



St. Clair County Master Plan

ENVIRONMENT

Technical Report

- Land Use
- **Environment**
- Economy
- Transportation
- Public Services
- Alternatives
Analysis



March 2000

Prepared by the:
St. Clair County Metropolitan Planning Commission

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EXECUTIVE SUMMARY

CLIMATE, GEOLOGY, TOPOGRAPHY AND DRAINAGE

Climate

The climate of the County is a product of latitude, and position relative to the Great Lakes. The Great Lakes are a major control factor on the climate for the Midwest; however, St. Clair County is less strongly influenced by climate because of its southeastern location in the State. The most obvious effect of the lakes on the County is the increased percent of cloudiness in late fall and early winter, when prevailing westerly winds move cold air across the warmer lake water. In addition, the County's southeastern location provides it with five to ten percent more sunshine than those counties at the same latitude on the western side of the State.

Geology

Much of the Great Lakes Region was an intracratonic basin (crater like), now called the Michigan basin. Marine and near shore sediments, including limestone, dolomite, evaporates, sandstone, and shale, were deposited over Precambrian bedrock. The soils derived from much of the Precambrian crystalline bedrock are generally acidic; resulting is less productive agricultural lands. The soils derived from marine deposits, including shale and marine limestone, dolomite, and evaporites, are typically more calcareous (less acidic), more nutrient- and moisture-rich loams and clays; they are generally the soils most utilized for agriculture.

Topography and Slope

The land surface of the County is a glacial landform, with characteristic slopes, substrata, soils, and drainage conditions, and as a result of these physical factors, certain vegetation evolved and now exist. According to the United States Geological Survey, St. Clair County is part of the landform called Washtenaw-Maumee Lake Plain, consisting primarily of clay soils, along with several one to three mile-wide end moraines.

Watercourses

There are six major water bodies affecting St. Clair County. The largest of these water bodies is Lake Huron, which as part of the Great Lakes water system encompassing 12.5 miles of St. Clair County's boundaries. The St. Clair River, a connecting waterbody for the Great Lakes system, is a receptor of a significant portion of the county's surface drainage. Recreational use of the St. Clair River is more limited than that of Lake Huron, largely due to the swift river currents and lack of sand beaches. The St. Clair flats area is at the mouth of the St. Clair River. The flats represent one of the world's largest freshwater deltas. Lake St. Clair, towards the southern end of the Great Lakes system, receives 218,000 cubic feet per second of water from the St. Clair River. Lake St. Clair supports a range of recreational activities and wildlife habitat.

The inland waters within the County total only 0.7% of land the area, and include the Black River, the largest drainage basin in southeastern Michigan (encompassing 455,040 acres); the Pine River, the largest drainage basin completely contained within the County (measuring 126,110 acres); and the Belle River, which has the smallest drainage basin (59,810 acres), but has a river bed significantly deeper than the Pine River bed.

Lake Levels

Water level fluctuations of two to three feet are common along the St. Clair River shoreline, from the City of St. Clair to the southern County line. Over 218,000 cubic feet per second of water passes through the St. Clair River from Lake Huron into Lake St. Clair, which causes tree mortality, shoreline erosion, and major alteration in species composition of marshes and wet prairies. According to the Great Lakes Information Network (Army Corps of Engineers), there are six locations along the St. Clair River that are monitored for lake levels on a monthly basis. In addition there is one park along Lake Huron that due to recent erosion,

Drainage Basins (Watersheds)

Watershed problems have been added to the monitoring list. According to the U.S. Army Corps of Engineers, there are a total of four major river drainage basins located within St. Clair County. These river basins include the Black, Pine, Belle and Clinton Rivers. The Black River is the largest river basin (159, 930 acres) and is characterized by a basin that is within a broad, flat plain bounded on three sides by hills ranging between 20 to 100 feet (the Mill Creek is a major tributary within the Black River basin). The Pine River basin is completely contained within the County and covers an area of approximately 126,011 acres. A relatively flat basin characterizes the River. The Belle River basin is only partially contained within the County (59,810 acres) and is characterized by a basin that is also relatively flat. The fourth basin is the North Branch/Clinton River basin, covering only 8,178 acres of the County. Undulating moraines and narrow sand and gravel plains characterize this portion of the Clinton River basin.

NATURAL RESOURCES

Soils

Based on the Soil Survey completed in 1974, by the Soil Conservation Service, there are twelve soils associations found in St. Clair County, further divided into thirteen great groups, which exhibit the following characteristics:

- Wet loamy and clayey soils are prevalent,
- Soil permeability is generally low, and these soils require drainage for agricultural use,
- Soils are calcareous at shallow depth,
- Soils in the sand channels are poorly or very poorly drained in depressions and excessively drained on dunes;
- Sandy soils in lower slope positions are often calcareous, while those on dune ridges are acidic; and,
- Sand soils are prone to wind erosion when cultivated.

Soils Least Suited for Development

Since the majority of the County has drainage problems, 95%-99% of the soils are considered severely limited for development. Several areas that are particularly unsuited for development are near the shoreline and on farmland. Analysis of the soils within the County determined the following soils to be the least suitable for development: Houghton, Latty, and Paulding.

Soils Best Suited for Development

Over 95% of the County has drainage problems, thus suitable building sites exist in only one to five percent of the County (primarily within the eastern third of the County). The areas that are particularly well suited for development are situated away from the shoreline. Analyses of the soils within the County have determined the following soils to be the most suitable for development: Boyer, Chelsea, and Croswell.

Hydric Soils

Hydric soils are found in areas that are moist or wet. The soils within St. Clair County which have hydric characteristics include the following: Bach, Blount, Conover, Corunna, Gilford, Houghton, Hoytville, Jeddo, Lamson, Latty, Londo, Metamora, Minoa, Otisco, Palms, Parkhill, Paulding, Sanilac, Sims, Spinks loamy substratum, Thomas, Toledo, Wainola, and Wasepi.

Pre-Settlement Vegetation

The pre-settlement vegetation of the clay lake plain differed greatly from that of the sand lake plain. Most of the clay lake plain supported either upland or wetland forests. In contrast, the sand lake plain supported oak barrens (savannas) on the uplands and wet prairies or marshes in the lowlands.

The forests of the clay lake plains also responded to differences in slope class and drainage. Where streams improved drainage conditions, there were mesic forests dominated northern hardwoods (311,583 acres). The beach ridges and low dunes of the sand lake plain supported open, 'barrens', or savannas of white and black oak. Extensive marshes occurred along the entire coast of Lake St. Clair, and extended into water four to five feet deep, one to two miles wide in places, and extended for miles up the major river corridors.

Woodlands

The majority of the woodlands still existing within the County are along the banks of the Black (including Mill Creek), Pine and Belle rivers, and in smaller quantities in varied locations throughout the County. Woodlands cover only nine percent of the County (approximately six percent is managed by the Michigan Department of Natural Resources), and provide a visual relief from the relatively flat topography of the area, along with providing a prime wildlife habitat.

The factors that determine the appropriate location to either preserve or plant woodland vegetation include the following: productivity, species priority, seedling mortality, plant

competition, equipment limitations, wind-thrown hazard, and erosion hazard. Based on the 1995 SEMCOG Land Use Cover, there are approximately 72,100 acres of woodlands within the County. The most predominant types of woodlands include the Central Hardwoods and the Lowland Hardwoods.

Prime Farmland

The clay soils of the region were among the first areas in the State farmed by European settlers. Most clay lands have been ditched and tiled and are among the most valued agricultural lands in the State. The best soils for grain and seed crops include the following: Blount, Boyer, Conover, Londo, Metamora, Metea, Minoa, Morley, Nappanee, Pert, Sanilac, Spinks, Wainola and Wasepi. These soils are located primarily north and west of the area between Port Huron and Memphis and cover approximately 240,000 acres (52% of County). Farming and related green industries are the second largest sector of the County's economy, rating statewide as one of the top 25 counties for soybean, oats, wheat, hay and hens.

Minerals - Sand, Gravel, Salt, Peat and Natural Gas Storage and Production

Historically, there have been sand, gravel, salt and peat minerals available within the soils of St. Clair County. At the present time there are only 2,244 acres of extractive land use, which is contained within only a few ongoing mineral extraction and related use activities. Currently one natural brine and salt (solution mining) well exists, while in previous years there were numerous operations. The caverns in the salt deposits are now used for liquid petroleum refining and storage facilities, several of which exist today. Once, found quite extensively throughout the county, peat deposits have been farmed, mined or burned over and deposits of significant size are no longer found within the County. Michigan, however, still remains the number one peat producer within the United States.

SENSITIVE LANDS/AREAS

Floodplains

The floodplain is an important part of the County's drainage system. Floodplains are defined as the land adjoining a lake, watercourse or similar body of water that has the potential of being inundated by floodwaters and act as floodwater retention areas. Within the County, floodplains are located adjacent to streams, rivers and drains that usually flood during 100-year storms. These areas are mapped and determined to be unsuitable for new construction, not only for the safety of the individuals constructing the home, but also it can create an alteration in the flooding further upstream.

Wetlands

Michigan is one of only two states allowed to assume federal permitting authority pursuant to Section 404 of the Federal Clean Water Act of 1984. According to the Goemaere-Anderson Wetland Protection Act of 1979, a wetland is the "land characterized by the presence of water at a frequency and duration sufficient to support, and under normal circumstances does support, wetland vegetation or aquatic life and is commonly referred to as a bog, swamp, or marsh."

Wetlands cover 8.6% of the St. Clair County's land area, and include lowland hardwoods, lowland conifers, wooded wetlands, shrub/scrub wetlands, aquatic beds, emergent wetlands and unvegetated flats. The wetlands within St. Clair County are scattered throughout the townships, but are more abundant along the eastern coastline and along the inland rivers.

Shorelands

There is a total of 58 miles of shoreland along the mainland, most of which has been developed or is unable to be developed. The majority of the shoreland has been stabilized by sea walls, but the remaining shoreland is significant because of its influence by and involvement in the geological erosion processes (deposition). However, very little beach erosion can be found along the shorelands due to their limited accessibility and recently consistently low water levels. At times of high water levels, evidence of erosion does exist, primarily along Lake Huron and the St. Clair River.

Wildlife Habitat

The Soil Survey for St. Clair County divided the appropriate soils for wildlife habitat and food sources into several categories. Each of these wildlife habitats can be found only in certain soils and will serve as a source of food for only certain wildlife; however, their existence is not a certainty. Additionally, several environmentalists have noted the County's abundant wildlife habitat is unique in the State, which has resulted in the abundant presence of migratory birds.

The County is located within the path of two flyway corridors for stop-over and migratory birds, thus indicating a rich wildlife habitat, including watersheds and other aquatic places, terrestrial habitats, and a variety of 'edge' lands. Bird species tend to be the leading indicator of the quality of wildlife habitat and are always directly or indirectly related to the supportive plant and microorganism species in a given area.

Unique Plants and Animals

Rare plant communities can be found in wet-mesic, and dry sand prairie, now remaining as small remnants on State-owned lands. Such areas are typically called 'lakeplain prairie or oak opening' because of their distinctive flora and fauna. Of the 51 rare plant species observed since the turn of the century in St. Clair County, the majorities are associated with the Great Lake's marshes or lakeplain prairies. However, only two of the state listed species have been observed since 1990, and the only federally listed species has not been observed since 1984 making its status uncertain.

Most of the 26 rare animal species are associated with either Great Lake's marshes or lakeplain prairies. Of the listed species, only twelve have been observed since 1990, thus making their existence more certain, while the only federally listed species (Bald Eagle) has not been officially observed since the beginning of the 1900's indicating its current status is unknown.

Unique Features

There are many unique features found within St. Clair County, including environmental features, recreation/parkland resources, archaeological and historical sites, scenic vistas/lookouts, countywide events, and miscellaneous features. Each of these adds to the character of the County while preserving its history and existing environmental character.

AIR AND WATER QUALITY

Air Quality

The only State maintained pollutant-monitoring site in the County is located in the City of Port Huron. The parameter measured at this site is ozone ($PM_{2.5}$), despite the attainment status denoted by the State of Michigan in 1996. No other parameters are currently being measured on a daily basis because in 1996 St. Clair County was designated as an attainment area for Carbon Monoxide (CO) and particulate matter with diameters less than 10 microns (PM_{10}), while the entire State of Michigan is designated an attainment area for Lead (Pb), Nitrogen Dioxide (NO_2), and Sulfur Dioxide (SO_2).

Water Quality

Surface Water - The previously designated trophic status (fertility or nutrient level) of some areas of the Great Lakes has improved dramatically due to the reduction of phosphorous loading through point source controls. There are still problems associated with very persistent, bio-accumulative, organic toxic substances such as polychlorinated biphenyl (PCB), chlordane, and dioxin. Based upon the amount of PCB in Great Lakes fish, Michigan Water Quality Standards are not being met, which includes the St. Clair River. The water quality of the rivers within the County is generally good, however some areas remain reduced in quality, which includes portions of the Pine, Black and Belle rivers. In addition to contaminants noted above, significant water quality problems in the Pine, Black and Belle rivers can be traced back to soil erosion, sedimentation, and agricultural and commercial site stormwater run-off.

Ground Water - Groundwater depths range from 50 to 170 feet below the surface. Wells in the glacial deposits (100-300 feet deep) yield less than 10 gallons per minute. In the western half of the County, the ground water yields in glacial deposits will generally be higher (10-100 gallons per minute) and dissolved solids are generally not a problem with the deeper wells in bedrock. Additionally, the County Health Department has indicated that no known areas of groundwater contamination exist within the County.

Contamination Sites

There are a total of 26 Michigan Sites of Environmental Contamination (Part 201) sites and 115 Leaking Underground Storage Tank (LUST) sites within St. Clair County. The Part 201 list includes sites that have known and unknown source contaminants, while the LUST sites are a list of known leaking underground storage tanks. There appears to be a predominance of both within the developed areas of the County and along the eastern shoreline. Leaking underground storage tanks that contained the fuel additive MTBE (methyl tertiary-butyl ether) represent a potential source of future groundwater

contamination. (It should be noted that all entries on both Part 201 and LUST lists, provided by the State, should be verified with the State as some sites may have recently been removed or others added.)

National Pollutant Discharge Elimination System Permits

The National Pollutant Discharge Elimination System (NPDES) program protects the surface waters of the state. The permit process is intended to assure that domestic and industrial storm and non-storm water, either treated or untreated, complies with state and federal discharge requirements when released into the surface waters of the State of Michigan. The Michigan Department of Environmental Quality (DEQ) may issue either an individual permit or Certificate of Coverage (COC) under a valid General Permit, dependent on the nature of the proposed discharge. The NPDES permitting program has substantially reduced point source loading to waters of the state.

Waste and Landfill Facilities

Based on the 1989 Solid Waste Management Plan, there are two wastewater pretreatment sludge/residue hazardous generators located within the County. The remaining waste generators are Type II Sanitary Landfills (on-land disposal to general solid waste), only one of which is owned and operated by the County, two transfer facilities and one processing plant. State Act 641 governs these sites.

SUMMARY

- Topographical variations affect the design and layout of sewage systems, roads, drainage systems, and utility systems.
- Low areas tend to be quite wet due to their high water tables. Many are unable to sustain a septic field.
- Lake and river edges tend to be unstable and highly susceptible to erosion.
- Lake Huron lacks soil stability along the dune sand areas.
- Important or unique wildlife habitat areas, such as the St. Clair River flats or delta area, are critical wildlife feeding and breeding areas.
- Many areas within the Black River basin have glacial water deposits that are too highly mineralized for most uses.
- Several areas within the Pine River basin yield water with a chloride concentration that exceeds the limit recommended by the U.S. Public Health service for drinking water.
- The southeastern part of the Belle River basin yields water high in sodium and chloride.
- Several areas within the North Branch of the Clinton River basin yield water with chloride concentrations that exceed the limits recommended by the U.S. Public Health Service for drinking water.
- Areas with hydric soils tend to be near the high water table, slow soil permeability, and the lack of sustainability for septic fields. The latter of these items can cause wastewater pollution of drains and watercourses.
- Houghton, Latty and Paulding soils have a high shrink-swell factor.
- Boyer, Chelsea and Croswell soils are best for septic systems, road construction,

- underground steel and concrete piping, with low runoff and erosion potential.
- Marshes and swamp forest is wet and unsuitable for development.
 - Woodlands cover only nine percent of the County; approximately six percent is managed by the Michigan Department of Natural Resources. These areas contain very rich wildlife habitat.
 - “Edge Lands” associated with farmlands are important sources of food and habitat for both migratory and breeding bird species and other vertebrate and invertebrate species.
 - 19,974 acres of land are enrolled in PA 116, Michigan Farmland Preservation Act.
 - Six percent of the Michigan’s total land area used for field crops and specialty crops are found within St. Clair County.
 - Farming and related green industries are the second largest sector of the County’s economy.
 - Previously mined areas of the County could be used in the future for extractive uses and/or storage of petroleum products.
 - Some salt caverns are now used to store natural gas under pressure.
 - The floodplains of the County are located along the Black (including Mill Creek), Belle and Pine rivers.
 - Wetlands cover 8.6% of the County, and help maintain the surface water quality, retain floodwaters, as well as provide an excellent transition of species habitat.
 - Shorelands tend to be high-risk erosion areas, and potential high volume contaminant areas that are frequently used by feeding and spawning fish and wildlife.
 - The “edges” of roadways, railways, and wet corridors are a prime breeding and habitat areas for migratory birds.
 - St. Clair County is part of two migratory corridors (Atlantic and Mississippi), and is a transitional zone for many bird species (upper and/or lower reaches of their ranges).
 - There are a few rare plant communities in wet-mesic and dry sand prairie.
 - There have been 51 State and Federal threatened and endangered plants and 26 threatened and endangered animals observed since the late 1900's within the County.
 - There are a number of unique features found within the County including environmental features, recreation/parkland, scenic vistas, countywide events and miscellaneous features.
 - Several pre-historic Indian mounds, historic Indian villages and burial grounds are known to exist within the County, many of which were associated with the Chippewa and Ojibway Indians.
 - There are 50 properties currently designated as Federal, State or Local historically significant sites within the County, while many other significant sites exist.
 - In 1996 St. Clair County obtained attainment status for photochemical oxidants (ozone); however, the county must comply with a maintenance program.
 - Federal Water Quality Standards are not being met in scattered areas along the waterways of the County.

- The rivers within the northern and southern ranges of the County are characterized by poor soil drainage.
- Scattered areas of the County have low water pressure, bad water (contains brine, hard water, gas, or other minerals) and areas with little water present.
- The pattern of contamination sites is indicative of more intensively developed areas, as noted along the rivers and shorelines of St. Clair County.
- The surface waters of the State are to be protected by the NPDES domestic and industrial storm and non-storm water discharge permits.
- There are currently no hazardous waste landfills within the County despite there being several generators.
- Properly closed waste facilities represent underutilized lands.