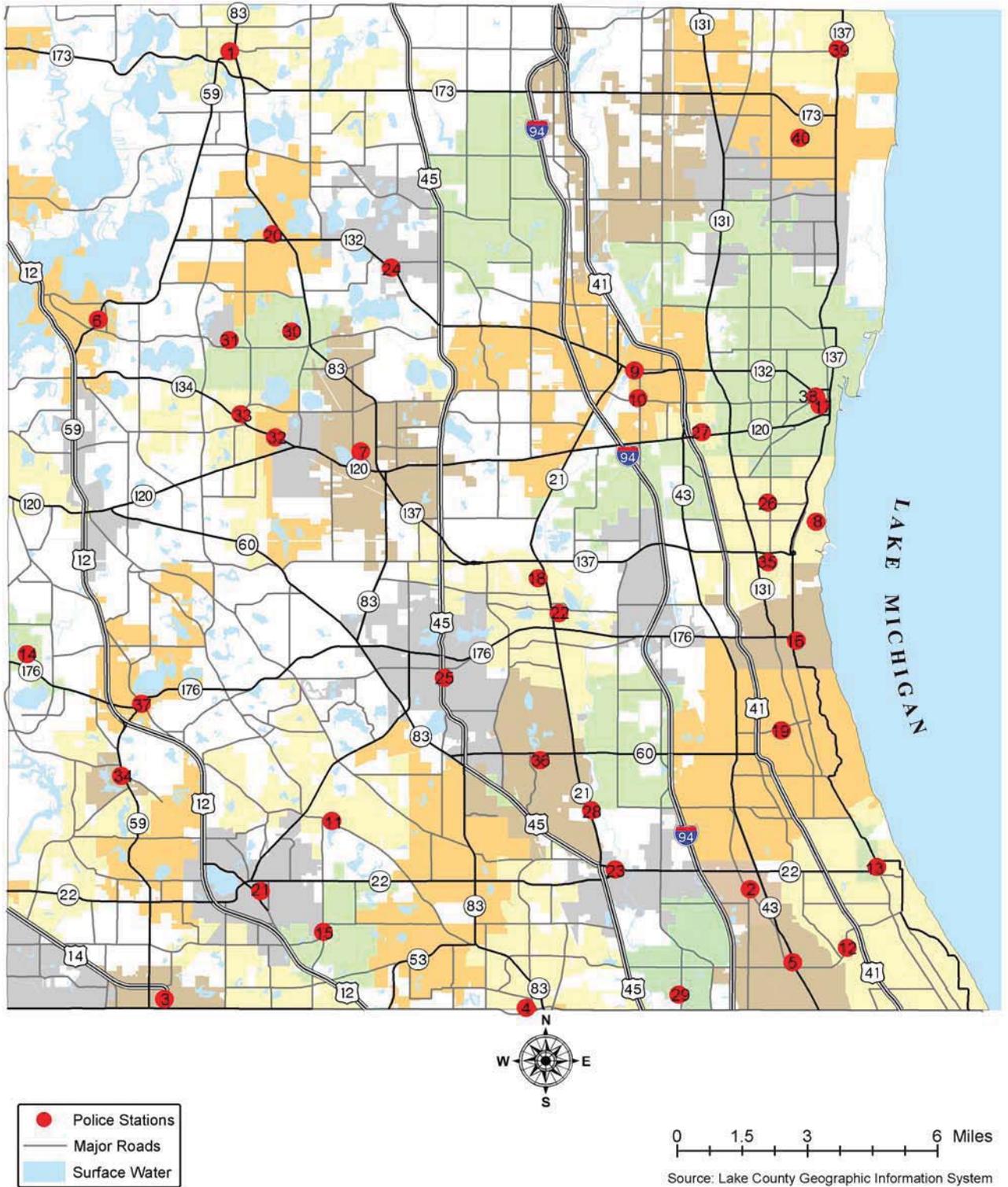


Figure 5.20 (cont'd)
Police Station Locations

1. Antioch Police Department
2. Bannockburn Police Department
3. Barrington Police Station
4. Buffalo Grove Police Department
5. Deerfield Police Department
6. Fox Lake Police Department
7. Grayslake Police Department
8. Great Lakes Naval Base Police
9. Gurnee Police Department

10. Gurnee Police Department
11. Hawthorn Woods Police Department
12. Highland Park Police Department
13. Highland Park Police Department
14. Island Lake Police Department
15. Kildeer Police Department
16. Lake Bluff Police Department
17. Lake County Sheriff Department
- 17a. Lake County Jail
18. Lake County Sheriff's Highway Patrol Substation
- 18a. Communications Non-Emergency
- 18b. Emergency Management Agency
19. Lake Forest Police Department

20. Lake Villa Police Department
21. Lake Zurich Police Department
22. Libertyville Police Department
23. Lincolnshire Police Department
24. Lindenhurst Police Department
25. Mundelein Police Department
26. North Chicago Police Department
27. Park City Police Department
28. R.W. Depke Justice Complex and Hulse Detention Center
29. Riverwoods Police Department

30. Round Lake Beach Police Department
31. Round Lake Heights Police Department
32. Round Lake Park/Hainesville Police Department
33. Round Lake Police Department
34. Tower Lakes Police Department
35. V.A. Medical Center Police Department
36. Vernon Hills Police Department
37. Wauconda Police Department
38. Waukegan Police Department
39. Winthrop Harbor Police Department
40. Zion Police Department

The goals of law enforcement are to prevent crime, protect life and property, apprehend those who break the law, and maintain public peace and order. To do this the Sheriff's Office has a variety of divisions and units including: General Investigations, Juvenile Investigations, Highway Patrol Division, Court Security, School Resource Officers, Community Services and Crime Prevention, Children's Advocacy and Child Exploitation Unit, K-9 Unit, Marine Unit, and Bicycle Patrol. Some city and village police departments also have their own specialized divisions.

The Northern Illinois Police Crime Laboratory is an accredited, privately owned and operated forensic crime lab located in Highland Park. A forensic crime laboratory is defined as a laboratory that examines physical evidence in criminal matters and provides testimony about this physical evidence in a court of law (American Society of Crime Laboratory Directors). The Sheriff's Office and most of the city and village police departments in Lake County utilize the services of this laboratory.

Cooperation Among Law Enforcement Agencies

The Sheriff's Office and various city and village police departments have joined together to fight crime through the Lake County Gang Task Force; Major Crime Task Force; Repeat Offender Strike Force; and the Lake County Metropolitan Enforcement Group Task Force for Drugs, Gangs, and Weapons Offenses.

The Sheriff's Office has a training facility and a firing range. Several city and village police departments have a contractual agreement to use the firing range.

Many of the city and village police departments are members of the Northern Illinois Police Alarm System. Through NIPAS, a police department can request additional officers in an emergency or receive assistance from specially trained teams in high risk situations. When a member community is confronted with an emergency that is beyond the ability of its law enforcement agency to resolve, additional officers and equipment will be provided through NIPAS.

For high risk or violent situations, the NIPAS Emergency Service Team (EST) or Mobile Field Force (MFF) can be called for assistance. The EST is trained to respond to incidents involving barricaded suspects, snipers, or hostages. The MFF provides crowd control during civil disobedience protests, demonstrations, and riots (Village of Deerfield, undated; Village of Morton Grove, 2002; Village of Round Lake Beach, undated; Village of Vernon Hills, undated).

The Illinois Terrorism Task Force was created in 2000. Its mission is "to implement a comprehensive coordinated strategy for domestic preparedness in the state of Illinois, bringing together agencies, organizations, and associations representing all disciplines in the war against terrorism" (Illinois Homeland Security, 2003A). The Illinois Law Enforcement Alarm System (ILEAS), which was created following September 11, 2001, is a supporting element of the Illinois Terrorism Task Force. The purpose of ILEAS is to improve the ability of law enforcement agencies throughout the state to communicate and respond to catastrophic disasters—both man-made and natural. Through ILEAS, specially trained teams of law enforcement officers can be sent wherever they are needed in the event of an emergency (DuPage County, 2002). The Lake County Sheriff's Office and several city and village police departments are members of ILEAS.

Another program to improve coordination and communication is the Illinois Integrated Justice Information Systems Initiative (IIJIS), begun by the state in 2001. The purpose of the IIJIS is to allow law enforcement and justice agencies to electronically share critical information over a secure network. The system is intended to facilitate the exchange of intelligence information needed to identify terrorist activity, as well as help an officer writing a traffic ticket (Illinois Homeland Security, 2003B). Lake County’s participation in IIJIS is being organized through the State’s Attorneys Office.

Lake County Jail and Work Release Center

The Lake County Jail and Work Release Center are operated by the Sheriff’s Office. According to “The Plan to Expand the Lake County Jail” (2002), both the Jail and Work Release Center need to be expanded.

The jail currently has housing for 602 detainees; the average daily population was about 525 in 2002. In 1994 the average daily jail population was 371 (Lake County Sheriff’s Office, 2002).

The range of projected beds needed for 2005, 2010, and 2015 contained in “The Plan to Expand the Lake County Jail” is shown below. The Low forecast assumes the jail’s population will increase at an annual rate of 4.2%; the Medium assumes an annual growth rate of 6.2%; and the High is based on an 8.7% annual increase in the number of inmates. The variations in the projected numbers of beds needed to come from analyzing the County’s historical justice system trends in different ways. Important components used in projecting the number of beds needed include: general population growth, calls made to the Sheriff’s Office, felony jail admissions, misdemeanor jail admissions, and average daily jail population (Lake County Sheriff’s Office, 2002:2-4).

**Figure 5.21
Jail Beds Needed**

Year	Low	Med.	High
2005	817	871	998
2010	1,003	1,194	1,621
2015	1,232	1,652	2,771

The Work Release Center can house 110 residents, and has an average daily population of 106. “The Plan to Expand the Lake County Jail” recommends expanding the Work Release Center to 240 beds (Lake County Sheriff’s Office, 2002:2-3). Expansion of the jail and Work Release Center are action items that the County Board is currently working on.

Defensible Space and Crime Prevention through Environmental Design

“Defensible space” and “Crime Prevention through Environmental Design” (CPTED) are closely related approaches to proactively reduce the need for law enforcement through building design and construction. The formal definition of CPTED— “The proper design and effective use of the built environment can lead to reduction in the fear and incidence of crime, and an improvement of the quality of life”—defines defensible space as well (Crime Prevention through Environmental Design, undated).

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The term defensible space is primarily used when referring to low- or moderate-income, medium- or high-density, multistory rental properties (Newman, 1972). In developing the concepts of defensible space Newman found that neither the socioeconomic characteristics of the residents nor the density of the housing projects was a major factor in “causing crime.” What he did find was that “Certain kinds of space and spatial layout favor the clandestine activities of criminals” (Newman, 1972:12). Changing how buildings are designed using the concepts presented below can reduce crime.

CPTED uses the same crime prevention concepts as defensible space, but elaborates on the details of the design elements so that they are applicable to single-family homes and subdivisions, commercial and office buildings, industrial developments, and parking garages (Crime Prevention through Environmental Design, undated).

The basic concept of defensible space is to design buildings in a manner that provides residents with a sense of responsibility and ownership. This is done primarily through a design that allows residents to casually and continually survey the nonprivate interior and exterior areas of their living environment as they go about their normal household activities. Key surveillance areas include entrances, communally used pathways, meeting areas, play grounds, and seating areas. Because of this “natural surveillance,” the residents come to recognize their neighbors and “[a]ny intruder will be made to anticipate that his presence is under question and open to challenge; so much so that a criminal can be deterred from even contemplating entry” (Newman, 1972:3).

CPTED employs the concept of natural surveillance in all uses from a single-family, detached home to an industrial complex.

Separation between private spaces and public streets or sidewalks is emphasized in defensible space and CPTED. Symbolic or real barriers are provided to visually alert a visitor, customer, or intruder that he is leaving a public space where his presence is not questioned and entering a private area that requires justification. The design of multifamily living units, single-family homes, or work areas must provide a natural view of this transitional area so that it is under constant surveillance. In order to deter crime, the design of the transitional area and its relation to the interior of the building must give an intruder the feeling that he is being watched.

The external appearance of a multifamily residential building is an important consideration in defensible space. The architecture should make a positive statement, exhibit uniqueness and dignity, and blend in with the streetscape of which it is a part. The satisfaction that residents get from living in an attractive building will increase their feeling that it is their building and it is worth maintaining.

Architecture and maintenance are also emphasized in CPTED. A warehouse that has some architectural character, is kept in good repair, and has clean grounds and attractive landscaping is more inviting for the workers. After hours, its kept-up appearance will deter loitering and criminal activity.

Defensible space and CPTED are intended to give residents and employees control over the environments where they live and work. Using these concepts provides greater security to residents, neighbors, guests, workers, and customers. The factors that increase the feeling of security for those who “belong”—residents, workers, or customers—simultaneously make intruders feel watched and unwelcome. Having witnesses everywhere reduces criminal activity.

Policy 5.30.2 recommends adopting design criteria utilizing Defensible Space and CPTED concepts. The Lake County Housing Authority, along with other public and private organizations that own, build, or manage residential and nonresidential properties, would be asked to participate in developing guidelines to help reduce crime through proactive building and site design.

The Lake County Emergency Management Agency and Emergency Operations Plan

The Lake County Emergency Management Agency (LCEMA), a part of the Sheriff's Office, has adopted a countywide emergency preparedness plan. The purpose of the "Emergency Operations Plan of Lake County" is to provide directions for responding to, and reducing the effects of, natural and manmade disasters. The Plan includes measures to preserve life and mitigate property damage, and procedures to set up a recovery system (LCEMA, 2002:1). The Plan provides directions for coordinating the disaster response of County resources including communications, law enforcement, fire, hazardous materials and other specialized response teams, rescue units, hospitals, and religious and charitable organizations (LCEMA, 2003; LCEMA, 2002:32). During an emergency, the LCEMA is the primary liaison with state and federal emergency management agencies (LCEMA, 2002:22).

A disaster is any occurrence that exceeds, or has the possibility of exceeding, the capabilities of the personnel or facilities in the area that has jurisdictional responsibility for responding to the situation (LCEMA, 2002:131). Natural hazards that could cause a disaster or emergency include: drought, earthquake, flood, tornado, wildfire, or severe winter storm. Manmade hazards include power failures, airplane crashes, train wrecks, massive automobile or truck accidents, hazardous materials spills or explosions, civil disorder, terrorism, nuclear or conventional attack, and radioactive accidents (LCEMA, 2002:3-4).

Lake County has over 320 industrial sites classified by the Illinois Environmental Protection Agency as producers or users of, or storage facilities for hazardous or toxic chemicals. These locations where hazardous materials are manufactured or stored are potential sites for an accident involving the uncontrolled release of hazardous materials. Accidents could also happen in the course of transporting these materials. The County's natural gas storage farm, petroleum pipeline, and natural gas pipeline could also be the site of emergencies (LCEMA, 2002:7-8).

The Lake County Board Chairperson has the authority to proclaim a disaster, and is then in charge of the disaster response and recovery operations (LCEMA, 2002:10). The Chairperson will activate the Emergency Operations Center (EOC). In an emergency, the County Board Chairperson, Lake County Emergency Management Agency Coordinator, Sheriff's Office, and fire chiefs are stationed at the EOC. From there, they communicate with personnel at the scene to determine what personnel and equipment are needed to control the situation. The senior law enforcement officer on duty in the jurisdiction where the disaster occurs is in charge of law enforcement at the disaster scene; the local municipal fire department or fire protection district is the lead agency for fire, hazardous materials spills or explosions, and emergency medical services. Other elected officials—County Board members, the Coroner, and Regional Superintendent of Schools (the superintendent's office is primarily responsible for transportation in an emergency situation)—may be called on to assist. The need to request state or federal assistance will be assessed at the Emergency Operations Center. If necessary, an evacuation can be ordered.

The Lake County Health Department/Community Health Center "Bioterrorism Preparedness Plan" is a component of the "Lake County Emergency Preparedness Plan." Bioterrorism is defined as "the intentional or threatened use of viruses, bacteria, fungi, or toxins from living

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organisms to produce death or disease in humans, animals or plants” (Lake County Health Department, 2001).

Bioterrorism attacks differ from other types in that there will usually be a time interval (incubation period) between the time the biological agents are released and the appearance of symptoms. Once symptoms start to appear and begin to be reported by local doctors, Health Department personnel are trained in how to quickly identify the disease, locate the possible source of the outbreak, and minimize the risk to residents.

If a biological attack were to take place, Health Department personnel would join law enforcement and other agencies in investigating where the agent was released, assist in providing treatment to people who may have come in contact with the agent, administer vaccines and antibiotics, and provide information to the public on how to protect themselves.

For questions on bioterrorism, call the Health Department at 847-377-8130, Monday through Friday, from 8:30 a.m. to 4:30 p.m. The number to call for emergencies or after hours is 847-389-4431 (Lake County Health Department, 2002).

Goals and Policies³¹

5.30 Goal: Lake County and the municipalities will continue to provide excellent law enforcement services.

5.30.1 Policy: The County and municipalities should seek state legislation that will allow the adoption of local impact fees that can be used to offset the expenses new development projects bring to law enforcement agencies.

5.30.2 Policy: The County will consider adopting design criteria that utilize the concepts of Defensible Space or Crime Prevention through Environmental Design to proactively reduce the opportunity for crimes to take place.

5.31 Goal: Improve the coordination and cooperation within the County and the municipalities to make more efficient use of personnel and equipment, which will provide better service to the citizens.

5.31.1 Policy: The County is encouraged to establish a task force to report on the communications systems in use and develop a plan to ensure all law enforcement agencies can communicate.

5.31.2 Policy: The County should support the State’s Attorneys effort to implement an integrated justice system whereby all appropriate Lake County law enforcement agencies will share data over a secure network.

5.31.3 Policy: The County encourages all police departments to seek accreditation.

5.32 Goal: Lake County will continue to maintain an excellent emergency management system prepared to respond to natural and man-made emergencies.

³¹ As stated in Chapter 1, Introduction, a Goal is defined as “the desired result to be achieved by implementing the *Plan*,” and a Policy is defined as “a general method or action designed to achieve a goal.”

- 5.32.1 Policy: Encourage municipalities and school districts to prepare emergency operations plans in cooperation with the Lake County Emergency Management Agency.

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Chapter 5 Infrastructure and Services Public Health System and Regional Hospitals

Significance

Medical services provided through the Lake County Health Department and Community Health Center, regional hospitals, and emergency medical services are an important quality of life factor. The Lake County Health Department provides many services at facilities throughout the County performing its daily mission of promoting good health, healthy life-styles, and preventing disease and injury. The services provided by the Health Department are directed towards improving the health status of the County's entire population.

During the early stages of the *Regional Framework Plan* update planning process, municipal officials and public participants mentioned the lack of a hospital and emergency care services as a significant concern in the northwest quadrant of Lake County. The hospitals in Lake County and the surrounding area, along with the locations of the Health Department clinics, have been mapped to show where medical services are available.

This section of the *Plan* provides the location of the regional hospitals and the clinics operated by the Lake County Health Department. Because the Health Department's facilities and the professional services available at the facilities make up a system, and the Health Department serves all County residents, the major programs and activities of the Health Department are summarized.

Issues and Opportunities

- Of the total population of 644,356 (2000 Census), it is estimated that Lake County has 86,682 uninsured residents: 20,441 children and 66,241 adults. An additional 100,581 residents are under-insured.³²
- The Lake County Health Department operates four clinics, with a fifth to be added in the near future. Residents can receive care at the clinics regardless of the ability to pay.
- It is important that residents in areas of Lake County forecast to experience significant population growth have access to a hospital.
- The Illinois Health Facilities Planning Board has the authority for approving new hospitals, expanding the number of beds in an existing hospital, closing existing hospitals, and approving significant modifications to existing hospitals.
- Hospitals employ a large number of workers, with a wide spectrum of skills and professional expertise.
- For the nation as a whole, there is a shortage of registered nurses and other skilled health care professionals. Lake County needs to proactively address its health care working environment to reduce potential worker shortages within the County.

³² "Under-insured refers to people who have health insurance but face significant cost sharing or limits on benefits that may affect its usefulness in accessing or paying for needed health services" (Lake County Health Department, 2003A).

Analysis

The goals of Public Health, at national and local levels, are:

- To prevent epidemics and the spread of disease
- Protect against environmental hazards
- Prevent injuries
- Promote and encourage healthy behaviors
- Respond to disasters and assist communities in recovery
- Assure the quality and accessibility of health services

The goals are achieved through providing such essential public health services as:

- Monitor health status to identify community health problems
 - Diagnose and investigate health problems and health hazards in the community
 - Inform, educate, and empower people about health issues
 - Mobilize community partnerships to identify and solve health problems
 - Develop policies and plans that support individual and community health efforts
 - Enforce laws and regulations that protect health and ensure safety
 - Link people to needed personal health services and assure the provision of health care when otherwise unavailable
 - Assure a competent public health and personal health care workforce
 - Evaluate effectiveness, accessibility, and quality of personal and population-based health services
 - Research for new insights and innovative solutions to health problems
- (U.S. Department of Health and Human Services, 2000)

The Lake County Health Department and Community Health Center³³

The Lake County Board appoints the 12-member Board of Health that governs the Health Department. While the Health Department coordinates its activities with the Lake County Board, it is not directly controlled by the County Board.

The “Mission Statement” of the Lake County Health Department and Community Health Center (Lake County Health Department) is to “promote physical and emotional health; prevent disease, injury, and disability; and protect the environment through the assessment of needs, the development of policy and provision of accessible, quality services” (Health Department, 2002:4). The Lake County Health Department is the second largest health department in Illinois (the City of Chicago is the largest). The services provided by the Health Department are available to all residents of the County.

The Health Department and Community Health Center has more than 950 full and part-time employees. Its budget in 2003 was about \$48 million. Approximately \$12 million was from local property taxes; \$18 million came from federal and state grants; and \$17 million was from fees, reimbursements, and payments for services. The fees charged by the Health Department are adjusted depending upon individual or family income. Third party billing for Medicaid or Medicare is available.

³³ Unless specifically cited in the text, the information describing the Health Department is from the Health Department’s Web site: www.co.lake.il.us/health.

Approximately 60 separately funded programs are implemented by the Health Department (Lake County Health Department, 2002:24, 25). The Health Department has four main service areas, which are Primary Care Services, Behavioral Health Services, Community Health Services, and Environmental Health Services. The service areas and their key programs are described below (Lake County Health Department, 2002).

Primary Care Services

The Health Department, through the Lake County Community Health Center, offers an extensive range of medical and dental services directed at individuals who may not have access to these services through the private sector (Lake County Health Department, 2002:56).

The Health Department has four clinics: North Chicago, Round Lake Beach, Waukegan, and Zion. A fifth is to be built in Highland Park. The clinics, along with hospitals in the area, are shown in Figure 5.24.

At the clinics, medical care is provided to adults and children, including: prenatal care—medical examinations, laboratory tests, health counseling, and prenatal and parenting classes; well-child care; immunizations; adult physicals; screening for breast and cervical cancer; prostate and colon cancer examinations; testing, treatment, and counseling for sexually transmitted diseases, including HIV/AIDS; the tuberculosis program for the prevention and control of TB; the treatment of acute and chronic illnesses; and limited psychiatric care. Residents are not turned away due to an inability to pay.

In 2003 the four clinics handled approximately 98,000 medical visits and 21,000 dental visits from about 37,000 clients, half of them uninsured. A mobile health service program makes medical care available to residents who are not able to travel to a clinic. The Health Department provided immunizations for 15,000 children at 10 locations.

The Primary Care Services programs and services include:

- **Clinical Laboratory Services:** These services support all the Health Department’s medical programs.
- **Dental Services:** Clinical dentistry and prevention services are provided at clinics, nursing homes, and schools.
- **General/Family Medicine:** Medical care is provided to adults. Services include prevention, treatment of illness, and school and pre-employment physical examinations.
- **Family Planning:** Medical examinations, pregnancy tests, laboratory tests, counseling, and education are provided for family planning and women’s health.
- **Illinois Breast and Cervical Cancer Project (IBCCP):** Free breast and cervical cancer screenings are offered to age-eligible (35 and older for cervical; 50 and older for breast), low-income women. Women can receive a complete physical, clinical breast exam, Pap test, and mammogram at no charge.
- **Pediatrics:** Medical examinations, immunizations, health and development appraisals, lead testing, and referrals are provided for infants and children.
- **Prenatal Program:** This program provides comprehensive medical care to income-eligible pregnant women who cannot afford or obtain care, or do not have private insurance. Complete medical examinations, laboratory tests, prenatal and parenting classes, and health counseling are provided at the Health Department’s clinics.
- **Special Supplemental Food Program for Women, Infants, and Children (WIC):** The WIC program provides nutrition education and nutritious foods to income-eligible, pregnant,

breastfeeding, and postpartum women and infants and children up to age five. (Lake County Health Department, 2002:55-63)

Behavioral Health Services

Behavioral Health Services “provides treatment, training and support services to persons experiencing problems related to emotional and mental illness or drug and alcohol addiction” (Lake County Health Department, 2002:27). Behavioral Health Services programs include: Mental Health Services

- **Assertive Community Treatment (ACT):** A specialized treatment and service delivery program in which a team consisting of a psychiatrist, nurse, and mental health and substance abuse counselors treat individuals with complex problems.
- **Child and Adolescent Behavioral Services (CABS):** Crisis assessment and case coordination is provided to Department of Children and Family Services (DCFS) wards and other youth at risk for psychiatric hospitalization. Intensive case management and counseling are provided so that youths and their families are able to cope with the problems they are experiencing and remain in the community.
- **Community Support Services (CSS):** This program provides comprehensive support services and treatment to chronically mentally ill persons. Residential housing programs are a part of the program’s services.
- **Crisis Care Program (CCP):** Crisis-intervention services are offered by telephone and through face-to-face contact. Respite care is provided in a six-bed residential facility.
- **Mental Health Group Home:** A supervised home for up to 14 adults with mental illness, with lengths of stay ranging from nine months to a year. Individuals are provided with assistance in improving interpersonal and daily living skills that enable them to transition to a less-structured environment.
- **Psychosocial Rehabilitation Program (PRP):** This program provides mental health rehabilitative services, socialization programs, and group activities to clients with serious mental illness. The program promotes self-confidence and teaches social and independent living skills.
- **Outpatient Services:** Counseling, crisis intervention, psychotherapy, and psychotherapeutic medication are provided for problems that range from temporary, stressful situations to more serious and enduring emotional problems.

Substance Abuse

- **Addictions Treatment Program (ATP):** A 24-hour residential care unit where medical detoxification, evaluation and rehabilitation, group therapy, and individual counseling are provided.
- **Mentally Ill Substance Abusers Care Management (MISA):** Individual and group counseling, psychiatric assessment, chemotherapy, and other services are provided to persons who have a dual diagnosis of mental illness and substance abuse.
- **Substance Abuse Program:** An outpatient chemical dependency program that provides counseling, detoxification, and methadone treatment to enable people to live without using alcohol or drugs. Counseling is provided to DCFS-involved chemically dependent women through the Substance Abuse Free Environment Project (SAFE). Youth in junior high and high school with drug-related school problems are given counseling.

- **Women’s Residential Services (WRS):** A residential alcohol/drug rehabilitation service for adult women. Housing is provided for up to 16 women and 14 of their children. (Lake County Health Department, 2002:26-34)

Community Health Services

Community Health Services provides patient care, consultation, assessment, evaluation, and information and education programs utilized by individuals, families, schools, community groups, and businesses (Lake County Health Department, 2002:36). Community Health Services programs include:

- **AIDS/HIV Prevention:** Provides education and anonymous testing and counseling.
- **Child and Family Connections:** Service is provided to families with children under age three who may have developmental delays or disabilities. Services include speech therapy, physical therapy, occupational therapy, developmental therapy, and social work.
- **Childhood Lead Prevention Program:** Children seven years of age and younger are tested for higher than normal levels of lead.
- **Communicable Disease Control:** Investigation, surveillance, and follow-up for communicable diseases.
- **Communities CAN Make a Difference:** This is a comprehensive, community-focused substance abuse prevention program targeting Beach Park, Winthrop Harbor, and Zion.
- **Community Health Assessment and Planning:** Surveillance and assessment of the health status of Lake County is provided through this program. Short term planning and coordination are carried out.
- **Community Nutrition:** A registered dietitian provides individual and group presentations.
- **Emergency Management and Bioterrorism Preparedness:** Management of and response to public health threats and emergencies such as nuclear, environmental, chemical, and biological are included in this program.
- **Family Case Management/Public Health Nursing:** Health counseling, supervision, demonstrations, and referral services are provided through home visits.
- **Family Life Education/Adolescent Health:** Provides educational programs and presentations on healthy lifestyle choices, sexuality, decision-making, and family communication to promote positive youth development between parents and teens. Services are also provided to pregnant and parenting teens.
- **Health Education:** Programs on a variety of health topics are provided for children, adolescents, and adults through camps, schools, and worksites.
- **Healthworks of Illinois:** This is a coordinated network of health services for children under DCFS custody.
- **Hearing and Vision Screening:** Screenings and referrals are offered in day care centers, nursery schools, and public and private schools.
- **Immunizations:** Children are given immunizations against preventable diseases. Seniors may obtain influenza and pneumococcal immunizations from October through December.
- **Institutional Health and Safety:** Programs help maintain standards of care and service in hospitals, nursing homes, child care centers, and residential facilities.
- **InTouch/Prevention Services:** This program provides drug abuse prevention, consultation, and education services to Lake County schools.
- **Sexually Transmitted Disease Prevention:** Education, testing, and counseling are provided for STDs.
- **TB Program:** Prevention and control of tuberculosis through clinic and community-based services. Illinois State Statutes authorize counties to develop programs to prevent and control tuberculosis. These programs can be financed through a property tax assessment dedicated to

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the “Tuberculosis Sanitarium Fund.” Lake County’s TB program receives about \$600,000 annually from property taxes. Additional funding is available from grants. The TB program, which has a staff of six, is part of the Community Health Services division of the Lake County Health Department. An estimated 20,000 to 25,000 patients use the services of the TB Clinic each year. The TB Program has a three person Board of Directors who are appointed by the Lake County Board. At least one of the directors must be a physician.

- **Teen Parent Services:** Helps teen parents get the education and training needed to support their families.
- **Tobacco Prevention:** Seeks to incorporate a strong tobacco use prevention and cessation message in all Health Department services and programs. (Lake County Health Department, 2002:35-46)

Environmental Health Services

The Environmental Health Services programs and services assure sanitary conditions in order to prevent disease and maintain and improve the quality of life in the County (Lake County Health Department, 2002:48). Programs include:

- **Animal/Rabies Control:** Animal bites and nuisance, neglect, and cruelty cases are investigated. Strays are captured and a lost and found pet service is operated. Rabies registration of dogs and cats is tracked. A pet neutering referral service is available for low-income pet owners. Animal welfare and care educational programs are offered.
- **Environmental Engineering Program:** Bathing beaches, swimming pools, and tanning salons are inspected. Sewage treatment plants are surveyed and discharge monitoring reports are reviewed. Staff responds to reports of sewage back-ups and odor problems. Advice is provided on radioactivity, in-door air quality, and lead and fluoride concentrations in drinking water. Radon gas test kits can be purchased. Staff is notified when boil orders are issued for public water supplies.
- **Food Program:** Food establishments are required to annually obtain an operating permit from the Health Department. Sanitarians inspect all food establishments, including schools, restaurants, retail food stores, taverns, hospitals, and daycare centers, to assure that food is prepared, served, and stored in a sanitary manner. Complaints and concerns about food establishments and incidents of possible food borne illness are investigated. Over 2,500 food establishments are inspected each year. Programs to educate food service workers on proper food handling procedures are provided.
- **Individual Sewage Disposal Systems (Onsite Wastewater Treatment Systems):** Staff conducts soil inspections, reviews plans, issues permits, conducts inspections, and assures appropriate maintenance for new OWTSSs; and for repairs, expansions, and replacements of existing systems.
- **Insect and Vector Control:** This program minimizes the potential for disease, discomfort, injury, and annoyance from vectors (which are organisms that transmit disease from one host to another). The program also targets the potential for illness and environmental pollution from the use of pesticides.
- **Laboratory:** Bacteriological and chemical analyses are performed at the laboratory. Services support the inspection and analysis of surface water samples. Drinking water from public water supplies is tested, and private requests for water analysis can be conducted.
- **Lakes Management:** Staff monitors swimming facilities for fecal contamination; conducts water quality, shoreline, and plant surveys of 32 lakes to determine their ecological condition. Technical assistance on lake protection and rehabilitation is provided.
- **Solid Waste:** The Health Department inspects open and closed solid waste landfills and composting facilities. Groundwater quality near landfills is monitored for possible

contamination. Illegal dumping is investigated and enforcement actions are taken to get properties cleaned up.

- **Water Well Program:** The Health Department issues permits, and inspects and samples private wells and some types of public water supplies. Upon request, private wells will be sampled and analyzed to ensure the water meets drinking water standards. (Lake County Health Department, 2002:47-54)

As the number and variety of programs and activities conducted by the Health Department illustrate, a large assortment of sources of information must be monitored in order to keep abreast of public health needs, identify trends, and help guide the Health Department in developing and targeting programs and allocating resources.

Information sources that are used by the Health Department include: the U.S. Department of Health and Human Services; Illinois Department of Public Health; Illinois Hospitals and Health Systems Association; Illinois State Cancer Registry; local hospitals; community and philanthropic organizations; the state and other local health departments; the Lake County Community Health Partnership; Northern Illinois Public Health Consortium, Inc.; religious organizations; the school system; and local governments (Lake County Health Department, 1998; 2002:5).

Because of the large amount of health-related information that has to be continuously monitored and updated, the Health Department has suggested Policy 5.33.4, which is to form an area-wide health planning organization to collect and distribute information on the general health status of the County and the County's health needs.

Lack of Access To Health Care In Lake County

A major function of the Lake County Health Department is to provide medical services to residents who cannot obtain treatment through the private sector. Often the lack of access to private health care providers is due to a lack of adequate health insurance.

The number of uninsured and under-insured County residents has been increasing. In 1997, there were approximately 67,600 uninsured individuals, which was 11.8% of the 1997 population (Lake County Health Department, 2000). This number had increased to 86,682 in 2000, (20,441 children and 66,241 adults), which is 14.7% of the County's population (Lake County Health Department, 2003A). It was estimated that there were an additional 70,000 to 92,000 under-insured residents in 1997 (Lake County Health Department, 1999:11). In 2000, the number of under-insured residents was estimated to be 100,581, or about 17% of the population (Lake County Health Department, 2003A). Combining the two categories of uninsured and under-insured, in 2000 almost 30% of the County's population either had no or inadequate health insurance.

“Underserved” is a subcategory under under-insured. Residents enrolled in Medicaid or KidCare are considered underserved. As of July 1, 2003, 48,894 Lake County residents were underserved. According to the Health Department, the three reasons most frequently given by private physicians for not serving more Medicaid clients are: low reimbursement rates; broken appointments due to numerous access barriers; and these patients need additional services, such as bilingual services, which private physicians usually do not supply (Lake County Health Department, 2003B).

The Health Department is expanding its network of clinics in order to improve access to health services for residents who either do not have insurance or whose insurance is inadequate. Improvements include expanding the clinic in North Chicago, moving the clinic in Round Lake

Lake County, Illinois

Park to the former village hall in Round Lake Beach, and constructing a new clinic in Highland Park. The clinics recently added evening and Saturday hours. In addition, the Health Department supports federal and state legislation that provides funding for programs that serve people with no, or inadequate, health insurance.

The Health Care Justice Act is being considered during the current session of the Illinois General Assembly (93rd General Assembly, 2004: HB 2268, SB1430). If approved this Act would require the state to develop and implement a universal access health care plan that would provide a full range of preventive, acute, and long-term health care services for Illinois residents (Illinois Campaign for Better Health Care, 2003; Illinois General Assembly, 2004).

Shortage of Nurses and Skilled Health Care Professionals

Research conducted by the National Center for Health Work Analysis, of the U.S. Department of Health and Human Services, found that in 2000 there was a shortage of registered nurses in 30 states. Illinois did not have a shortage at that time. As Figure 5.22 shows, Illinois is expected to experience a shortage of nurses starting in 2005, with this shortage increasing through the year 2020. (U.S. Department of Health and Human Services, 2002A).

Figure 5.22
Shortage of Registered Nurses in Illinois—2000-2020

Year	Supply	Demand	Excess or Shortage	Percentage of Shortage
2000	87,457	86,097	1,360	
2005	89,830	90,521	(691)	(.7%)
2010	91,419	95,684	(4,265)	(4%)
2015	91,032	101,944	(10,912)	(11%)
2020	87,975	109,334	(21,359)	(19.5%)

A survey by the American Hospital Association (AHA) looked at the shortage of nurses at the county level. The AHA study identified 24 Illinois counties with a nursing shortage in 2002. Lake County was found to not have a shortage in that study (U.S. Department of Health and Human Services, 2002B). However, based on information from Winchester House and the Lake County Health Department, there is a shortage of nurses for nursing homes and senior care.

In addition to registered nurses, there is a nationwide shortage of other types of health care professionals: medical and clinical laboratory technicians for example. The shortage of laboratory technicians will continue to increase since fewer than half the number needed annually graduate in the U.S. It is estimated that 12,400 technicians will be needed annually through 2010, while only 4,200 qualified workers enter the job market on a yearly basis (American Society for Clinical Pathology, 2002; El Centro College, 2003). The supply and demand for other types of medical assistants and health care professionals was not researched, but shortages are probable based on registered nurses and laboratory technicians. Federal and state programs to recruit students for all types of health care specialties are needed.

Efforts have begun at the national and state level to alleviate the nursing shortage. The Nurse Reinvestment Act was passed by Congress and signed by President George W. Bush in 2002. Among other provisions this Act established a college scholarship program for nursing students, provided grants to nursing schools to expand enrollment, created a grant program to promote

career advancement so that home health aides and nursing assistants can become registered nurses, established a student loan fund to increase qualified faculty for nursing schools, created a grant program to educate nursing in geriatric care, and initiated a national public service announcement campaign advertising and promoting the nursing profession (American Association of Colleges of Nursing, 2002). Two bills that would promote the nursing profession were introduced in the regular session of the 2003 Illinois General Assembly, but neither passed.

Policies for this section of the *Plan* include supporting federal and state legislation that will help alleviate the shortage of nurses, and supporting the introduction of legislation that will help recruit and train students for other professions in the health care field.

Regional Hospitals

Hospitals, as defined in the Unified Development Ordinance of Lake County, are facilities that provide medical or surgical care to patients and offer overnight care (UDO 2003:14-5). The hospitals in Lake County, and those nearby in Cook, Kane, McHenry, and Kenosha counties are listed in Figure 5.23 and shown on the map in Figure 5.24.

The State of Illinois Certificate of Need Program for Hospitals

The purposes of the Health Facilities Planning Act of 1974 (20 ILCS 3960) are to improve the financial ability of the public to obtain health care services; to establish an orderly and comprehensive health care delivery system which will guarantee the availability of quality health care to the general public; and to reduce the costs of health care that result from the unnecessary construction or modification of health care facilities (20 ILCS 3960/2).

With the Act, a number of activities cannot take place until a permit, known as a certificate of need (CON), has been issued by the Health Facilities Planning Board (20 ILCS 3960/3, 5, and 14.1). These include:

- construction of a new hospital;
- a major construction or modernization project at an existing hospital [exceeding \$6,326,066 (Illinois Department of Public Health, undated)];
- the reduction or addition of hospital beds, including eliminating beds at one hospital and relocating those beds to another hospital;
- the establishment of a new category of service (medical-surgical, pediatrics, and intensive care are examples of categories of service), or the discontinuance of an existing category of service;
- change in ownership; or
- closing of an existing hospital

The Illinois Department of Public Health has adopted a series of rules with criteria that have to be met in order to obtain a CON. The two most significant factors are demand and travel time. In Illinois, demand to justify a CON for a new hospital or adding beds to an existing one can be calculated using two different formulas. The first is the Demand Formula. In simple terms, a ratio is established between the number of hospital beds that are occupied during a given year and the Lake County³⁴ population for that same year. The Demand Formula assumes that this ratio will remain the same in future years, so as the County's population increases, the number of

³⁴ Lake County has been designated as the "planning area" for purposes of determining the need for a new hospital or additional hospital beds (77 Illinois Administrative Code 1100.220, 1100.510).

Lake County, Illinois

hospital beds in the County should also be increased in order to maintain the established ratio between population and utilized beds (77 Illinois Administrative Code 1100.510.b.1).

The second technique for calculating future hospital and bed need is the Incidence Formula. In this approach, incidence levels for certain diseases or conditions are obtained based on state or national rates of hospitalization. It is assumed that these rates will be accurate when applied to smaller population groups, such as the population of a county. The number of beds available would have to be sufficient to handle the expected number of patients on an annual basis using the incidence standard set at the state or national level (77 Illinois Administrative Code 1100.510.b.2).

The state recognizes that residents may prefer a hospital outside their own county. As Figure 5.23 shows, there are many hospitals in adjoining counties, and even southern Wisconsin, that are accessible to Lake County residents. In analyzing an application for a CON, the state takes into consideration where the patients who are admitted to a hospital live. The degree to which Lake County residents are admitted to hospitals outside the County, together with the number of people who travel into Lake County for hospital services, can impact how many hospitals and how many beds are needed in the County (77 Illinois Administrative Code 1100.510.c.9).

The travel distance and time it takes for residents to get to an existing hospital are evaluated when a new hospital is proposed. Travel time is considered excessive when it takes 45 minutes or more to reach an existing hospital (77 Illinois Administrative Code 1110.320.a.4). The 45 minute travel time is normally based upon estimates from Internet sources. In some cases, a representative for the proposed hospital or staff from the Illinois Department of Public Health may determine travel time by driving from a proposed site. Travel time is based upon “normal driving conditions, neither peak times nor in the middle of the night” (Illinois Department of Public Health, 2003).

The consideration of a CON by the Health Facilities Planning Board includes public testimony. Residents have the opportunity to address the Board and present “special conditions” that should be considered (77 Illinois Administrative Code 1100.340). The Board can grant a variance to the demand criterion when special needs or conditions are presented during the CON review process (77 Illinois Administrative Code 1100.220).

Zoning Districts that Allow Hospitals in Unincorporated Lake County

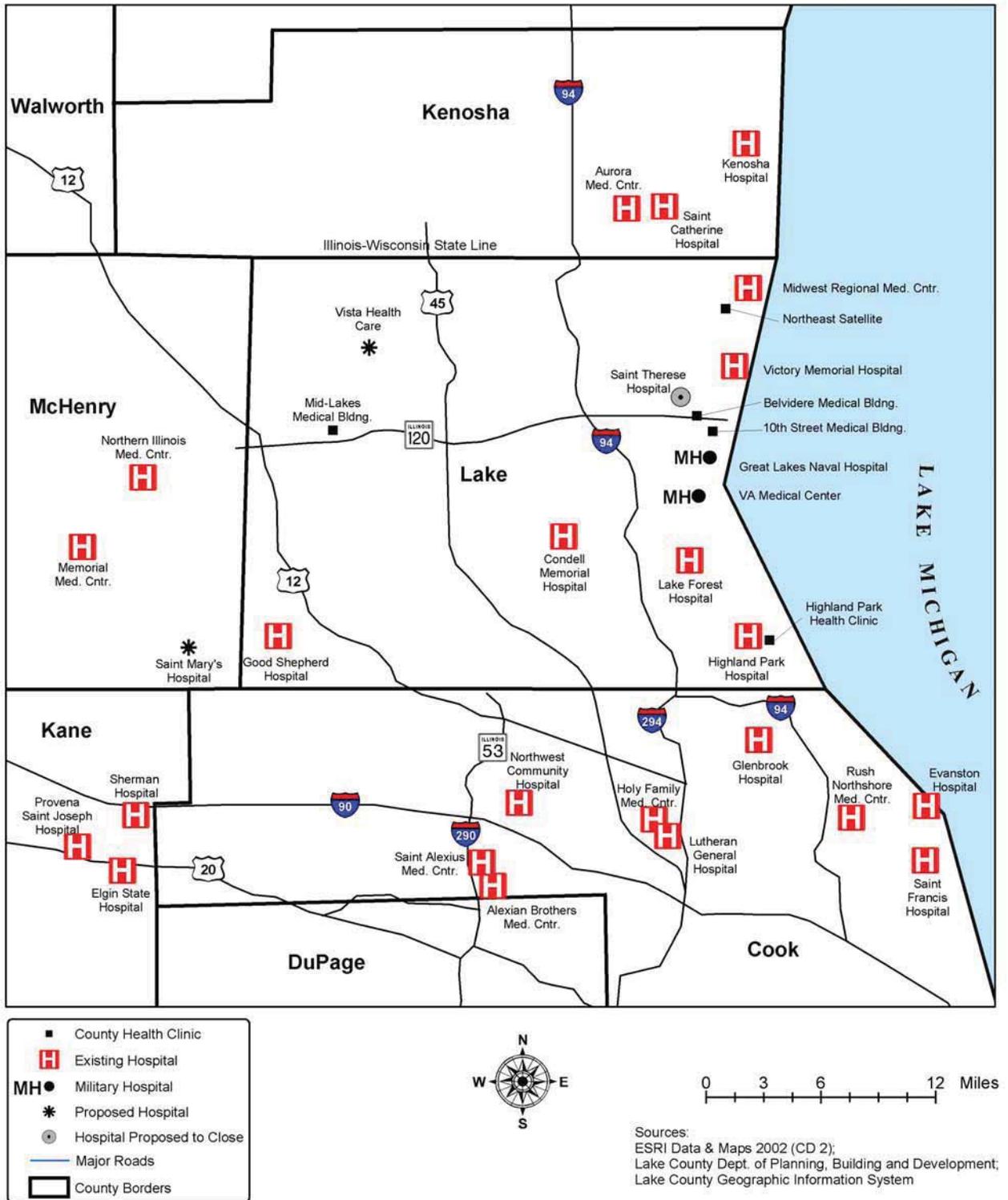
According to the Lake County Unified Development Ordinance, hospitals are allowed as a permitted use in the recreational commercial, general commercial, limited industrial, and intensive industrial zoning districts. Hospitals are allowed with a conditional use permit in the general office, limited commercial, rural residential, and residential 5 and 6 districts.

**Figure 5.23
Regional Hospitals**

Lake County		
Municipality	Hospital Name	Owner
Barrington	Good Shepherd Hospital	Advocate Health Care
Great Lakes	Great Lakes Naval Hospital	US Government
Highland Park	Highland Park Hospital	Evanston Northwestern Healthcare
Lake Forest	Lake Forest Hospital	Lake Forest Hospital
Libertyville	Condell Medical Center	Condell Medical Center
Lindenhurst	Proposed	Vista Health
North Chicago	Veterans Affairs Medical Center	US Government
Waukegan	Provena Saint Therese Medical Center ¹	Vista Health
Waukegan	Victory Memorial Hospital	Vista Health
Zion	Midwestern Regional Medical Center	Cancer Treatment Centers of America
Cook County		
Municipality	Hospital Name	Owner
Arlington Heights	Northwest Community Health Care	Northwest Community Health Care
Des Plaines	Holy Family Medical Center	Resurrection Health Care
Evanston	Evanston Hospital	Evanston Northwestern Healthcare
Evanston	St. Francis Hospital of Evanston	Resurrection Health Care
Glenview	Glenbrook Hospital	Evanston Northwestern Healthcare
Hoffman Estates	Alexian Brothers Behavioral Health Hospital	Alexian Brothers
Hoffman Estates	Saint Alexius Medical Center	Alexian Brothers
Park Ridge	Lutheran General Hospital	Advocate Health Care
Skokie	Rush North Shore Medical Center	Rush Health Care Network
Kane County		
Municipality	Hospital Name	Owner
Elgin	Elgin Mental Health Center	State of Illinois
Elgin	Provena Saint Joseph Hospital	Provena Health
Elgin	Sherman Hospital	Sherman Hospital
McHenry County		
Municipality	Hospital Name	Owner
Crystal Lake	Proposed St. Mary's Crystal Lake	Mercy Health Alliance (Janesville WI)
McHenry	Northern Illinois Medical Center	Centegra Health System
Woodstock	Memorial Medical Center	Centegra Health System
Kenosha County (WI)		
Municipality	Hospital Name	Owner
Kenosha	Aurora Medical Center	Aurora Health Care
Kenosha	Kenosha Hospital & Medical Center	United Hospital System
Pleasant Prairie	St. Catherine's Hospital	United Hospital System

¹ Vista's stated intention is to close Saint Therese if/when the proposed hospital in Lindenhurst begins operating

Figure 5.24
Lake County Health Department Clinics and Regional Hospitals



Goals and Policies³⁵

5.33 Goal: Support the Health Department's efforts to sustain and enhance its service system.

- 5.33.1 Policy: Support, whenever possible, the expansion of the number of public primary care and behavioral health care clinics.
- 5.33.2 Policy: Encourage efforts to expand funding for the Medicaid program in Illinois to maintain services for uninsured and underinsured residents and to support health care providers who treat patients on Medicaid.
- 5.33.3 Policy: Promote health care insurance pooling for small businesses and self-employed residents and educate employers about what a good health insurance plan contains.
- 5.33.4 Policy: Encourage the formation of an area wide health planning organization to measure and improve the health status of Lake County residents through collecting and distributing information on the general health status of the County and the County's health needs.

5.34 Goal: Hospitals should be within reasonable travel time of all Lake County residents.

- 5.34.1 Policy: The County and municipalities are encouraged to support sufficient private hospital presence in Lake County, including Waukegan and northwest Lake County.
- 5.34.2 Policy: Consider access to transit when locating new hospitals and public health care facilities.
- 5.34.3 Policy: The County and municipalities are encouraged to review zoning codes and development regulations to ensure they do not contain unnecessary requirements that would discourage new hospitals from being built or existing hospitals from being renovated.

5.35 Goal: There will be an adequate supply of nurses and other health care professionals in Lake County.

- 5.35.1 Policy: Lake County is encouraged to support federal and state legislation to help reduce the shortage of nurses.
- 5.35.2 Policy: Lake County is encouraged to support the introduction of federal and state legislation to help reduce the shortage of all health care professionals.
- 5.35.3 Policy: Lake County should encourage local and regional educational institutions to utilize existing grant programs to recruit students for the nursing profession.

³⁵ As stated in Chapter 1, Introduction, a Goal is defined as "the desired result to be achieved by implementing the *Plan*;" and a Policy is defined as "a general method or action designed to achieve a goal."

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- 5.35.4 Policy: Continue to develop the County's recruitment program for the Health Department and Winchester House by providing incentives such as scholarships, competitive salary, and training opportunities.

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Chapter 5 Infrastructure and Services Parks and Recreation

Significance

Parks and recreation facilities are an essential component of livable cities and villages. Lake County, the townships, cities, and villages have a long history and a continued commitment to providing and maintaining a high quality system of parks and recreation sites. The parks network covers a range from neighborhood “tot lots” to the State Parks.

State Parks and properties owned by the Lake County Forest Preserve District are addressed in Chapter 4, Environmental Resources, Open Space, and Farmland. Golf courses are included in this chapter due to their recreational function. Common open space areas that are reserved as part of the approval process for new developments, such as the open space in a conservation design development, are addressed in the Chapter 9, Land Use. Areas reserved as common open space and golf courses contribute to the open space “feel” of Lake County even though these areas may not be accessible to the general public.

Issues and Opportunities

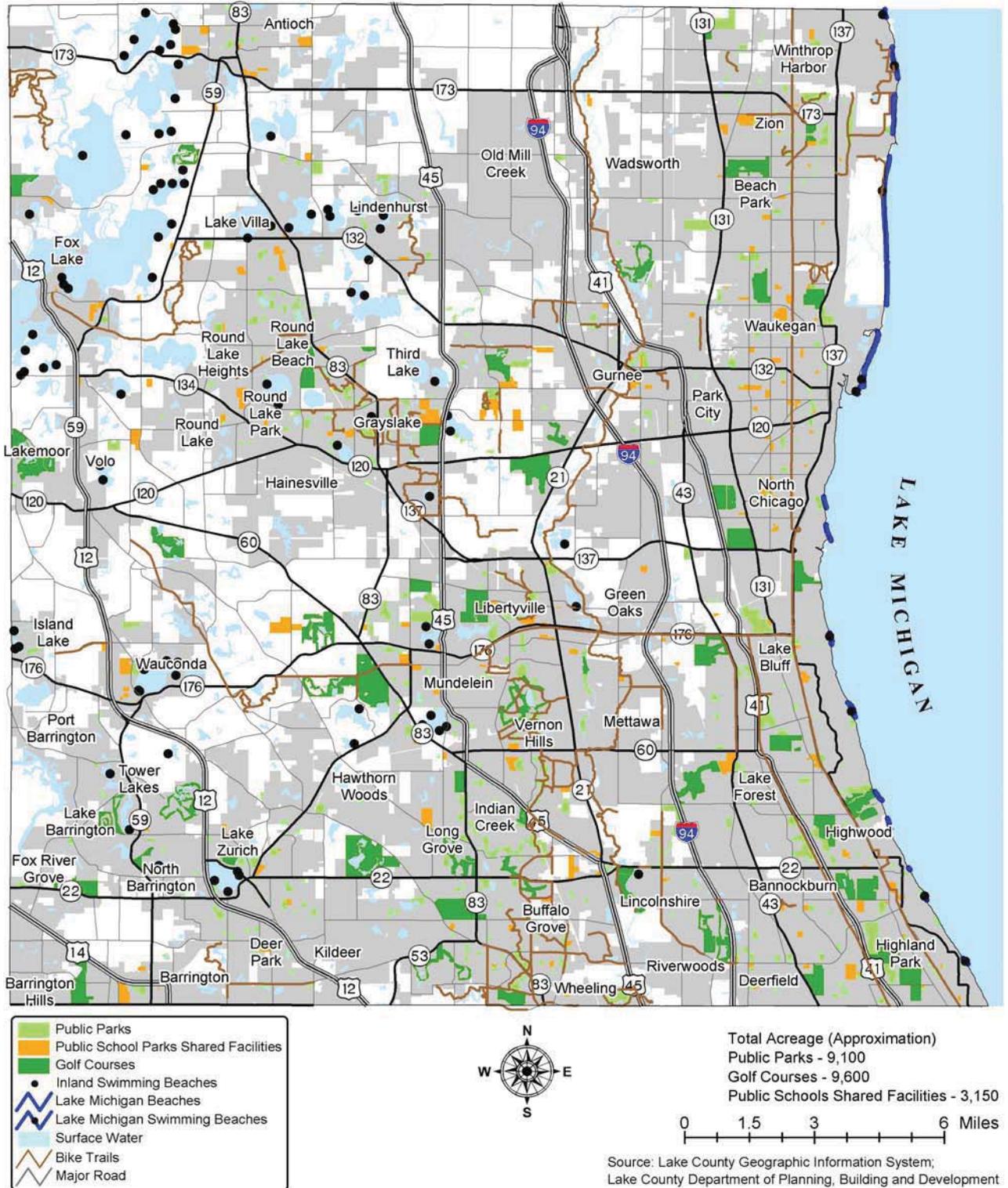
- Several municipalities, townships, and school districts “share” recreational areas.
- Development pressure to convert privately owned golf courses to other uses may increase.
- Local public parks, together with State Parks, Forest Preserve District lands, golf courses, and common open space areas all contribute to the open space “feel” of Lake County.
- The public beaches on Lake Michigan, the Chain-O-Lakes, and other inland water bodies are a valuable recreational asset but there have been frequent beach closings, especially of Lake Michigan beaches, due to bacterial contamination.

Analysis

Local public park and recreation facilities are mapped in Figure 5.25. Parks and recreation sites have been identified through tax ownership records and information provided by the municipalities and park districts. This search resulted in finding and mapping 9,400 acres of public parks. This total does not include privately owned parks, such as those that are sometimes provided in residential subdivisions; or conservation lands owned by private organizations. State Nature Preserves, Lake County Forest Preserve lands, State Parks and State Natural Areas, and the open space owned by Libertyville Township, which are discussed in Chapter 4, Environmental Resources, Open Space, and Farmland, are also not included.

Some public schools have agreements with a municipality to allow residents to use the school playgrounds. These shared recreational sites contribute another 3,150 acres. However, there is no long-term guarantee that these sites will remain available for recreation. If classrooms are added at a school, the recreation area may have to be reduced. A school may have to close and sell a site because of demographic changes, which would also reduce recreational land.

Figure 5.25
Publicly Owned Parks, Public Beaches, and Golf Courses Open to the Public



Combining the 9,400 acres of public parks with the 3,150 acres *currently* available at the public schools, gives a total of 12,500 acres. Using the 2000 Census population of 644,356, there are 19.5 parkland acres for each 1,000 residents.

Access to public parks where a variety of activities are possible is an important aspect of quality of life. This *Regional Framework Plan* recommends that the current 19.5 acres per 1,000 residents be maintained in the future, with the recognition that this will be increasingly difficult as the County grows.

The existing parks have not been divided into “passive” or “active” because of the potential for differences in definitions between communities. Because of the regional perspective of the *Plan*, no attempt has been made to count the number and types of indoor and outdoor recreational facilities such as courts, rinks, fields, sledding hills, or swimming pools.

Parks are commonly classified into types, in part based on their size. However, because other factors—such as the number of residents within a certain distance of the park, whether the park is passive or active, is the park shared with a school—need to be considered for the classifications to be useful, the parks are not assigned to types.

Existing bike trails are also included on Figure 5.25. These bike trails are derived from Lake County’s adopted Year 2020 Transportation Priority Plan. The trails include the major bicycle facilities maintained by the Lake County Division of Transportation, the Lake County Forest Preserve, and by some townships and municipalities. The total length of the mapped bike trail network is approximately 217 linear miles. The Year 2020 Transportation Priority Plan includes recommendations for a countywide trunk bicycle network that builds on the existing trails through a combination of trail extensions and new paths (LCDOT, 2002:np). The proposed trunk network includes 50 new trail projects covering over 120 miles (LCDOT, 2003:9). The proposed trails will accommodate the increasing demand for bicycle travel (LCDOT, 2002:np), as well as the recreational needs of Lake County’s residents.

Golf courses have also been identified and mapped in Figure 5.25. The four golf courses owned by the Forest Preserve District are included, along with the other publicly owned courses. Private golf courses that are open to the general public (not restricted to members only) are also included in the inventory. Golf courses cover about 9,500 acres. Golf course acreage was not included in the parkland-to-population ratio calculated above.

Lake County Health Department records show that there are as many as 168 inland, public beaches in the County. The Lake County Health Department has the responsibility for monitoring the levels of bacteria in the water at the County’s operating, inland public beaches, as well as the beaches on Lake Michigan where swimming takes place.³⁶ According to the Health Department, only about half of the possible public beaches were open for public swimming between 1998–2002. In 2002, 86 public, inland beaches open for swimming were monitored (see Figure 5.26). In 2002, there were nine public beaches on Lake Michigan that were open for swimming (see Figure 5.27).

³⁶ The authority for the Lake County Health Department to do the testing at the County beaches has been delegated to it by the Illinois Department of Public Health.

**Figure 5.26
Beach Closings**

BEACH NAME	LAKE	Number of Days the Beach Was Closed by Year				
		2002	2001	2000	1999	1998
Elmcrest Subdivision	Bangs Lake	2	1	1	0	0
Lake View Villa Subdivision	Bangs Lake	1	3	0	1	0
Lindy's Landing	Bangs Lake	0	0	0	0	0
Maimans Lake Shore	Bangs Lake	4	0	0	0	0
Maimans Lakeside Manor	Bangs Lake	0	0	0	0	0
Wauconda Park District	Bangs Lake	0	0	0	0	2
Chain O' Lakes (Country Club)	Bluff Lake	0	0	0	0	0
Lodge's Beach	Bluff Lake	0	0	0	0	0
Cedar Lake Park	Cedar Lake	1	0	0	0	0
Lehmann Park	Cedar Lake	0	0	1	0	0
Bluff's Subdivision	Channel Lake	0	0	0	0	0
Channel Lake Shores	Channel Lake	0	0	0	0	0
McDermotts (Waz's Playtime)	Channel Lake	0	0	0	0	0
Northeast Beach	Countryside Lake	0	0	1	0	0
Sedgewood Cove	Crooked Lake	0	0	0	0	0
Camp Peacock	Crooked Lake	0	0			
Hermitage	Deep Lake	2	0	1		
Jack and Lidia's Resort	Deep Lake	0				
Grove Terrace	Diamond Lake	0	0	0	0	0
Lake Terrace	Diamond Lake	0	0	1	0	0
Mundelein Park District	Diamond Lake	0	2	2	0	0
Oak Terrace	Diamond Lake	1	0	2	0	0
Mariners Cove	Druce Lake	1	0	1	0	0
Fox Lake Vacation Village	Dunns Lake	0	0	1		
Camp Duncan	Fish Lake	2	0	1		
Fish Lake Beach	Fish Lake	1	1	0		
Atwater Park	Fox Lake	0	0	0	0	0
Bonnie View Estates	Fox Lake	0	0	0	0	0
Bue Park	Fox Lake	0	0	0	0	0
Columbia Bay	Fox Lake	0	0	0	0	3
Mineola	Fox Lake	0	0	0	0	0
Stanton Bay Park	Fox Lake	0	0	0	0	0
Pebble Beach	Gages Lake	0				
Picnic Grove	Gages Lake	0	0	0		
Gurnee Park District	Gowe Memorial Pond	0	1	0	0	0
Blarney Island	Grass Lake	0	0	0	1	0
Grass Lake Marina	Grass Lake Pond	0	0	0		
Jones Island	Grayslake	1	0	0	0	0
Camp Hastings	Hastings Lake	5	1	1		0
Biltmore Country Club	Honey Lake	0	0	5	0	0
Independence Grove Beach	Independence Grove	6	2			
Brier Court	Island Lake	1	0	0	0	0
Fern Drive (Park Drive)	Island Lake	6	5	2	2	0
South Shore	Island Lake	1	0	0	0	0
Lake Barrington Shores	Lake Barrington	2	3	0	0	1
Bob's Marina	Lake Catherine	0	0	0	0	0
Feltner's Subdivision	Lake Catherine	0	0	0	0	0
Warriner's Subdivision II	Lake Catherine	1	0	0	0	0
Lindins Landing	Lake Linden	2	0	2	0	0
Meyers Beach	Lake Linden	0	0	0	0	0
Ferris Trailer Park	Lake Marie	0	0	0	0	0
Lake Marie Subdivision	Lake Marie	0	0	0	0	0
Chain-O-Lakes Park Subdivision	Lake Matthew	0	0	0	0	0
Pistakee Heights Subdivision	Lake Matthew	0	0	0	0	0
Fourth Lake Resort	Lake Miltmore	2	0	0	0	0

Figure 5.26 (Continued)
Beach Closings

BEACH	LAKE	2002	2001	2000	1999	1998
West Township	Lake Miltmore	4	1	1	1	0
Libertyville Boat Club	Lake Minear	0	0	0	0	0
Brezewald Park	Lake Zurich	0	1	2	0	0
Henry G. Paulus Park	Lake Zurich	24	3	0	0	4
Nestlerest Park	Lake Zurich	0	0	1	0	0
Oakwood Beach Club	Lake Zurich	0	0	0	0	0
Park District Beach	Lincolnshire	0	0	1	0	0
Lomond Park Beach	Loch Lomond	2	0	0	0	0
North Beach	Loch Lomond	1	2	0	0	0
Improvement Association	Manor Lake	0	0	0	0	0
Beachwood Subdivision	Petite Lake	0	0	0	0	0
Highwood Subdivision	Petite Lake	0	0	0	1	0
Jo-Al's Resort/Cypress	Petite Lake	0	0	0	0	0
Petite Lake Park	Petite Lake	0	1	1	0	0
Summerside	Petite Lake	0	0	0	0	0
Cedar Island	Pistakee Lake	0	0	0	0	0
Crockett's Estates Subdivision	Pistakee Lake	0	0	0	0	0
Meyer's Bay	Pistakee Lake	0	0	0	0	0
Watt's Marina	Pistakee Lake	0	0	0	0	0
Prairie Crossing	Prairie Crossing Lake	5	0	0	0	0
Hilldale Manor	Red Head Lake	0	1	1	4	0
Lakeview Subdivision	Red Head Lake	0	0	0	1	0
Bengston Park	Round Lake	1	0	0	1	0
Round Lake Beach	Round Lake	0	0	1	0	0
South Township	Sand Lake	2	0			
Southeast Beach	Sylvan Lake	0	0	1	0	0
South Beach	Timber Lake	1	0	0	0	0
East Beach	Tower Lake	1	1	1	0	0
Camp Moyoca	West Loon Lake	0	0	0	0	0
Camp Henry Horner	Wooster Lake	4	1	0		
Number of Beaches Licensed & Open for the Year		86	84	81	75	76
Total Days the Beach Was Closed for the Year		87	30	32	12	10

Source: Pfister, 2002

 Indicates the lake was not licensed for that year

Inland beaches are sampled every two weeks and beaches on Lake Michigan are sampled daily from before Memorial Day to Labor Day³⁷ for *Escherichia coli* (E. coli). Possible sources of E. coli and other pathogens include improperly treated sewage, including failing septic tank systems (onsite wastewater treatment systems); fecal discharges from swimmers, especially from children who are not toilet trained; and wild and domestic animal waste (Illinois Department of Public Health, 2002 and undated; Pfister, 2002). If sampling finds 235 or more E. coli colonies in 100 milliliters of water, state regulations require the beach to be closed. The beach cannot be reopened until the bacteria count is below 235. It takes almost one day after the sample has been taken to know if the water is safe enough to reopen the beach.

Because of high E. coli counts, the 86 operating inland beaches were closed a total of 87 days (one beach was closed for 24 days, accounting for over 25% of the inland beach closings) in 2002. The nine Lake Michigan Beaches were closed a total of 207 days in 2002 (Pfister, 2002).

³⁷ In 2002 the Lake Michigan beaches were tested from May 23rd through August 31st (Pfister, 2002).

Figure 5.27
Lake County's Lake Michigan Beaches

BEACH NAME Listed from North to South	Number of Days the Beach Was Closed by Year				
	2002*	2001	2000	1999	1998
North Point Marina Beach	46	33	18	2	4
Illinois State Beach North Beach	4	5	1		
Illinois State Beach Sailing Beach			1	2	1
Illinois State Beach South Beach	18	11	13	7	2
Waukegan North Beach	33	10	11	6	1
Waukegan South Beach	54	22	10	2	7
Lake Bluff Sunrise Beach	9	2	2	4	0
Lake Forest Forest Park Beach	13	12	3	9	5
Highland Park Park Avenue Boating Beach	17	16	4	3	0
Highland Park Rosewood Beach	13	8	4	4	3
Total Days the Beach Was Closed for the Year	207	119	67	39	23

*In 2002, the beaches were sampled daily from May 23rd through August 31st
Source: Pfister, 2002

 Indicates the beach was not licensed for that year

The Lake County Health Department initiated a study in August 2002 to try to determine the cause of the high E. coli counts at four Lake Michigan beaches: Highland Park Rosewood beach, Lake Forest Park beach, North Point Marina beach, and Waukegan South beach. E. coli was collected at these beaches and the DNA of the bacteria was analyzed. The study “found that gull feces were the predominant source of the high bacteria counts” at the four beaches. Human sewage was also found to be significant at the Highland Park Rosewood beach (Lake County Health Department, 2003).

The beach closings due to high bacteria counts for the years 1998 to 2002 are summarized in the table, Figure 5.28. (See Figure 5.26 and 5.27 for beach closing information on the specific inland and Lake Michigan swimming beaches.)

Figure 5.28
Beach Closings Due to High Bacteria Counts

Swimming Beaches				
Year	Inland		Lake Michigan	
	No. Open	Days Closed	No. Open	Days Closed
2002	86	87	9	207
2001	84	30	9	119
2000	81	32	10	67
1999	75	12	9	39
1998	76	10	9	23

Beach water can also be contaminated by urban or agricultural stormwater runoff following a rain. The Illinois Department of Health recommends staying out of the water if it looks murky, has an odor, or if there has been a heavy rainfall within 24 hours (Illinois Department of Public Health, 2002 and undated).

The Sewage Treatment and Stormwater Management sections of this chapter contain policy recommendations that are intended to protect water quality for all uses, including recreation.

The policy recommendations in the *Plan* are directed towards providing an integrated system of parks and park facilities that serves the needs of a population that is diverse in culture, age, and interests: “[R]ecreation for both adults and children includes social contacts, experiences in natural environments, and intellectual and cultural experiences and expression, as well as sports” (National Recreation and Parks Association, 1983:19).

Goals and Policies³⁸

5.36 Goal: Provide adequate parks and recreation facilities for present and future residents.

5.36.1 **Policy:** Determine the parks and parkland needs of all County residents, based on the needs of a diverse population, including children, the elderly, and residents with disabilities.

³⁸ As stated in Chapter 1, Introduction, a Goal is defined as “the desired result to be achieved by implementing the *Plan*,” and a Policy is defined as “a general method or action designed to achieve a goal.”

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5.36.2 Policy: Expand parks and parkland facilities to meet the current and future needs of a growing population by maintaining, at a minimum, the current (2000) ratio of 19.5 acres of parkland per 1,000 population.

5.36.3 Policy: Evaluate existing ordinances and amend when necessary to require developers to provide adequate recreation and parkland in new developments.

5.37 Goal: The publicly owned recreation and parks facilities in Lake County will form a balanced network serving all portions of the County.

5.37.1 Policy: Acquire land and develop trails and paths that connect existing and new parks and recreation sites.

5.37.2 Policy: Acquire and develop additional parkland in areas where parkland and park facilities are deficient.

5.37.3 Policy: Encourage coordination among park districts, the Forest Preserve, school districts, municipalities, Lake County DOT, and the Stormwater Management Commission to economically and efficiently improve the park and trails system.

5.37.4 Policy: Consider access to public transit when selecting new park sites.

5.38 Goal: Provide adequate amenities in existing and future parks.

5.38.1 Policy: Provide improved customer service and convenience facilities where needed such as year-round restrooms, additional benches, picnic shelters, and drinking fountains.

5.38.2 Policy: Maintain, upgrade, and beautify existing parks and publicly owned recreation facilities.

5.39 Goal: Design and develop new, and modify existing parks to serve a variety of purposes.

5.39.1 Policy: Design and provide park trails for a variety of uses, including hiking, biking, snowmobiles, cross country skiing, and horse riding so that the parks can be used in all seasons.

5.39.2 Policy: Encourage passive recreational facilities in natural conservation areas for activities such as nature walks, bird watching, and demonstration areas for best environmental management practices.

5.40 Goal: The publicly owned recreation and parks facilities in Lake County will be sanitary, safe, and managed in an environmentally sound manner.

5.40.1 Policy: Maintain frequent testing for elevated bacteria levels in order to discover and eliminate the sources of bacteria that are causing public beach closings.

5.40.2 Policy: Encourage adequate security and public safety at new and existing parks.

5.40.3 Policy: Upgrade parks to meet federal, state, and local sanitary, safety, and environmental standards.

Sources

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- Lake County Division of Transportation (LCDOT), 2002, *Year 2020 Transportation Priority Plan, Libertyville, IL*
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- Lake County Health Department and Community Health Center, 2003 (April 10), "Study Confirms that Gulls Contributed to Lake Michigan Beach Closings Last Summer," www.co.lake.il.us/health (click "Press Releases").
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- National Recreation and Park Association, 1983, *Recreation, Park and Open Space Standards and Guidelines*, National Recreation and Park Association, Alexandria VA.

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