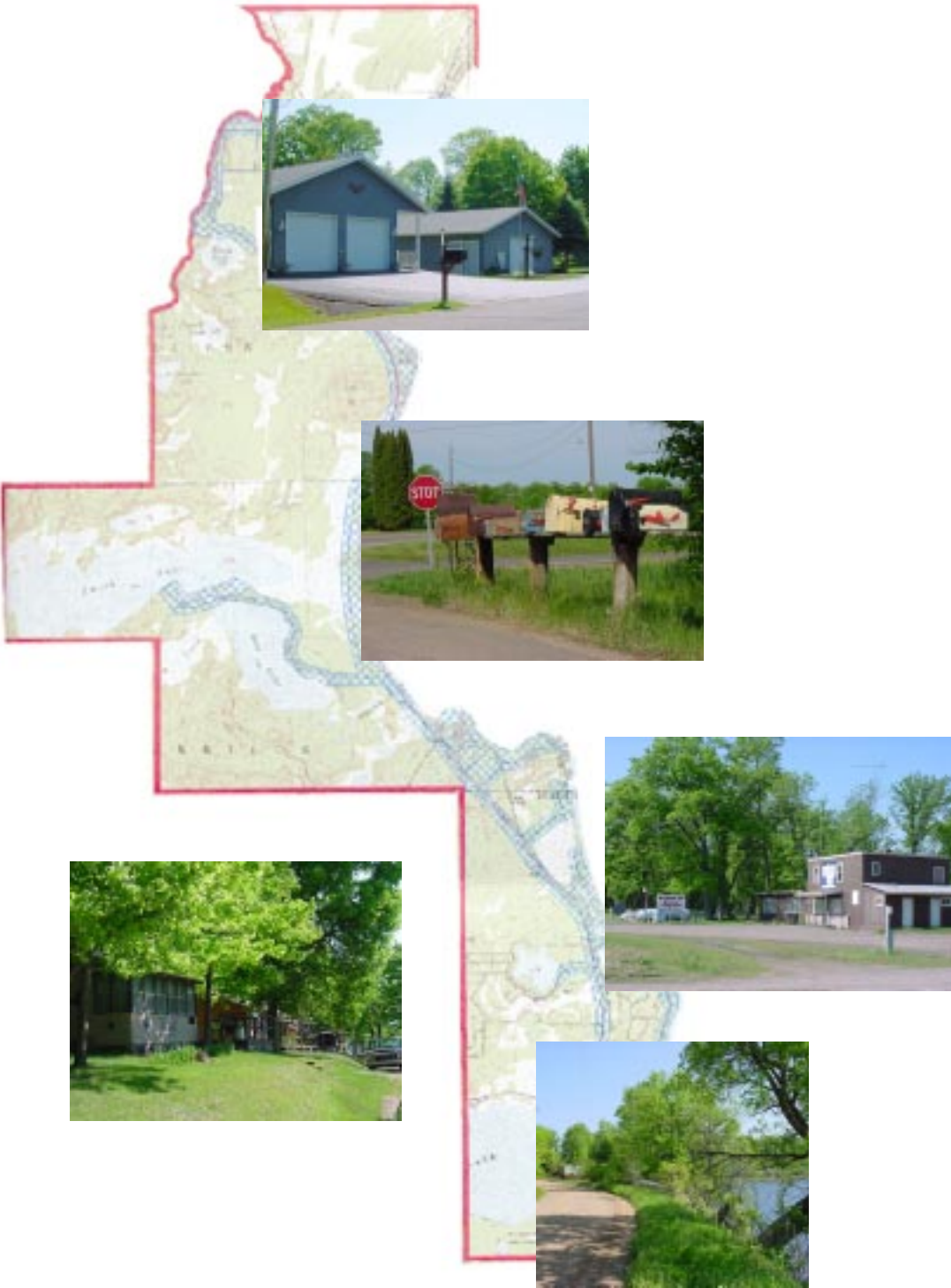


Background Study and Build-Out Analysis

Garrison Kathio West Mille Lacs Lake Sanitary District Wastewater Project



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Background Study and Build-Out Analysis

Garrison Kathio West Mille Lacs Lake Sanitary District

Background

The Garrison Kathio West Mille Lacs Lake Sanitary District has proposed to build a new sewer line. The line will carry wastewater to the ML Wastewater treatment facility located a short distance outside the District's boundaries. The sewer line will protect the extraordinary value of the area's natural resources, recreation and tourism, and the traditional community character. The District recognizes, however, the complex relationships between investment in public infrastructure, development pressure, and water quality. The District consequently decided to study the potential effects of the sewer line on natural resources, water quality and community character.

Wastewater Problems

Many of the developed areas within the District were originally built as seasonal residences or fishing cabins. Lot sizes are frequently substandard as measured against current zoning, shoreland, and ISTS ordinances, and soils are unable to support compliant ISTS system. Even on lots that might accommodate compliant septic systems, many existing systems are typically older, in need of maintenance, or designed for low intensity of use. Coupled with the location of developed areas on lakeshores, existing development poses substantial risk to water quality.

The proposed sewer system will eliminate failing, incorrectly designed, or poorly managed on-site treatment systems common to the area properties. The most heavily developed areas in the District include substandard lots, even by sewer lake standards, and housing density that puts surface and ground water quality at significant risk from septic failure. The proposed course of the sewer line follows the most heavily developed areas of the District, and largely avoids undeveloped or natural areas. The project is thus consistent with the existing and planned land uses along the project corridor, targeting those areas with septic-related risk rather than area with development potential.

Development and Water Quality

While mitigating the water quality risk from inadequate wastewater treatment, the proposed sewer line creates a new risk for water quality; non-point pollution, lake and stream temperature changes, and increased erosion from stormwater runoff. New development in sewer areas typically occurs at a higher density than areas served with ISTS treatment. Higher density development will result in more intensive land use patterns than currently exist, and more intensive than currently planned for by local governmental bodies. While risk from wastewater will be largely mitigated, more intensive and higher density development increases the amount of impervious surface along lakeshore and wetland areas, increasing the volume, velocity, temperature, and pollutant level of stormwater runoff.

The potential effect of new and more intensive land development patterns made possible by the sewer is of major concern to all parties involved with this project. To answer these concerns and to enhance public communication, the District has conducted a series of public meetings and is participating in watershed and land use planning efforts. These efforts and additional mitigation strategies are discussed in detail in the final section of this report.

Description of Project Area

The service territory of the Sanitary District includes the area from the Mille Lacs County portion of Whitefish Lake past the northern edge of the City of Garrison, and following the Mille Lacs County line on the west until its northern boundary, and running west then north in Crow Wing County to include all of Smith Lake and the eastern shore of Borden Lake, then east to Lake Mille Lacs. The eastern edge of the Sanitary District follows the shore of Lake Mille Lacs with the exception of the southern end of the District where the eastern border follows State Highway 25. The area is approximately 9 miles long (following Highway 169) and has a total area of 7,414 acres. The corridor's width ranges from less than one mile at the northern Mille Lacs/Crow Wing border, to 2.4 miles along Smith Lake in Crow Wing County. Three units of government (LGU) lie in the corridor, including the City of Garrison, Mille Lacs County, and Crow Wing County. The Mille Lacs County portion lies entirely within the township of Kathio, and the Crow Wing portion entirely within Garrison Township. The two counties administer the zoning and planning activities for their respective townships.

Garrison Kathio Mille Lacs Lake Sanitary District (7,414 acres)



Figure 1

Existing Development Patterns

The project area, as noted above, follows the western shore of Lake Mille Lacs and the existing U.S. Highway 169 corridor along the Lake. Land uses along the 169 corridor through the Sanitary District includes a mix of suburban to urban-density commercial, resort, and residential development. Much of the residential shoreland development was originally built as seasonable development, but has been redeveloped or converted to year-round residences. Lake Mille Lacs has been a recreation and tourist destination since the turn of the century, and U.S. Highway 169 has been a major corridor for tourist traffic, and an inter-regional route for commerce through central Minnesota for most of the 20th century.



The project area also includes several urban density development areas off of Lake Mille Lacs and the Highway 169 corridor. Urban density areas include shoreland and highway development along Highway 25 and Whitefish Lake in Mille Lacs County, the Mille Lacs Golf Resort and associated development at the north end of Mille Lacs County, the heavily developed residential area between Smith and Holt Lakes in Crow Wing County, and the western shore of Borden Lake and the City of Garrison.

Much of the undeveloped area in the Sanitary District is open water or wetland (almost 2,900 acres, 40% of total land area, see Figure 2) or public land (almost 1,500 acres, or 20% of the total land area). The corridor does include some larger tracts of undeveloped or natural areas off of the immediate riparian areas. The riparian lots along the lakes in the Sanitary District are, however, almost completely developed. Some shore development is at quite high densities for unsewered areas. Existing development patterns include many shoreland lots that are substandard under the Shoreland Ordinance standards, some with only 50-foot widths and less than 200 feet of depth (10,000 square feet, or less than one quarter of an acre). Most existing developed lots are less than 1 acre in size. The District is offering sewer service to nearly all the developed areas in the District, and estimates that approximately 952 buildings will be hooked up to the sewer.

The primary commercial land uses are motels, resorts, campgrounds, and gift shops located on the Highway 169 corridor along Lake Mille Lacs, and the Mille Lacs Golf Resort. Some waterfront commercial is also located on Smith and Borden Lakes.

The proposed sewer line follows, with a few exceptions, existing transportation corridors, lying in the disturbed soils of road right-of-ways and urban density development.

Wetlands 2,891 acres

- Seasonally Flooded <1%
- Fresh Meadow 2.6%
- Shallow Fresh Meadow 23%
- Deep Fresh Meadow <1%
- Open Fresh Water 37%
- Shrub Swamp 25%
- Wooded Swamp 6%
- Bog 7%

Streams
6 Miles

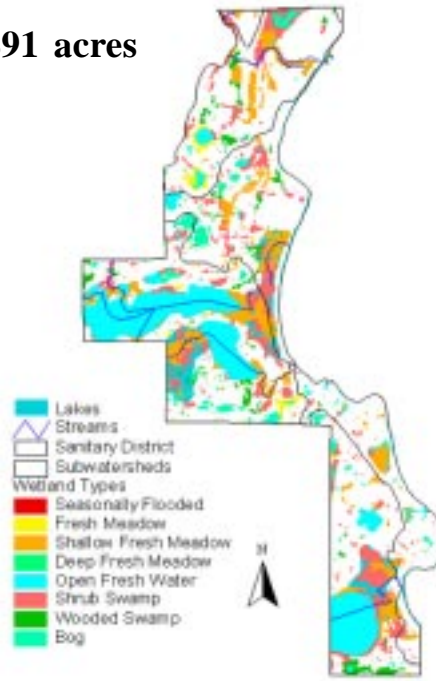


Figure 2

Population and Development Trends

Census data for the communities that include the project area is summarized below. There are no readily available demographic data specific to just the project area. The Sanitary District estimates that its initial hookup will include approximately 952 buildings or households.

The population for the Lake Mille Lacs region has been steadily increasing over the last half a century. The population of Crow Wing County increased by 32% from 1980 to 2000, most of which occurred since 1990 (a 25% increase). Mille Lacs County saw its population increase by 21% since 1980, most of which (19%) occurred since 1990. At the township level, the 2000 Census identified 213 people in the City of Garrison, and 1,309 people in Kathio Township, and almost 800 people living in Garrison Township in Crow Wing County. All three of these areas saw significant population increases relative to their 1990 population. Since 1990 the population increased by 41% (379) in Kathio Township, 63% (308) in Garrison Township, and 54% (75) in the City of Garrison.

The population increase in the townships and City of Garrison are small in an absolute sense (an increase of 762 people in the last decade), but large relative to the 1990 population. The overall density of the City and two townships is typical for rural areas. The land characteristics, however, result in a population clusters rather than a spreading of population across the landscape. The large amount of water, wetlands, and publicly-owned land eliminate most of the land from potential development. Development has clustered along the primary amenity in the area - the shoreland areas. Consequently the average density is low, but the density of developed areas is significantly higher.

The Minnesota Department of Transportation (MnDOT) recently issued an Environmental Impact Statement (EIS) for potential new alignments and reconstruction of Highway 169, including a projection of population growth and creation of new housing units. While the study area for the Highway 169 EIS is significantly larger than the Sanitary District, the elements of population growth, housing creation, and commercial growth should be similar for the District and the Highway 169 EIS corridor. The Highway 169 EIS estimated that the number of housing units would increase by 35% over the next 30 years, assuming that the Sanitary District would be sewered. The EIS did not estimate how the proposed sewer project might affect the rate of development.

Given the recent trend in population growth, and the large number of seasonal homes that yet remain in the project area, the District is likely to see significant population and development pressure over the next 20 years.

Natural Resources

The planning corridor includes a significant amount of undeveloped land, covered by an aspen/birch forest with intermixed conifers. Approximately 70% of the non-wetland land is privately owned (not including transportation right-of-ways), with the balance in various forms of public ownership. The entity with the largest public ownership is the State of Minnesota, which owns tax-forfeit lands in addition to a number of parcels that different State agencies hold fee-title. Tax-forfeit lands are managed, however, by Crow Wing County.

Land Cover

The land cover in the project area includes suburban to urban density development along much of the privately owned lakeshore, with substantial wetland areas of shallow fresh meadows, shrub swamp, and wooded meadows and bogs (see Figure 3). Forested areas include a mix of species typical for the Laurentian Mixed Forest eco-system, including mixed northern hardwoods and boreal-conifer mixtures.

The existing land cover map for the corridor was obtained from a vector-based land cover data set. This map was derived from satellite imagery. The land is classified into 15 cover classes with source imagery dates ranging from June 1995 to June 1996. The 15 categories include the following classes:

1. **Cultivated** - Areas under intensive cropping or rotation, including fallow fields. Fields seeded to forage or cover crops are included. The fields exhibit linear or other patterns associated with current or recent tillage.
2. **Deciduous Forest** - Areas with at least 2/3s or more of the total canopy cover composed of predominantly woody deciduous species. It may contain coniferous species, but is dominated by deciduous species. It includes woodlots, shelter belts, and plantations.
3. **Open Water** - Permanent water bodies such as lakes, rivers, reservoirs, stock ponds, ditches, and permanent and intermittently exposed palustrine open water areas where photo evidence indicates that the area is covered by water the majority of the time.
4. **Grassland** - Areas covered by grasslands and herbaceous plants. May contain up to 1/3 shrubs and/or tree cover. Areas may be small to extensive and range from regular to irregular in shape. These areas are often found between agricultural land and more heavily wooded areas, along right-of-ways and drains. Some areas may be used as pastures and be mowed or grazed.
5. **Mixed Wood Forest** - Areas of forest where the canopy is composed of approximately equal amounts of deciduous and coniferous species.
6. **Wetlands: marsh and fens** - Grassy, wet areas with standing or slowly moving water. Vegetation consists of grass and sedge sods, and common hydrophytic vegetation such as cattail and rushes. Areas are often interspersed with channels or pools of open water.
7. **Wetlands: bogs** - Peat covered or peat filled depressions with a high water table. The bogs are covered with a carpet of sphagnum and ericaceous shrubs and may be treeless or tree covered with black spruce and/or tamarack.
8. **Farmsteads and Rural Residences** - Farmsteads include farmhouse and adjoining farmyard area. Includes machinery storage buildings, grain storage buildings, corrals, livestock holding and feeding areas directly associated with farmyard area.
9. **Coniferous Forest** - Areas with at least 2/3s or more of the total canopy cover composed of predominantly woody coniferous species. It may contain deciduous species, but is dominated by coniferous species. It includes woodlots, shelter belts, and plantations.

10. **Other Rural Developments** - Commercial and industrial, cultural and recreational, and agricultural developments not associated with urban areas. Commercial and industrial developments include both businesses and infrastructure such as substations and communications facilities. Cultural and recreational developments include facilities and service areas associated with parks, rest areas, campgrounds, and golf courses.
11. **Shrubby Grassland** - A combination of grass, shrubs, and trees in which deciduous and/or coniferous tree cover comprises from 1/3 to 2/3s of the area, and/or shrub cover comprises more than 1/3 of the area. This complex is often found adjacent to grassland or forested areas, but may be found alone. These areas are often irregular in shape and vary greatly in size.
12. **Gravel Pits And Open Mines** - Areas are stripped of topsoil revealing exposed substrate such as sand/gravel. This includes gravel quarry operations, mine tailings, burrow pits, and rock quarries. Natural beaches/sand dunes are included.
13. **Urban/Industrial (cities & towns)**
14. **Regeneration/Young Forests** - Areas that have a good likelihood of being young forest replanted or naturally regenerated since 1970. It includes lands that were commercially logged or affected by catastrophic events, primarily fire and wind damage.
15. **Bare Rock** - Areas of rock outcrops that lack appreciable soil development or vegetation cover.

To simplify the above categories, and set a baseline for the build-out analysis, the above-described land cover classes were grouped into five categories colored as follows in Figure 3.:

1. **Green** = Forested
2. **Brown** = Open space, grassland, and/or gravel pits
3. **Yellow** = Farmsteads and rural residences
4. **Red** = Commercial, industrial, and/or roads
5. **Blue** = Open water and/or wetlands

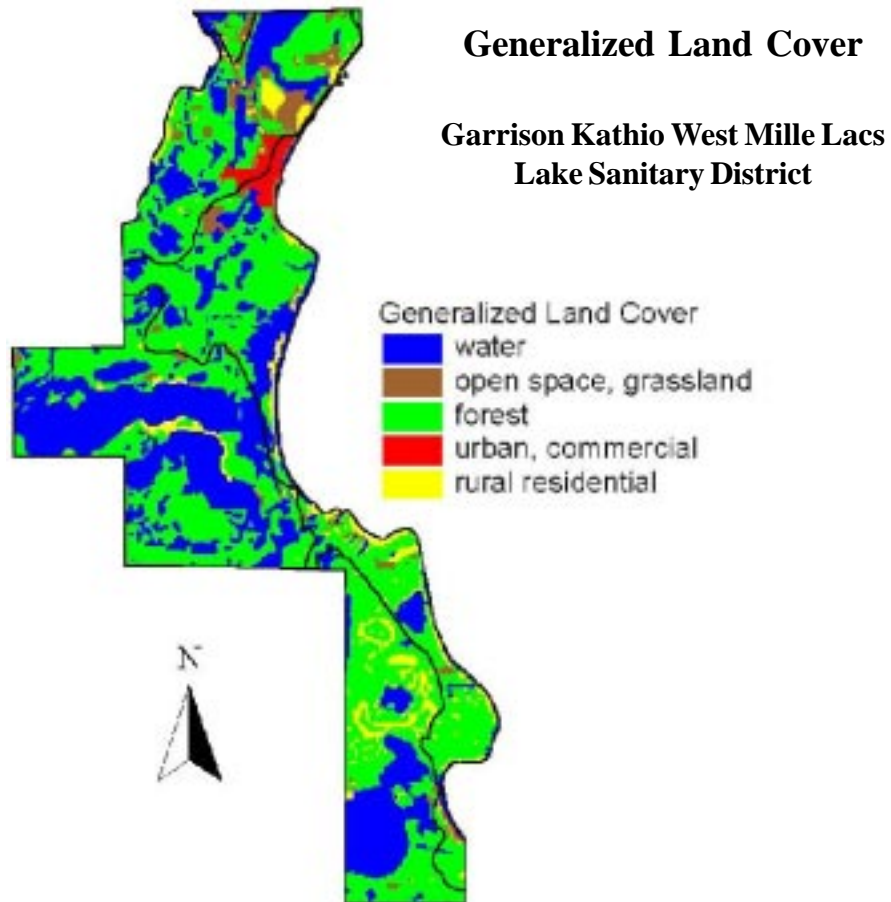


Figure 3

Soils

The soils in the District include areas with well-drained soils and poorly-drained clay-based soils. The large number of wetland areas also demonstrate that some areas have a high water table. Development in the District has not, however, been greatly constrained by soils limitations for Individual Sewage Treatment Systems (ISTS). Environmental officials in both Mille Lacs and Crow Wing counties stated that recent developments at less than an acre have met soils and drain field requirements for compliant ISTS systems.

Sensitive Areas

The U.S. EPA Region 5 has mapped environmentally and economically sensitive resources through a program called the Inland Spill Response Mapping Project. The Project's mission is to provide community planners and oil spill responders with spatial information on resources at risk during a spill. Currently Crow Wing County has been mapped, but not Mille Lacs County. The data layers reviewed for the background information were boat accesses, marinas, surface water intakes, managed lands, non-navigational dams, and special designated areas (Figure 4). A brief description of these data layers that exist in the Sanitary District follows:

Boat Access - There are two boat accesses in the District. Boat access areas include boat access locations and ramps without the range and variety of services found at the majority of the marinas. Boat accesses provide water access for response vehicles and equipment during spill response.

Managed Natural Resource Areas (Environmentally Sensitive Areas) - This data layer overlapped with the public lands ownership data layer, and therefore, the public lands ownership was used instead. The data includes state, federal, county, and regionally managed areas that are high-priority, sensitive resources that offer habitats for a wide range of plant and animal species and may also support high levels of human use.

Marinas - There are three marinas in the District. Marinas are typically high-use recreational areas and may include amenities such as picnicking or camping facilities. Marinas may be in need of protection from spills because of the economic value of the boats and other equipment located there.

Publicly Managed Lands and Access Points

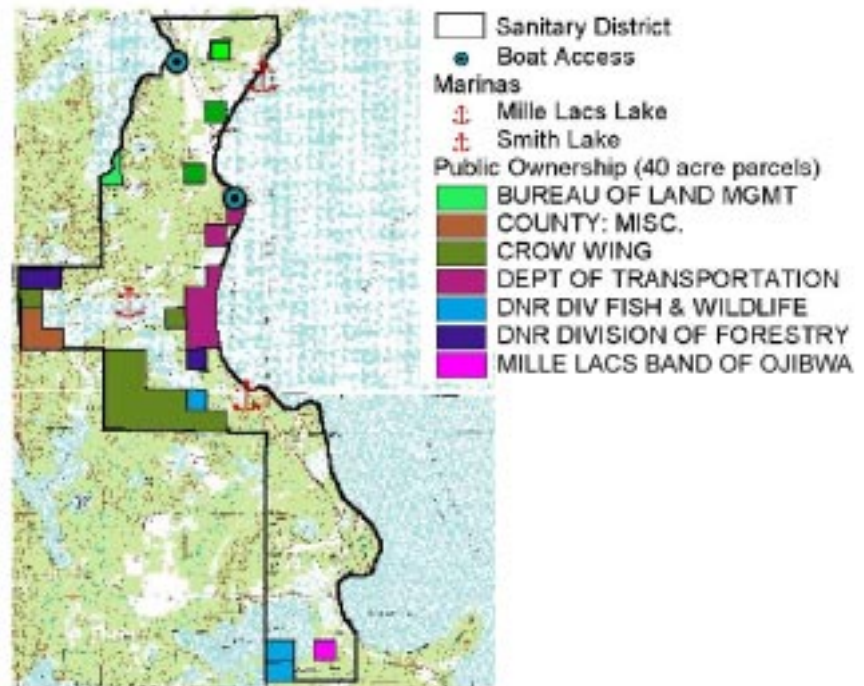


Figure 4

Rare Plant Or Animal Species

The Minnesota Natural Heritage database was reviewed to determine if any rare plant or animal species or other significant natural features are known to occur within the District. The review indicates 30 known occurrences of rare species in the area including the Bald Eagle, Red-Shouldered Hawk, American Ginseng, and Blandings Turtle (Figure 5).



Figure 5



Wetlands

Figure 6 shows the National Wetland Inventory wetlands. The wetlands data was developed through interpretation of National Aerial Photography Program (NAPP) imagery (approx. 1:50,000 scale, typically color-infrared) in conjunction with limited field verification studies. After interpreting the aerial photographs, delineations were transferred to a 1:24,000 scale map. The erosion control protection sites were manually located on a 1:24,000 scale map by BWSR staff.

Figure 6 also shows the streams in the district. The streams are captured from the U.S. Geological Survey's 7 1/2 minute quadrangle maps. The streams are categorized as perennial or intermittent, and show the connectivity through lakes, rivers, and small wetland basins. None of the District's streams are designated trout streams. Data originated with the MnDOT basemap stream traces at a 1:24,000 scale.

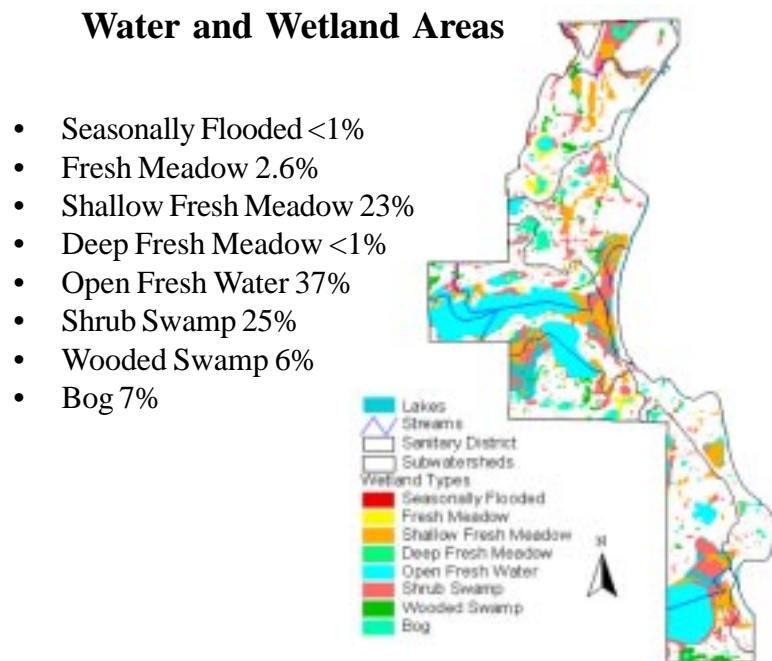


Figure 6

Drinking Water Wells

Another important land use consideration is the location of drinking water wells and protecting the quality and quantity of the groundwater supply. All of the wells in the community are serving transient noncommunity water systems and protection areas are not delineated around these wells. Rather, the Minnesota Department of Health will be focusing on protecting a 200-foot zone around each well. All of these wells are considered vulnerable to groundwater contamination due to the depth of the groundwater table, soil types, etc.

Watersheds

A watershed is the area in which all runoff flows to a common outlet. The water quality within a watershed depends to a large extent on the ability of the watershed to filter pollutants, reduce water temperature of runoff, slow the velocity of runoff, and sustain a mix of vegetation and habitat. Properly functioning watersheds thus do far more than merely drain water - watershed functions dictate the diversity and type of natural habitat that can exist within stream corridors, wetlands, and lakes. Watersheds provide an important frame of reference for land use planning and for communities making decisions about the preferred location and rate of development.

The entire Sanitary District lies within the Rum River watershed (see Figure 7). Most of the District's watersheds drain into lakes and wetlands rather than rivers or other watercourses; the District only has approximately six miles of perennial streams. All of the wetland and lake watersheds affected by the proposed project ultimately flow into Lake Mille Lacs, which is the head waters for the Rum River. All the District's watersheds include significant areas outside the District, particularly the Mille Lacs Lake watershed. The land uses and land management practices outside the project area thus have substantial impacts on the diversity and type of natural habitat within the project area, the water quality of lakes in or abutting the District, and the carrying capacity of the lakes and wetlands affected by the proposed project. The subwatersheds that flow through the District are shown in Figure 7. Watershed boundaries were interpreted from contours present on the original U.S. Geological Survey 7.5 Minute Quadrangle maps.

Watersheds and Subwatersheds

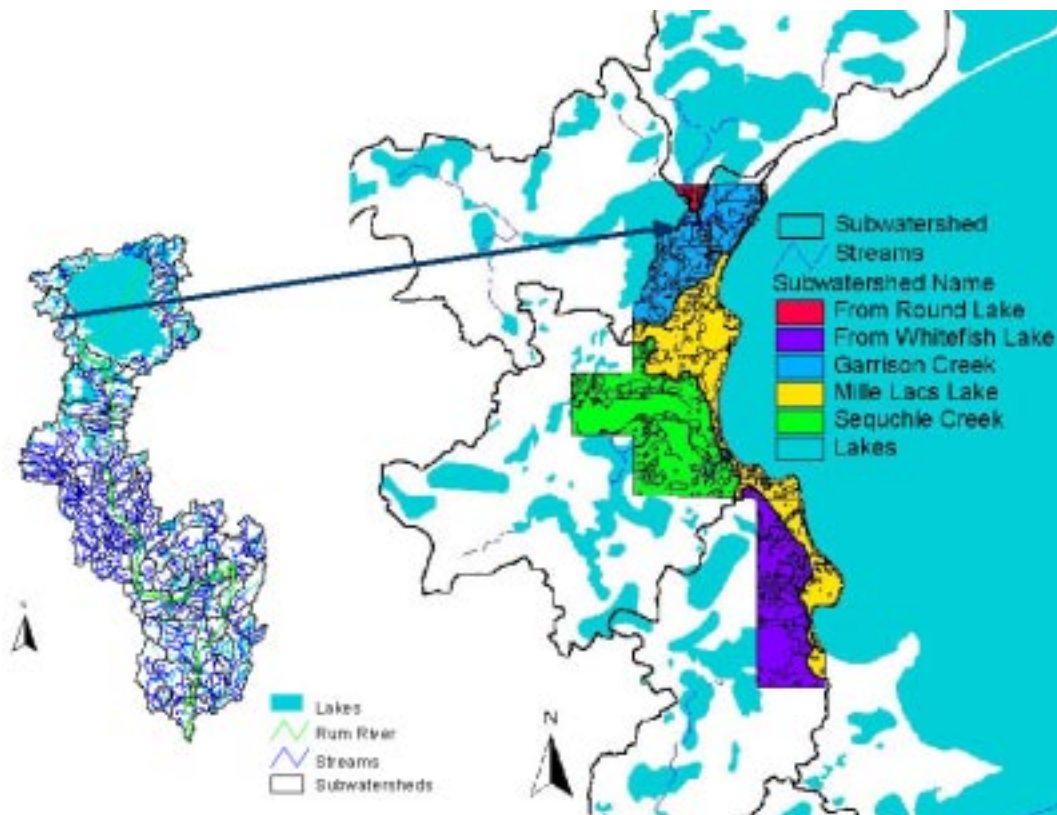


Figure 7

Impervious Surface and Water Quality

The amount of impervious surface in a watershed is a good indicator of water quality within the watershed. The amount of impervious surface within a watershed can be estimated by the amount of each type of land cover within the watershed. The amount of impervious surface for each land cover classification was calculated using the following methods and assumptions:

- The green (forest) area counted as 2% impervious cover.
- The brown (open/grassland/gravel pits) area counted as 2% impervious cover.
- The yellow (farmsteads/rural residential and other rural developments) and red (urban/industrial) area have an estimated impervious coverage that was calculated using a reflection methodology with the Digital Orthophoto Quads (DOQs)
- The blue (water/wetland) areas did not count for any impervious area; rather they were considered “unbuildable”.

From the watershed perspective, land uses generally do not begin to affect the sustainability of the watershed until the percentage of impervious surface exceeds 10%. (the yellow indicator). The watershed is degraded when impervious surfaces exceed 25% (the red indicator); watershed functions are no longer sustainable without significant intervention and management.

These thresholds are general rules of thumb used as indicators of water quality. Some water resources, such as trout streams that must remain cold to sustain the trout populations and lake wetland areas that provide vital habitat for a variety of flora and fauna, can be affected by local changes in land use that may not be captured by a watershed level indicator. If particular sensitive areas are identified, the risk from development needs to be evaluated on a site-specific basis rather than on a watershed basis. This study, however, is not examining specific natural areas or watershed elements, but only the effect of development at the watershed level.

The existing percentage of land covered by impervious surface for each of the District’s watersheds is shown in Figure 8. The results give the percent impervious coverage based on the land cover within the entire watershed, not just the portion of the watershed within the District except for the Mille Lacs Lake watershed.

The existing impervious surface coverage is relatively low; all watersheds are within the green (0-9.9%) indicator. Three of the five watersheds are at approximately 2% impervious surface coverage, or what a forested or grassland area would be. Only the portion of the Mille Lacs Lake watershed is higher at 8.4% impervious surface coverage.

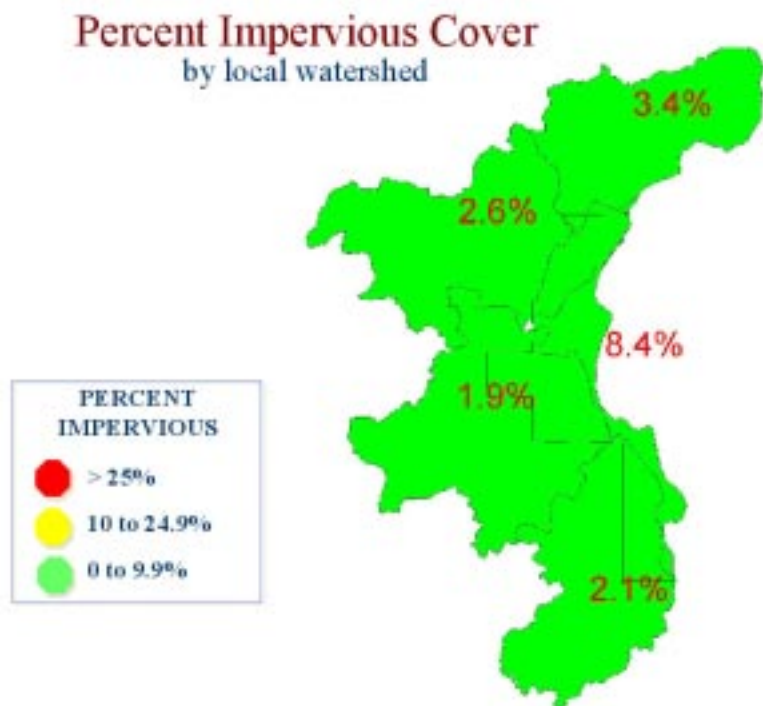


Figure 8

Existing Land Use Policy and Regulation

The proposed sewer line project crosses three local jurisdictions (City of Garrison, Crow Wing County, and Mille Lacs County), each of which have adopted a comprehensive land use plan, zoning ordinance, shoreland ordinances and other land use regulation. In addition to the three local jurisdictions, other entities have some planning jurisdiction over construction and development that occurs in the planning corridor, including the Minnesota Department of Natural Resources (DNR), the Minnesota Department of Transportation (MnDOT), and the Minnesota Pollution Control Agency (PCA).

The proposed project is designed to alleviate the problems created by historic development on lots that are now recognized to be too small, or with inadequate soils or drainage, to accommodate on-site wastewater treatment systems. Under current regulation, however, the installation of a sewer system will allow smaller lots and lots with poor drainage or soils to be developed. To avoid trading one water quality problem (inadequate wastewater treatment) for another (inadequate stormwater mitigation), the Sanitary District is assessing the potential impacts and risks of “secondary development” created by the new sewer line. The magnitude of risk associated with secondary development enabled by the project is affected by the kind and type of current local land use regulation.

Descriptions of current local land use regulations, and proposed changes to local land use regulation, for each jurisdiction are listed below.

Government Jurisdictions

The use of land and type of development that will occur over the next twenty years in the Sanitary District is ultimately determined by the individual actions of public and private landowners. Public and private decisions on land use and development are encouraged, discouraged, or regulated by governments in the following ways:

- by local governments with land use planning authority;
- by state and federal agencies with land use, natural resource, or other planning authority granted by the legislature;
- by governmental choices concerning investment in public infrastructure.

Private entities, such as land trusts, non-profit organizations, and charitable foundations also encourage or discourage actions of public and private landowners through educational and promotional programs and financial incentives.

Local Governments with Authority Over Development and Land Use

- City of Garrison - Primary land use authority (zoning and other land use regulation) within City boundaries.
- Crow Wing County - Primary land use authority within County boundaries, except in incorporated areas. The Crow Wing County portion of the Sanitary Service District lies entirely within Garrison Township. The Township does not administer land use policy or regulation. The County also makes public infrastructure decisions regarding county roads, regulation of individual sewage treatment systems (ISTS, or septic systems), and stormwater management.
- Mille Lacs County - Primary land use authority within County boundaries, except in incorporated areas. The Mille Lacs County portion of the Sanitary District lies entirely within Kathio Township. The Township does not administer its own comprehensive plan or land use regulation. The County also makes public infrastructure decisions regarding county roads, regulation of individual sewage treatment systems (ISTS, or septic systems), and stormwater management.

Joint Powers Boards or Special Districts

- Garrison Kathio West Mille Lacs Lake Sanitary District (GKWMLLSD) - A sanitary sewer district formed in 1999, created to address the wastewater management issues along and near the west shore of Lake Mille Lacs. The District board includes representatives from the City of Garrison, Garrison Township, and Kathio Township. The District is overseeing the construction, administration, maintenance, and operation of the new sewer line.
- Mille Lacs Lake Watershed Project (Clean Water Partnership Program) - The Minnesota Pollution Control Agency (PCA) provides grants and loans to local governments or coalitions of governments for purpose of diagnosing threats to water resources and developing appropriate response to the threats. The Watershed Project has completed its analysis and will soon finish its Phase I plan, at which time it will begin Phase II, the implementation phase. The Watershed Project is also working with the Local Solutions Alliance (administered by Minnesota Planning) to conduct an watershed-wide land use planning project. The Watershed Project has no formal land use planning powers, but is investigating the possibility of a using Joint Powers Agreements for the land use planning process.

State Agencies

- Minnesota Pollution Control Agency - Oversees State ISTS regulation, surface water discharges from sanitary sewer systems, and regulations and programs governing non-point source pollution, including agricultural and urban stormwater runoff.
- Minnesota Department of Natural Resources - Administers the State Shoreland Ordinance, as well as surface water uses and state-protected natural resources. The Shoreland districts in the Sanitary District is shown in Figure 12 (this is now on page 22). Enforcement of the State Shoreland ordinance is delegated to the local governments.
- Minnesota Department of Transportation - Manages regional and inter-regional transportation system, including configuration, access management, and potential realignment of U.S. Highway 169.



Existing and Proposed Land Use Policies and Regulation

Discussions of the land use regulation for each local government is provided below. Figure 14 shows the zoning districts for the entire District.

City of Garrison

Policy - The City of Garrison lies entirely within the Sanitary District's service territory, comprising 9% of the District's total area. The District will offer sewer service to all developed areas of the City. There are not plans at this time to extend sanitary services to the City's undeveloped areas.

The City's Comprehensive Plan dates to 1995. The Comprehensive Plan provides "a guide for the decisions the city council must make concerning development. Goals and policies were developed for population, housing, economy, transportation, land use, natural resources, and public facilities" (p. 2). The Plan identifies ongoing problems of development on the protected waters of Lake Mille Lacs and the planning efforts regarding the development of sanitary wastewater treatment (p. 13). The Plan identifies provision of sewer and water to commercial areas as a primary goal (p. 20), as well as increasing the number of housing units, and creating provisions for orderly annexation of land to accommodate residential and commercial development.

Regulation - The City has four zoning districts R-1, R-2, C, and O. The R-1 districts allow one and two family dwelling units, the R-2 allows multi-family housing, the C district is designated for commercial land use, and the O district is for natural resource areas, parks, and open space. The allowed density and land uses are not contingent upon whether the lot has access to a sewer system. Allowed lot sizes for all districts are 20,000 sq. ft (slightly less than 1/2 acre) or 30,000 sq. ft.

The City adopted the State Shoreland Ordinance, including the State's stormwater provisions. The lot sizes for unsewered shoreland areas are larger than those designated in the base zoning district. For sewerred shoreland areas, however, the base zoning districts tend to have larger lot sizes.

The City does not administer a stormwater ordinance. Its shoreland ordinance, however, includes stormwater management provisions and limits the amount of impervious surface in shoreland lots to 25% of the lot.



Table 1 - Garrison Zoning Districts

	Permitted Uses	Conditional Uses	Minimum Lot Sizes
R-1	1-2 family dwellings, parks, ag (no livestock), service utilities	Multiple family dwellings, public bldgs, lodging	20,000 sq. ft.
R-2	Multiple family housing, parks, service utilities	Multiple family dwellings, public bldgs, lodging	30,000 sq. ft.
C	Retail, wholesale, offices, restaurants, public bldgs, lodging		30,000 sq. ft.
O	Forest Management, sensitive resource management	Parks & trails, historic sites, golf courses	20,000 sq. ft.

City of Garrison Zoning Districts

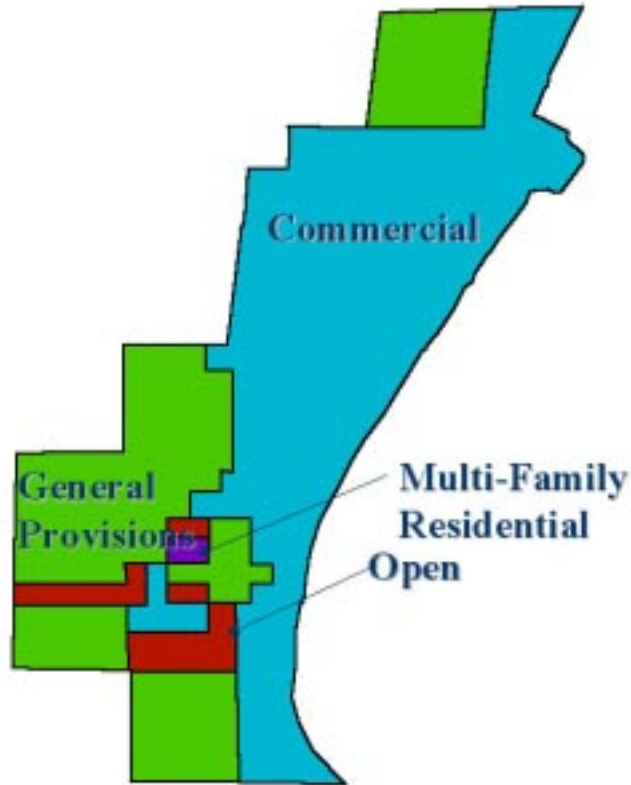


Figure 9

Crow Wing County

Crow Wing County governs the single largest portion of the three local governments served by the Sanitary District, comprising 64% of the District's total land area. All of the District's Crow Wing territory lies in Garrison Township, which does not administer its own planning or land use regulation. Approximately one quarter of the District's Crow Wing territory lies in public ownership, and a large portion of the remaining area is open water or wetland (including all of Smith, Maple, Holt, and Sunfish lakes). The Crow Wing territory also includes several areas with urban density development, including portions of the Highway 169 corridor along Lake Mille Lacs, residential subdivisions between Smith and Holt lakes, and the shore of Borden Lake.

Policy - Crow Wing County adopted a new comprehensive plan in 1994. The County has also completed a County Water Plan, dating to 1990, and incorporated into the Comprehensive Plan.

The County Water Plan includes a number of goals that affect the way development should occur in the County, including the following policies:

- Policy 3) Minimize the harmful effects of storm water runoff into surface waters of the county.
- Policy 5) Limit the density of development on lands adjoining surface waters and control land uses which have a detrimental effect on water quality.
- Policy 9) Plan for water management on a watershed basis, cooperating with other governmental jurisdictions as necessary.
- Policy 12) Identify marginal lands, i.e., wetlands and fragile areas bordering lakes and stream, and restrict their development.

The County's Comprehensive Plan emphasizes the principles of sustainable development to guide the County's goals, policies, and strategies. The County Plan states the following:

Sustainable development provides a means to protect our environment, provide economic growth opportunities, and enhance our society. . . There can be no sustained development without a clear commitment to preservation of the environment, and the promotion of wise and efficient use of all resources (p. 22).

The Comprehensive Plan's recommendations include the following priorities that affect the shape of future development in Crow Wing County:

Residential Development Goal

- Allow cluster development concepts . . . that emphasize preservation of natural resources, common sewage disposal fields, service roads, and common open space.
 - Promote the development of high quality affordable subdivisions near existing trade centers.
- ### Commercial Forestry Goal.
- Create a commercial forestry class or land preservation district.

Recreation Goal

- Protection of the lake and river resources. Of utmost importance is the protection of water quality, fish populations, aquatic resources and shore land resources.
- Encourage but manage recreational use of the lakes and rivers.
- Develop state/county tax assistance program (a green shores program). . .
- Aggressively implement programs to maintain or improve water quality standards.
- Encourage the development of lake density and use standards to guide lakeshore related zoning decisions . . .

Economic Growth Goal

- The county should continue support for the state ‘County Biological Survey’ . . . Making it easier to plan and expedite economic expansion and conservation of the natural resource base.

Regulation - Garrison Township does not administer its own land use regulation. The Crow Wing County zoning ordinance includes 14 distinct zoning districts and a separate shoreland ordinance. The Sanitary District portion of the County includes the following eight zoning districts;

- Residential
- Rural Residential
- Agriculture
- Green Space
- Commercial 1
- Commercial 2
- Waterfront Commercial
- Public

Most of the Crow Wing County land in the District is zoned Green Space, which does not allow any residential development other than seasonal recreation (2.5 acre minimum) or commercial development other than campgrounds or recreational uses. The next three most prominent zones are Agriculture, with a 15-acre minimum lot size, Rural Residential, with a 2.5-acre minimum lot, and Residential, with a half-acre (20,000 sq ft) minimum lot size. The remaining districts (three commercial districts and Public) are small portions of the District’s total Crow Wing area. All the above districts include a provision that allows for a 20% reduction in minimum lot size if the lot has access to a sanitary sewer.

Crow Wing County also has a Shoreland Ordinance, separate from the zoning ordinance. Shoreland overlay districts are 1,000 feet from the lake’s mean high water mark. The provisions of the Shoreland Ordinance follow the State standards set by DNR in 1972. Minimum lot sizes and setback requirements are dependent on three factors; the lake’s classification (General Development, Recreational Development, or Natural Environment), whether the lots are riparian or non-riparian, and whether the lots have access to a sanitary sewer. The minimum lot sizes for sewered lakeshore areas are generally smaller than allowed under the base zoning district, while for unsewered areas the shoreland standard is generally the more restrictive standard.

Crow Wing County does not have a stormwater ordinance, but the Shoreland Ordinance includes some stormwater provisions and a 25% per lot ceiling on impervious surface.



Table 2 - Crow Wing Zoning Districts

	Permitted Uses	Conditional Uses	Minimum Lot Area		Max. Bldg Coverage
			(unsewered)	(sewered)	
R	1-2 family dwellings, ag, pets	Occupational uses, public uses	20,000 sq. ft.	Reduce unsewered by 20%	30%
RR	1-2 family dwellings, ag, pets	Occupational uses, public uses	2 1/2 acres	Reduce unsewered by 20%	15%
A	1-2 family dwellings, ag, pets, animal & poultry production, dairy, feedlots	Occupational uses, public uses, incidental occupations, commercial/ag use	15 acres	Reduce unsewered by 20%	20%
G	Rural parks, campgrounds, forest/recreation, game refuges, industrial forests, ag, seasonal residence	Environmentally sensitive or historic areas	2 1/2 acres	Reduce unsewered by 20%	15%
B	roads between zoning districts, ag, timberland		None	None	0%
C1	Commercial/downtown, multi-family dwellings	Second story apartments	None	Reduce unsewered by 20%	50%
C2	Auto/equipment sales & services, theaters, parks, gas stations, airports, bait sales	Owner-caretaker purpose/residence on or adjoining lot concerned	None	Reduce unsewered by 20%	50%

Crow Wing County Zoning Districts

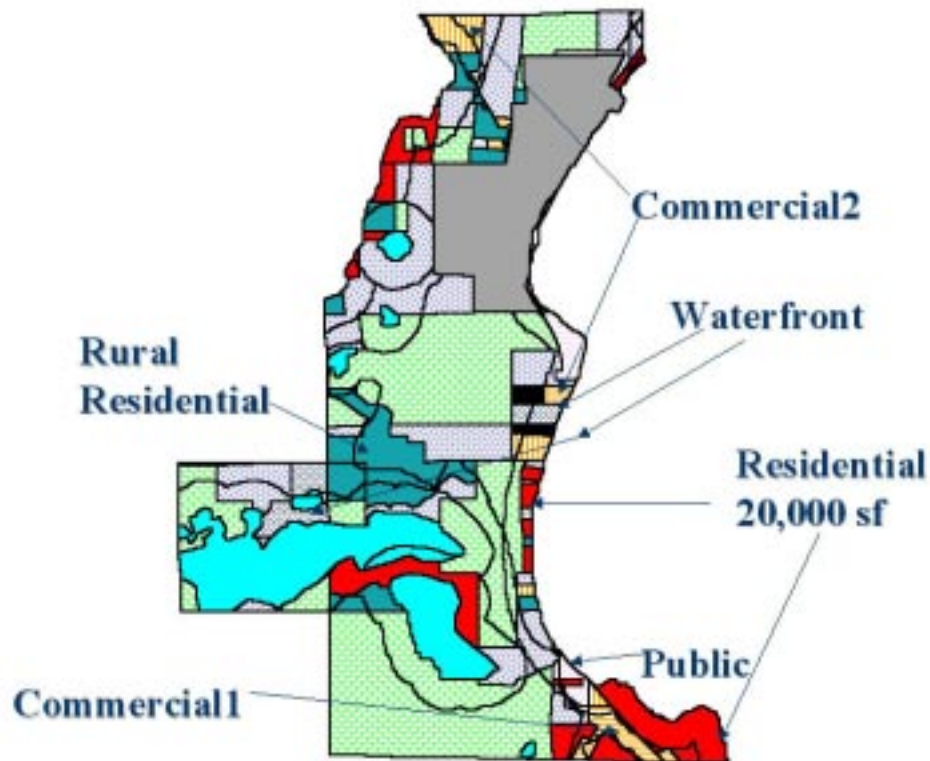


Figure 10

Mille Lacs County

Mille Lacs County is the southernmost portion of the Sanitary District, comprising 27% of the District's total service area. The entire Mille Lacs County portion of the District is in Kathio Township.

Policy - Mille Lacs County created a new Comprehensive Plan in 1990, and adopted some modifications and updates in 2002. The Plan emphasizes directing growth to existing urban areas, encouraging cluster developments to protect community character and natural resources, and preserving the County's recreational and tourist amenities. For residential lands, the Plan notes the following:

Although the County's population has traditionally been located primarily within cities, recent trends show a dramatic shift where the highest growth rates are occurring out in the Townships. The County must continue to revise planning residential densities and zoning requirements to remedy those deficiencies created by increased development in the rural areas . . .

Additional examples of the Plan's policies are noted below:

- NRH.7 - Mille Lacs County shall discourage land development activities which will materially diminish the existing capacity of the County's eco-system.
- R.5 - Mille Lacs County shall require subdivides to dedicate a sufficient amount of land for future park/open space uses or equivalent funds.
- ED.6 - Mille Lacs County shall recognize and promote the tourism industry as an important economic activity. Mille Lacs County shall encourage sound planning when locating resorts and other tourist-oriented business that will both protect the existing environmental resources as well as to encourage tourism.
- ED.8 - Mille Lacs County shall promote commercial development in close proximity to the intersections of State Highways: Hwy 169, Hwy 95, Hwy 23, and Hwy 27 . . .
- PF.5 - Mille Lacs County shall discourage the extension of public utilities and services over large undeveloped / "unserviced" parcels to serve small pockets of scattered development. This policy recognizes that the indiscriminant provision of public utilities and services can promote urban sprawl and can overly burden local government's facilities and ability to provide such services.

Regulation - Mille Lacs County administers a zoning ordinance outside the incorporated areas of the County, including Kathio Township (the entire portion of the Sanitary District within Mille Lacs). Kathio Township does not administer land use regulation, although it does maintain a planning and zoning committee to comment on development proposals reviewed by the County.

The Mille Lacs County Zoning Ordinance describes three zoning districts for the Kathio Township area in the District. Two areas are shoreland districts (S-2 and S-4), while the remaining district is Residential (R-1). Minimum lot sizes in the R-1 district are 1 acre, and are not affected by whether the area has access to sewer treatment. The shoreland districts follow the requirements of the State Shoreland Ordinance, where allowed lot sizes vary according to several variables including sewer access, riparian location, and lake classification, as described below.

Shoreland Ordinance - Mille Lacs County also has a Shoreland Ordinance, separate from the zoning ordinance. Shoreland overlay districts are 1,000 feet from the lake's mean high water mark, although the County has designated the entire northern tip of Kathio Township as S-4, including those areas outside the formal shoreland overlay. The provisions of the Shoreland Ordinance follow the State standards set by DNR in 1972. Minimum lot sizes and setback requirements are dependent on three factors; the lake's classification (General Development, Recreational Development, or Natural Environment), whether the lots are riparian or non-riparian, and whether the lots have access to a sanitary sewer.

Mille Lacs County does not have a stormwater ordinance, but the Shoreland Ordinance includes some stormwater provisions and a 25% per lot ceiling on impervious surface.

Table 3 - Mille Lacs Zoning Districts in the Sanitary District

Permitted Uses		Conditional Uses	Minimum Lot Size
R-1	One single family dwelling, public recreation, golf, ag, forestry, light essential services, multi-family dwellings, lodging, accessory uses	Community, gvt. bldgs, kennels, essential services-heavy, PUDs, subdivision, home occupation, feedlots, hwy business, hospital/clinics, mining	1 acre
S-4	Single fam. res. & accessory uses, golf courses, essential services, rec. camping	Res. PUDs, multi-family, home occupations, marinas, accessory bldgs.	
	Unsewered, Riparian		40,000 sq. ft.
	NonRiparian		20,000 sq. ft.
	Sewered, Riparian		15,000 sq. ft.
	Non Riparian		10,000 sq. ft.
S-2	Single, duplex, triplex, quad residential, forest management	Res. PUDs, surface water commercial, semipublic, parks, historic sites	
	Unsewered, Riparian		40,000 sq. ft.
	NonRiparian		20,000 sq. ft.
	Sewered, Riparian		15,000 sq. ft.

Mille Lacs County Zoning Districts

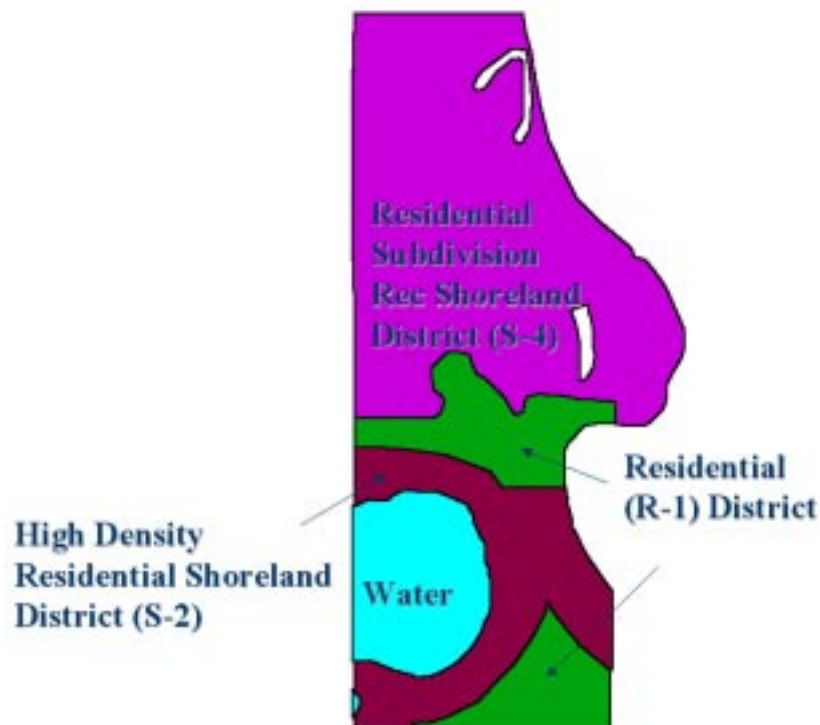


Figure 11

Minnesota Pollution Control Agency

The Minnesota Pollution Control Agency (PCA) has regulatory authority over a host of water and natural resource policies adopted by the State of Minnesota. The PCA has rules, standards, and regulations for management of both wastewater and stormwater from new and existing development. PCA rules (7001) historically required a stormwater management plan to be approved for any land disturbance of more than 5 acres. A recent rule change is lowering the NPDES threshold to one-acre disturbances (Phase II of NPDES).

Minnesota Department of Natural Resources

The Department of Natural Resources (DNR) generally has regulatory jurisdiction over activities in water bodies, or within the high-water line. DNR also has administrative authority for the State Shoreland Ordinance. All three local jurisdictions have adopted the DNR model ordinance language and have been delegated enforcement powers.

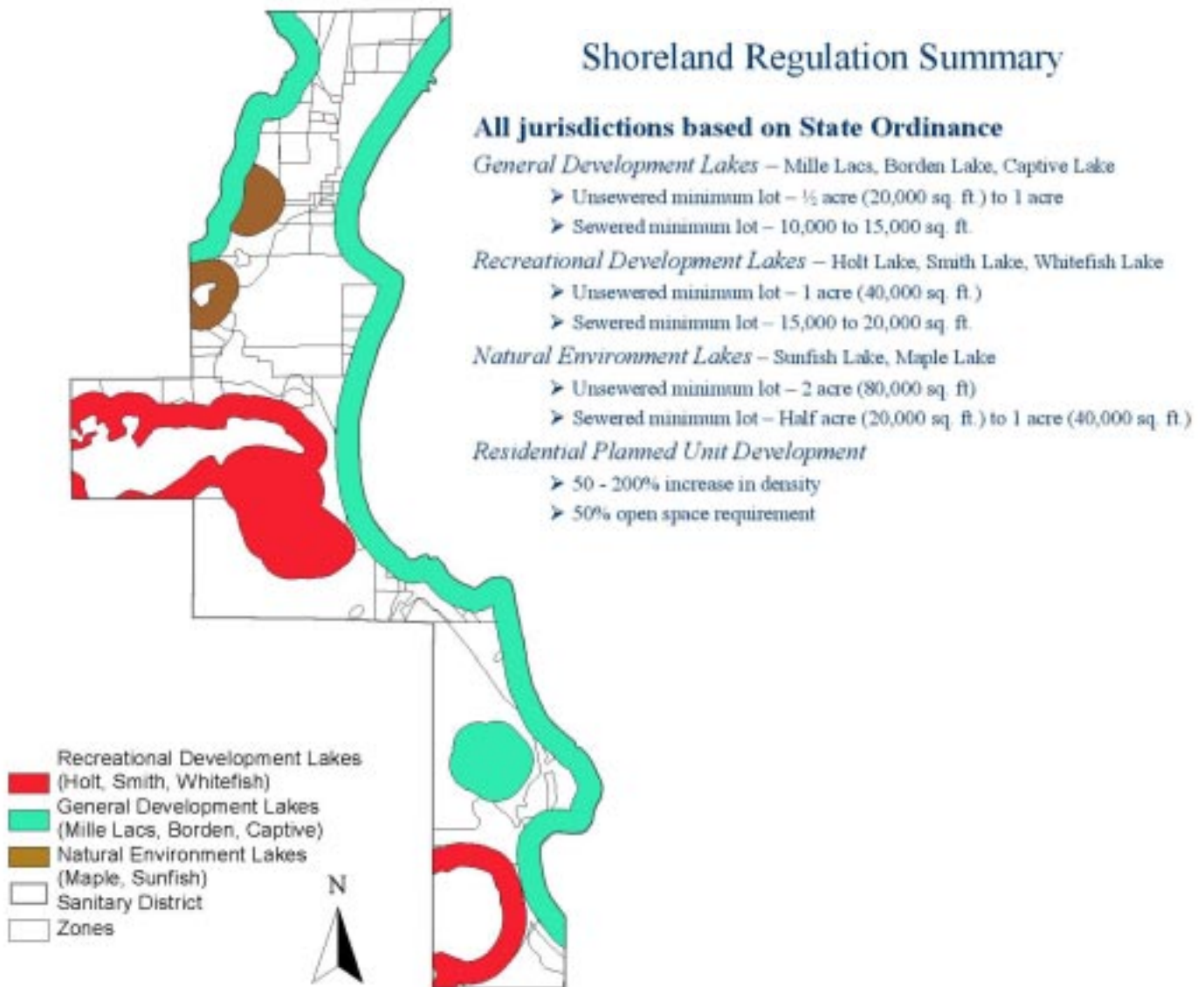


Figure 12

Minnesota Department of Transportation

The MnDOT has planning authority for the easement upon which U.S. and State Highways lie, and has authority to condemn easement for new alignments. U.S. Highway 169, which runs through the Sanitary District along Lake Mille Lacs, is a designated Inter-Regional Corridor (IRC). MnDOT has designated certain highways as IRCs in order to assign priority to these roads for moving traffic at generally high speeds between regions of the State. MnDOT completed an Environmental Impact Statement examining the rebuilding or potential realignment of U.S. 169, including expanding it to a four-lane along its existing alignment and four alternative new alignments. Some of the new alignments would move the highway outside the boundaries of the Sanitary District.

The IRC designation for U.S. 169 affects development patterns in the Sanitary District. MnDOT recently announced that it will not change the alignment of 169 within the District, and will instead rebuild along the existing alignment. If the alignment does not change, the IRC designation limits new access or signaling along the route. Should significant development occur in, for instance, the Port Mille Lacs area the traffic generated by the new development would require substantial changes in the existing unsignaled intersection or the construction of a frontage road to another signaled intersection.

The alignment choice will also affect the market for development in the District. If the alignment is moved away from the Sanitary District, road access is significantly easier, but market pressure for commercial development significantly decreases, and some residential development is also less likely to occur. The market implications of the different alignments, as they affect future development, are presented in detail in the Projected Development Analysis for Highway 169 Improvements (2001) authored by George Orning (University of Minnesota) and Brad Digre (Short Elliot Hendrickson, Inc.).



Assessing the Risk from Secondary Development

The density and intensity of development that occurs in any area is affected by the characteristics of the local development market, local land characteristics, and the capacity of public infrastructure. Market demand for housing or commercial sites is the primary determinant for the density and intensity of development. Where market demand is high, development pressure will fill buildable areas and increase the intensity of land uses. Where market demand is weak, development will be sporadic even if the land is buildable and infrastructure capacity is plentiful.

When market demand is high, however, land characteristics, infrastructure capacity, and community priorities will constrain the amount or intensity of development. Constraints include the following factors:

- Access to transportation infrastructure;
- Local preferences for development, expressed through zoning or other land use regulation;
- Regulatory protection of natural resources, including shorelands, wetlands, protected habitats, and endangered species;
- Access to drinking water;
- Access to adequate wastewater treatment, either sewer systems or compliant septic system.

The primary constraints on development within the Sanitary District are the presence of large wetland areas and open water, lack of existing roads or other infrastructure into some areas of the District, and local governmental land use regulation on lot size, setback, and impervious surface coverage. Some less significant constraints include high water table and poor soils for on-site wastewater treatment, potential limited access to U.S. Highway 169, and existing non-compliant plats (tax-forfeit or in single ownership) in several undeveloped areas.

Wastewater-related development constraints are of primary concern in this analysis. Thus the two constraints of primary interest are those on Individual Sewage Treatment Systems (ISTS, or septic) and the zoning and shoreland minimum lot sizes.

In regard to constraints on ISTS, Crow Wing and Mille Lacs county planning offices have indicated that most developable areas within the District have soils and water tables that do not prevent compliant septic systems on minimum-sized lots (minimum size dictated by zoning). While a lot-by-lot assessment would likely identify areas where ISTS drainage field requirements demand larger lots (and thus lower development densities) than allowed under zoning and shoreland regulations, septic system limitations appear not to be a significant limiting factor to development.

Much of the area's zoning, however, includes provisions for denser development if the development has access to a sanitary sewer. In Crow Wing County most of the base zoning districts allow for a reduction of 20% in minimum lot size for sewer areas. The Shoreland Ordinances for all three governments allow a significant reduction in minimum lot size (as large as 400% difference) for sewer developments relative to non-sewered developments. The sewer project, consequently, will remove one of the constraints to residential, and some commercial, development within the District. The proposed project could result in more dense development patterns than would be allowed without the proposed sewer. Such a development pattern could increase the amount of impervious surfaces within project area watersheds, expose lakes and wetlands to additional non-point source pollution, pose additional risks to sensitive natural areas in the project area, use limited capacity of existing transportation and other public infrastructure, and potentially change the character of the area's existing communities.

Build Out Scenario

The sewer line project has the potential to put at risk natural systems, public infrastructure, and community character due to “secondary development” enabled by the sewer system. Secondary development is defined as that development that would not have occurred but for the construction of the sewer line. In order to assess the level of risk to natural systems, public infrastructure, and community character, the Sanitary District commissioned a “build-out” study. The build-out study examines the amount of development that could occur if the District is 100% built-out - the maximum number of new units that could legally be constructed.

Quantifying the amount of secondary development enabled by the project is problematic. The marginal change in density and intensity attributable to the installation of the sewer line is dependent upon the assumptions one uses for the market demand for land over the next 20 years, the type of changes to local land use regulation, the level of enforcement practiced by local and State regulators, the level of regulation or protection of natural resources, and the costs of expanding transportation, water, and utilities in the project area.

Nevertheless, creating a build-out scenario can provide insight into the level of risk posed by the secondary development associated with the project. The following build-out scenarios estimate the future development density for the Sanitary District, assuming that development reaches the maximum density threshold allowed by each LGU. The build-out analysis provides two specific scenarios - a baseline estimate of maximum development if the sewer line is not built, and an alternative showing the build-out if the sewer line is constructed and extended to all areas of the Sanitary District. The build-out scenarios represent the most extreme development scenarios under the assumptions described below.

Assumptions

A variety of different build-out assumptions can be incorporated into this analysis, which could change the comparison of sewer and non-sewer scenarios. Several examples of different sets of build-out assumptions are noted below:

- Estimate the total build-out under current land use regulation, assuming publicly-owned lands will not be developed, and that existing development will not be substantially re-developed;
- Estimate the total build-out, under current land use regulation, but assuming additional public acquisition of land in sensitive areas and prime recreational areas. Development is limited by land use regulation and a priority of sensitive natural and recreational areas;
- Estimate the total build-out, under current land use regulation, but assuming that existing development will be substantially re-developed after the addition of the sewer line. Development is limited by land use regulation under sewer standards, and by environmental protection laws and infrastructure limitations;
- Estimate the total build-out assuming that land use regulation will change over time to reflect a particular development market. Development is constrained by the selected shape of the future market, the capacity and cost of infrastructure (wastewater systems, drinking water systems, transportation systems), environmental limitations, and any additional public acquisition of land or development rights.

Additional assumptions could include not extending sewer services beyond the initially served areas, assuming the enforcement of land use regulation is wanting and results in many noncompliant developments, removing areas with steep slopes or high water tables from development consideration, assuming that development will aggressively use Planning Unit Development (PUD) density bonuses, or assuming that governmental land use regulation will be more, rather than less, restrictive in the future.

The selected build-out scenario balances between aggressive and restrictive development assumptions. Based on discussion with the Sanitary District Board and public meeting comments, this study uses the following assumptions in regard to infrastructure, existing development patterns, and local regulation;

- Current zoning will remain unchanged, and enforcement will be sufficient to assume that new development will remain compliant with land use regulation (including the most restrictive lot size between shoreland and base zoning, and impervious coverage standards);
- PUD development will be either a small portion of total development or will result in approximately the same building and infrastructure densities as non-PUD development.
- The proposed wastewater system will be completed and ultimately available to the entire Sanitary District - physical constraints on the system capacity were assumed to be surmountable;
- Market development pressure will be sufficient to reach complete build-out;
- Existing building sites will not be re-developed, although subdividing lots will be allowed;
- Commercial development will occur primarily at existing commercial locations, or will occur consistent with allowed residential densities;
- The buildable riparian lots in shoreland areas are already fully developed (shoreland development uses non-riparian standards);
- Sites with steep slopes, wetlands, or other natural features that make it difficult to build on will remain undeveloped;
- Publicly-owned land will remain in public ownership.

Methodology

This study used the following three-step process to characterize the risk from secondary development:

1. Identify the “buildable” land in the Sanitary District;
2. Identify the maximum number of residential and commercial parcels that can be developed with and without the new sewer, based on existing land use regulation;
3. Identify the impacts of a full build-out on each sub-watershed, based on the amount of impervious surface created within each sub-watershed.

Buildable Land

Using a variety of Geographic Information System (GIS) data, this analysis first calculates the “unbuildable” area in the District, or that area which was assumed to be unavailable for development. Unbuildable area was assumed to include existing impervious surfaces (buildings, roads, parking lots), steep slopes, wetlands, streams, lake buffer setbacks for shoreland lakes, and public lands. Below are the assumptions built into the “unbuildable” area estimate.

- Existing impervious surface (i.e. Roads, roofs, drives, parking lots, ball fields, etc.);
- Water bodies (lakes and wetlands);
- 100-foot width around the streams. Each stream was buffered for general planning purposes. The buffer width given for all streams was 100 feet (50 feet on each side from the center of the stream). Although these setbacks are not consistent with the zoning ordinances in the district, they were used as a general assumption to cover non-buildable areas riparian to the stream in order to help visual build-out scenarios;
- Shoreland lake buffer setbacks. This buffer, coupled with removal of existing building locations, effectively removes most riparian lots from the analysis. General development lakes received a 25-foot buffer (Mille Lacs, Borden, Captive). Recreational development lakes received a 37-foot buffer (Holt, Smith, Whitefish). Natural environment lakes received a 100-foot buffer (Sunfish, Maple);
- Steep slopes (greater than 18%); and,
- Public lands.

Buildable Land

Garrison Kathio West Mille Lacs Lake Sanitary District

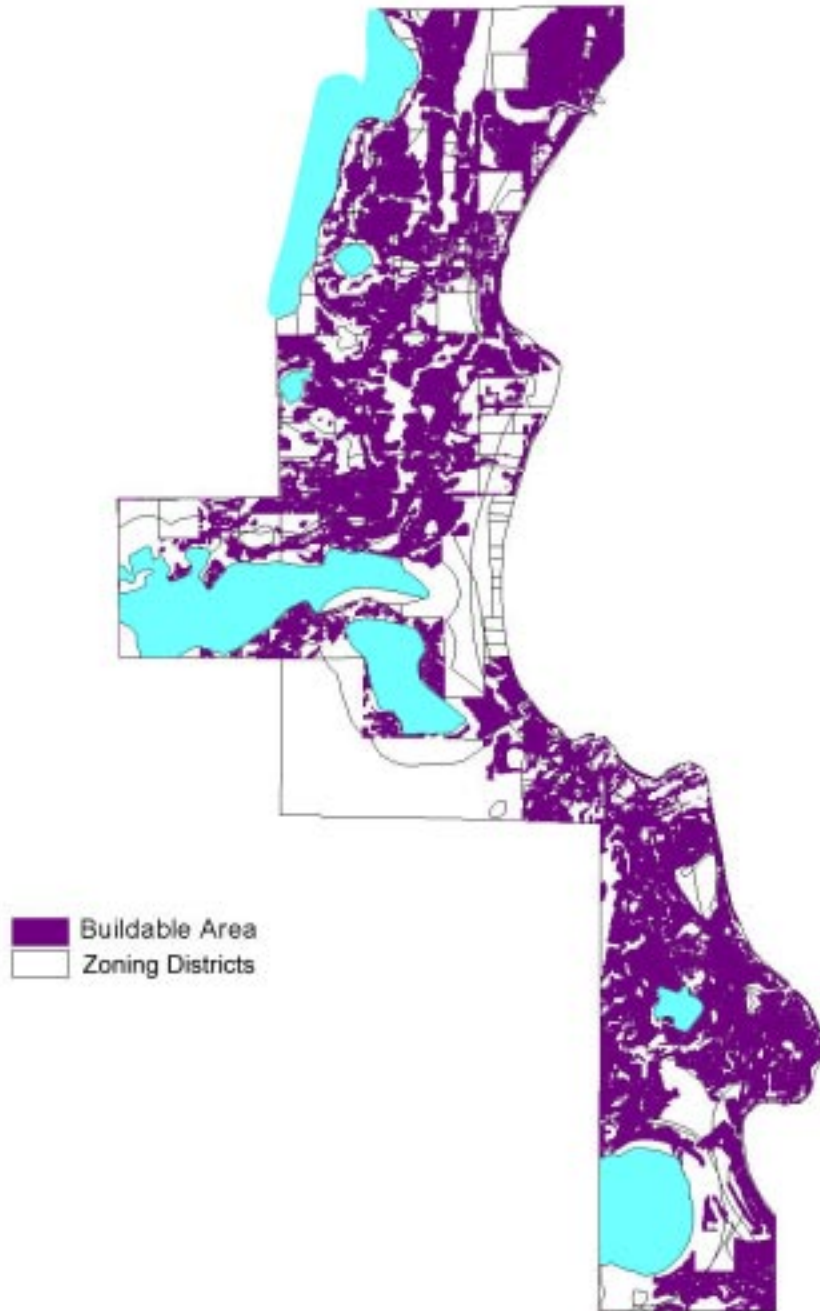


Figure 13

Estimate New Parcels

Based on the amount of buildable land, this study estimated the total build-out under two distinct scenarios:

1. Access to sewer services throughout the Sanitary District;
2. Reliance on ISTS wastewater treatment.

The build-out analysis estimates the maximum number of new housing and commercial parcels that can be constructed based on current zoning and shoreland regulation. Where base zoning and shoreland overlay districts provided conflicting results, this study used the more stringent (larger lot size). The zoning districts and shoreland overlays were digitized and incorporated as an additional layer in the GIS analysis, allowing zoning restrictions to be overlaid on the buildable area.

Zoning Districts

Garrison Kathio West Mille Lacs Lake Sanitary District

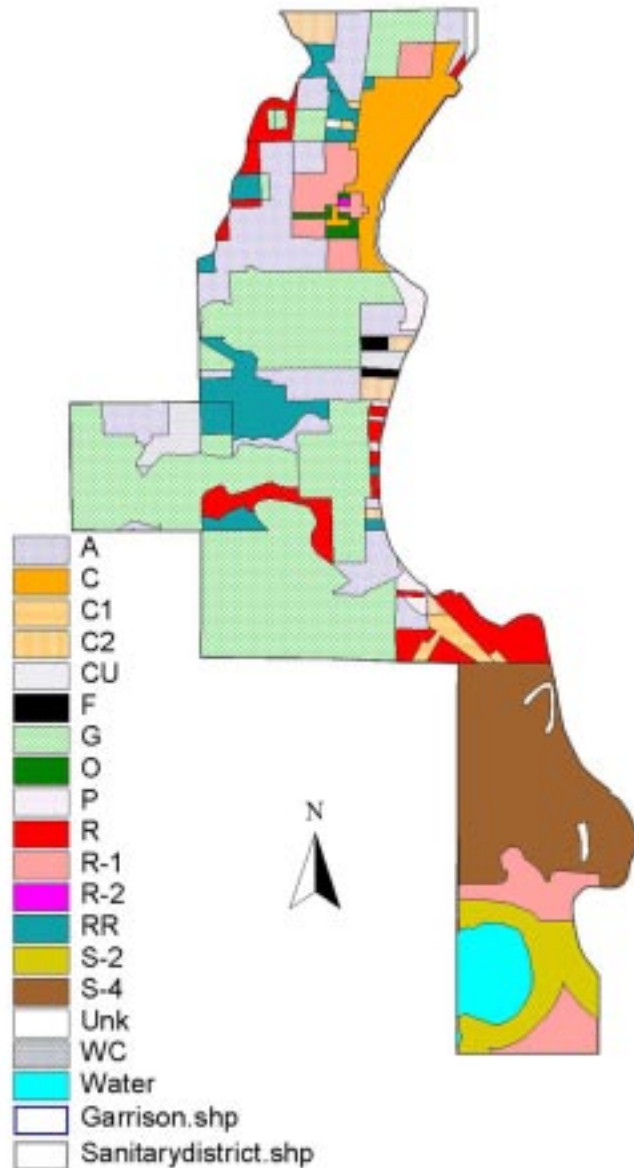


Figure 14

Estimate Watershed Impacts

Based on the number of new parcels, and the amount of existing impervious surfaces, the study estimated the total new impervious surface for the two build-out scenarios. The impervious surface estimates assumed the relationship between lot size and new impervious surface coverage shown in Table 4. When the table coefficients were in conflict with the impervious surface limitation in the shoreland ordinance, the ordinance controlled the estimate.

Impervious Surface Coefficients

Table 4 - Garrison Kathio West Mille Lacs Lake Sanitary District Analysis

Lot Size	Impervious Surface Estimate*
15,000	50
20,000	40
30,000	25
40,000	25
1 ac	25
80,000	10
2.5 ac	10
6 ac	5
15 ac	2.5

* Sources: Hwy 169 Study and Center for Watershed Protection Studies



Risk assessments were based on a simple threshold-level analysis developed under the University of Connecticut Non-point Education for Municipal Officials (NEMO) program. The NEMO program is now operating in a number of states, including Minnesota. The thresholds for risk are noted below:

- Less than 10% impervious surface coverage - no or little general impact on watershed functions, although specific sensitive areas may still be at risk;
- 10 - 25% impervious surface coverage - watershed functions are likely to be comprised, and sensitive areas at high risk of being degraded;
- Over 25% impervious surface coverage - general watershed functions are degraded and the watershed is no longer sustainable without substantial investment in pollution control; lake, river, and habitat restoration; or engineered storm water systems.

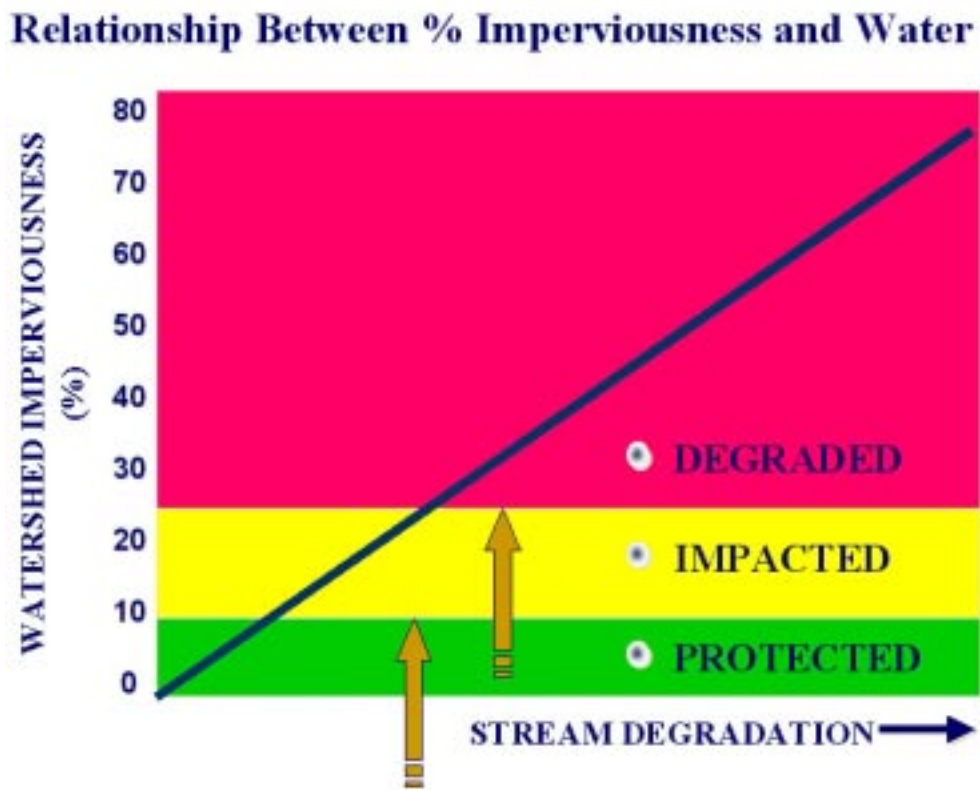


Figure 15

Build-Out Results

When an area gains access to a sanitary sewer line, the allowed density under zoning and shoreland regulations is reduced, sometimes considerably reduced. The build-out analysis identified those areas in the Sanitary District with the greatest potential change in lot size: the shoreland areas along Lake Mille Lacs, Borden Lake, and the entire S-4 district in Mille Lacs County (the Port Mille Lacs area). In these areas the allowed lot size drops from 40,000 sq. ft. to 20,000 or 10,000 sq. ft., depending on the base zoning district.

Table 5 shows the estimated buildable area, the minimum lot size, and the estimated full build-out for the non-sewer scenario by zoning district.

Table 5- Build-Out without Sewer

Code	Zoning	Minimum Lot Size Limit Without Sewer*	Estimated Buildable Acres Remaining*	Estimated Number of Additional Buildings to Zone
C (City of Garrison)	Commercial	30,000 sq ft	205	259
O (City of Garrison)	Open	20,000 sq ft	8	16
R-1 (City of Garrison)	General Provisions	20,000 sq ft	137	290
R-2 (City of Garrison)	Multi-Family Residential	30,000 sq ft	0.7	1
A (Garrison Twn)	Agricultural	15 Ac	530	35
C1 (Garrison Twn)	Commercial 1	15,000 sq ft	54	147
C2 (Garrison Twn)	Commercial 2	15,000 sq ft	48	77
F (Garrison Twn)	Future	40 Ac	3	0
G (Garrison Twn)	Green Space	2.5 Ac	521	209
P (Garrison Twn)	Public	Unknown	NA	NA
R (Garrison Twn)	Residential	20,000 sq ft	205	279
RR (Garrison Twn)	Rural Residential	2.5 Ac	246	99
WC (Garrison Twn)	Waterfront Commercial	15,000 sq ft	35	62
R-1 (Kathio Twn)	Rural Residential	1 Ac	160	160
S-2 (Kathio Twn)	High Density Residential Shoreland	40,000 sq ft	124	135
S-4 (Kathio Twn)	Residential Subdivision-Recreational Shoreland	40,000 sq ft	741	807

* Estimated using GIS methods to subtract out existing impervious surface, water bodies, streams, steep slopes, shoreland lake buffers, and public lands.

** Where the district lies in a shoreland district, the greater minimum lot size was used. For shoreland districts, the minimum lot size is 40,000 sq ft for general and recreational development lakes (a buffer setback was subtracted out as “unbuildable” area from these lakes, and therefore, nonriparian minimum lot sizes were used) and 80,000 for natural environment lakes.

Table 6 shows the same information, but assuming that the sewer is available throughout the Sanitary District.

Table 6 - Build-Out with Sewer

Code	Zoning	Minimum Lot Size Limit with Sewer**	Estimated Buildable Acres Remaining*	Estimated Number of Additional Buildings to Zone
C (City of Garrison)	Commercial	30,000 sq ft	205	297
O (City of Garrison)	Open	20,000 sq ft	8	18
R-1 (City of Garrison)	General Provisions	20,000 sq ft	137	298
R-2 (City of Garrison)	Multi-Family Residential	30,000 sq ft	0.7	1
A (Garrison Twn)	Agricultural	12 Ac	530	44
C1 (Garrison Twn)	Commercial 1	12,000 sq ft	54	196
C2 (Garrison Twn)	Commercial 2	12,000 sq ft	48	174
F (Garrison Twn)	Future	40 Ac	3	0
G (Garrison Twn)	Green Space	2.0 Ac	522	261
P (Garrison Twn)	Public	Unknown	NA	NA
R (Garrison Twn)	Residential	16,000 sq ft	205	557
RR (Garrison Twn)	Rural Residential	2.0 Ac	246	123
WC (Garrison Twn)	Waterfront Commercial	12,000 sq ft	35	114
R-1 (Kathio Twn)	Rural Residential	1 Ac	160	160
S-2 (Kathio Twn)	High Density Residential Shoreland	10,000 sq ft	124	542
S-4 (Kathio Twn)	Residential Subdivision-Recreational Shoreland	10,000 sq ft	741	3226

*Estimated using GIS methods to subtract out existing impervious surface, water bodies, streams, steep slopes, shoreland lake buffers, and public lands.

** Where the district lies in a shoreland district, the greater minimum lot size was used. For shoreland districts, the minimum lot size is 40,000 sq ft for general and recreational development lakes (a buffer setback was subtracted out as “unbuildable” area from these lakes, and therefore, nonriparian minimum lot sizes were used) and 80,000 for natural environment lakes.

Table 7 shows a comparison of the additional number of buildings that would be allowed under if the sewer was available throughout the District. Some areas, including most of the City of Garrison, the R-1 district in Mille Lacs County, and the larger lot areas in Crow Wing County see little or no change (looking both at percentage increase and increase in total number of units) due to the sewer installation. Other areas, particularly the shoreland zones in Mille Lacs and Crow Wing counties, allow higher density with access to a sanitary sewer, and have sufficient buildable land to allow a large change in the number of units under a full build-out.

Table 7 – Comparison of Sewer and Unsewered Scenario

Zone	Jurisdiction	Complete Build-Out		Change	
		Unsewered	Sewered	Units	%
C	Garrison	259	297	38	15%
O	Garrison	16	18	2	13%
R-1	Garrison	290	298	8	3%
R-2	Garrison	1	1	0	0%
A	Crow Wing	35	44	9	26%
C1	Crow Wing	147	196	49	33%
C2	Crow Wing	77	174	97	126%
F	Crow Wing	0	0	0	0%
G	Crow Wing	209	261	52	25%
P	Crow Wing	-	-	0	0%
R	Crow Wing	279	557	278	100%
RR	Crow Wing	99	123	24	24%
WC	Crow Wing	62	114	52	84%
R-1	Mille Lacs	160	160	0	0%
S-2	Mille Lacs	135	542	407	301%
S-4	Mille Lacs	807	3,226	2,419	300%
Total		2,576	6,011	3,435	133%

The zones with the greatest growth potential under the assumptions of this build-out scenario are listed below:

- * 2,419 additional developed lots in the S-4 district (the Port Mille Lacs area) in Mille Lacs County;
- * 407 additional lots in the S-2 shoreland area in Mille Lacs County;
- * 278 additional lots in the Crow Wing's R (residential) district;
- * 97 additional commercial lots in the C2 district;

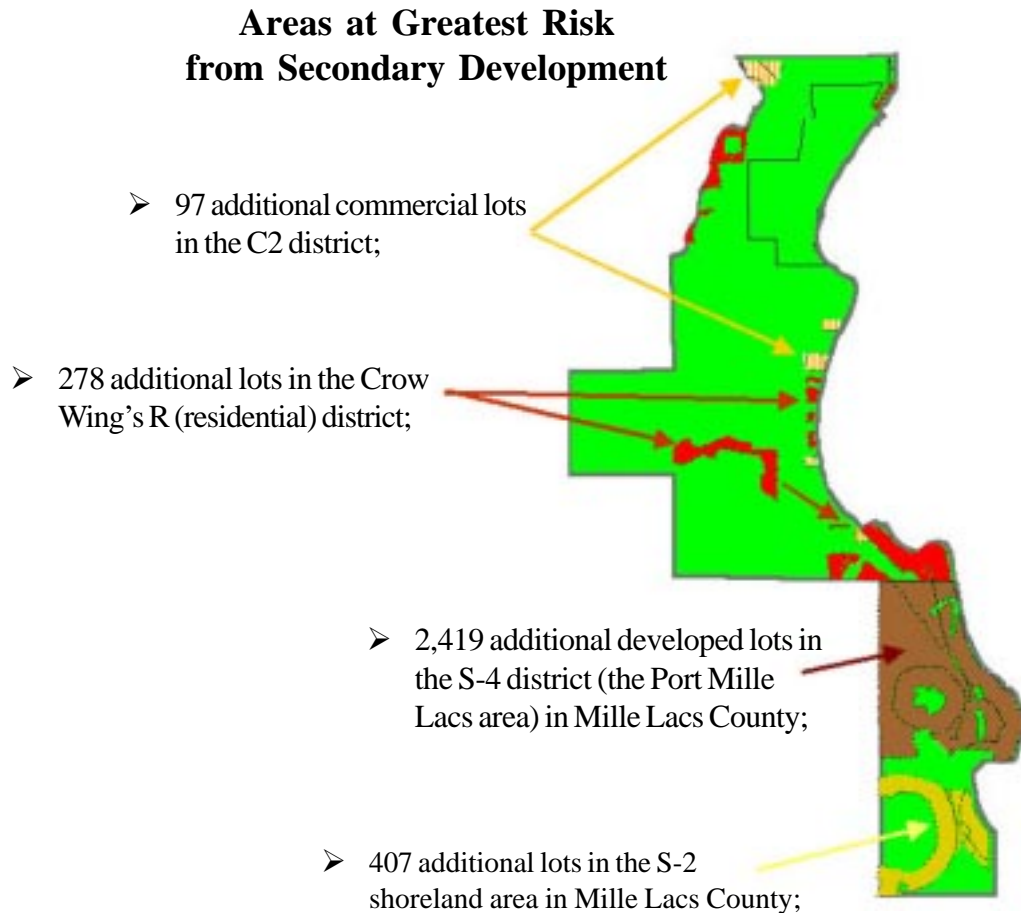


Figure 16

The build-out scenario estimated a maximum build-out (as measured by number of buildings) that is over 133% higher in the sewer scenario than with the unsewered scenario, or an increase in the number of total developed parcels in the Sanitary District of over 3,400 lots. Most of the new units fall into a single zone - the Port Mille Lacs area of Kathio Township (Mille Lacs County). This area has both substantial amounts of buildable land (740 acres) and a substantial change in allowed density (from 40,000 sq. ft. to 10,000 sq. ft.). A closer examination of the S-4 area, however, lowers the likely impacts of the sewer line, as discussed in the mitigation and implementation section.

Risk of Build Out to Water Quality

In order to assess the potential harm of additional developed parcels to water quality and the watershed function, the build-out analysis was translated from showing number of parcels to changes in impervious surface coverage. The number of developable parcels was converted to impervious surface area for each watershed within the District. The analysis also estimates the change from existing impervious surface levels to potential impervious surface levels assuming a complete build-out under both the sewered and unsewered scenarios.

Existing levels of impervious surface coverage, as measured on a watershed basis, are relatively low. General standards developed from a number of research efforts note that if less than 10% of a watershed is covered by impervious surfaces, the impacts on the watershed are difficult to measure (localized effects of impervious surfaces on specific sensitive areas are not considered by the general standard). The District's portion of the Lake Mille Lacs watershed, at 8.4% impervious coverage, is the only area approaching the impacted threshold (greater than 10%).

Existing Impervious
Percentage by Watershed

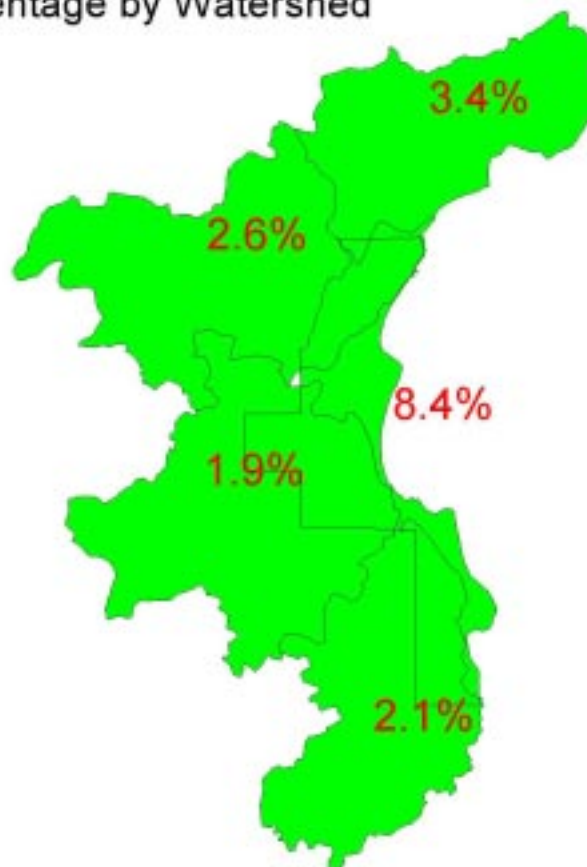


Figure 17

Where water quality problems currently exist, inadequately-designed or failing septic systems are likely the greater culprit than total impervious surface coverage. Additional water quality risk is associated with riparian structures and recreational water use, inadequate stormwater management infrastructure, and removal of native shoreland vegetation.

Translating new lot development to impervious surface required making additional assumptions about how development would occur in the District. A number of sources provide estimates for categories of development. This study considered two sources for estimating impervious surface coverage - the Center for Watershed Protection and the Highway 169 Environmental Impact Statement (EIS). The Center for Watershed Protection's estimates of impervious surface by class of development and lot size tended to be lower than the standards used in the EIS. The Center's standards did not, however, include the coverage of roads serving the development. Road impervious surface is likely to exceed 15% of the total development land area. This study therefore used two standards - the Hwy169 EIS standards (ranging from 2% to 50% depending on lot size), or the maximum impervious surface allowed under the shoreland ordinance (25%). The Shoreland ordinance's maximum impervious surface coverage does not include roadways, but for much of the District's undeveloped shoreland area (particularly in the Port Mille Lacs area) roads are already developed and included in the existing impervious surface analysis.

Results

The results of the impervious surface analysis show that, under the specific assumptions of this analysis, the risk to water quality from more impervious surface is very low. Table 8 shows the amount of new impervious surface, by watershed, for the sewered and non-sewered build-outs. In spite of a dramatic increase in the number of buildings for several zoning districts, the amount of impervious surface only marginally increased. While this seems initially counter-intuitive, the result makes sense in the context of existing regulatory limits - the Shoreland Ordinance limits lot coverage to 25% impervious surface. Except for additional roadway to serve smaller lots, the amount of impervious surface is the same for four 10,000 sq. ft. lots as for one 40,000 sq. ft. lot. Where roads are already in place, or the number of lots is small and will not need additional roads, the shoreland impervious surface limitation results in the same amount impervious surface coverage in spite of many additional lots.



Table 8 – Change in Impervious Surface by Zoning District

Zone	Jurisdiction	Impervious Acres		Change	
		Unsewered	Sewered	Acres	%
C	Garrison	51.2	51.2	0	0%
O	Garrison	3	3	0	0%
R-1	Garrison	53.8	53.8	0	0%
R-2	Garrison	0.2	0.2	0	0%
A	Crow Wing	13.3	13.3	0	0%
C1	Crow Wing	25.7	25.7	0	0%
C2	Crow Wing	15.4	15.4	0	0%
F	Crow Wing	0.1	0.1	0	0%
G	Crow Wing	52.1	52.1	0	0%
R	Crow Wing	58.7	64.2	6	9%
RR	Crow Wing	24.6	24.6	0	0%
WC	Crow Wing	12.1	12.1	0	0%
R-1	Mille Lacs	39.9	39.9	0	0%
S-2	Mille Lacs	31.1	31.1	0	0%
S-4	Mille Lacs	185.1	185.1	0	0%
Total		566	566	6	1%

Figure 18 shows the effects of the build-out (both sewerred and non-sewerred) on the District’s watersheds. The Lake Mille Lacs watershed, where most of the new units lie, has increased from 7.8% to 18.7 %. The impervious surface now exceeds the 10% threshold, and is into the impacted watershed zone. The remaining watersheds have realized several percentage point increases in impervious surface coverage, but remain below the 10% threshold, indicating a protected watershed.

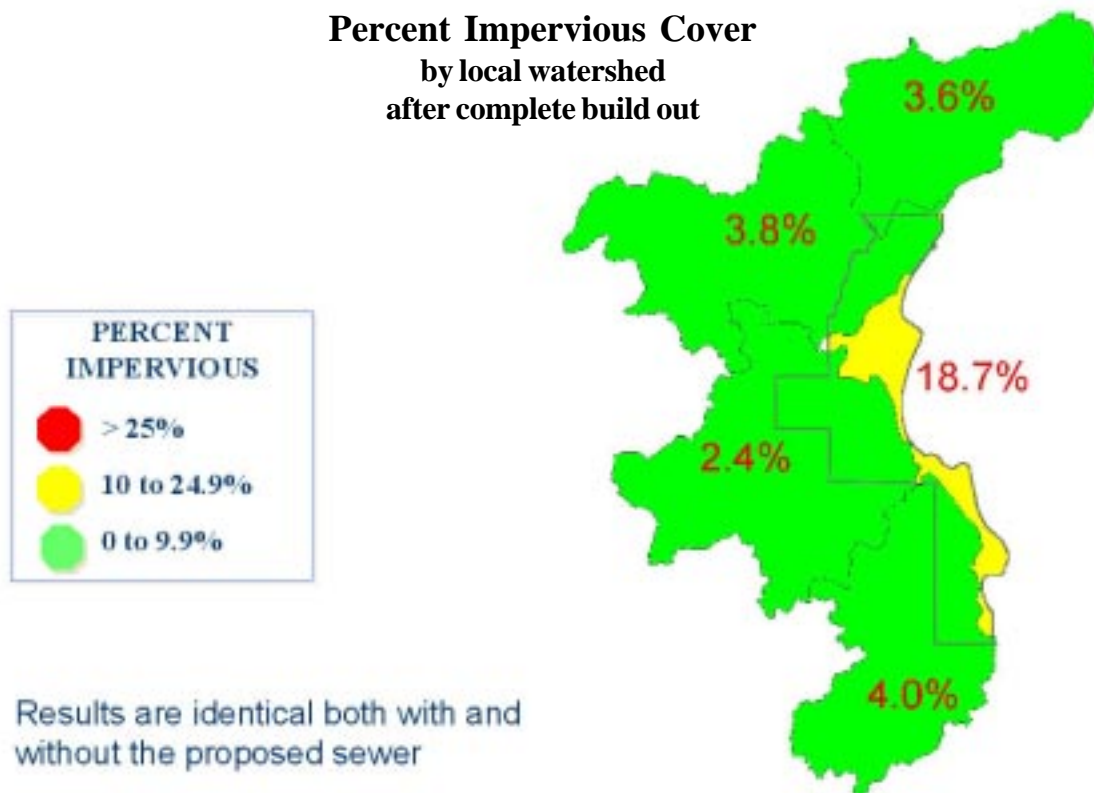


Figure 18

The effects of secondary development on water quality are not exclusively determined by the amount of impervious surface created. Even if the amount of impervious surface is the same for the sewerred and non-sewerred build-out, the sewerred build-out results in a much more intensive land use. If four times as many housing units are on the same impervious surface, there will be many more cars, more litter or miscellaneous waste in the environment, heavier use of regional public facilities, and more congestion on area roads. Quantifying the environmental impacts from the more intensive use, however, is considerably more problematic than the foregoing analysis. Moreover, mitigating measures for these and other impacts may largely ameliorate environmental impacts from more intensive development, as discussed below.

Testing the Build-out and Water Quality Impact Analysis

Sensitivity

The Port Mille Lacs Area in Mille Lacs County, zoned S-4, is the area with the greatest potential for secondary development impacts. Seventy percent of the potential new units under a sewer build-out lie in this area. As noted earlier, while the shoreland ordinance impervious surface limitations (25% per lot) appear to substantially mitigate the water quality risks, the magnitude of the change in land use intensity deserves some additional attention, analysis, and consideration of mitigation strategies.

In order to test the sensitivity of the impervious surface analysis, the 25% shoreland impervious limit was disregarded for the Port Mille Lacs area. Instead, a 50% impervious surface assumption was used for the 10,000 sq. ft. lots. This is consistent with the Highway 169 EIS estimate, and with Center for Watershed Protection estimates for small urban lots, including an allowance for abutting roads. Doubling the impervious surface assumption doubles the number of impervious acres in the S-4 District.

Table 9 shows the results of the sensitivity test by watershed. The District's portion of the Lake Mille Lacs Watershed, already fairly high at 18.7% increases to 22.6%, and the White Fish Lake watershed increases from 4% to 5.3%. Neither of these changes moves the watershed into a state of degradation (greater than 25%), but the community can expect to see more harmful impacts to the watershed.

Table 9 – Sensitivity for S-4 Impervious Assumptions

Watershed	% Impervious	
	Non-Sewered	Sewered
Round Lake	3.6%	3.6%
White Fish Lake	4.0%	5.3%
Garrison Creek	3.8%	3.8%
Sequachie Creek	2.4%	2.4%
Mille Lacs Lake (within District)	18.7%	22.6%

Another sensitivity issue in regard to S-4 is the amount of buildable land. Figure 19 shows the satellite imagery of the Port Mille Lacs areas. Existing development can be seen all along the shore of Lake Mille Lacs, the network of existing roads on both side of Highway 169 is readily apparent, and the golf course and resort area may also be identified. The buildable area identified in the GIS analysis for the S-4 district totaled 741 acres. Approximately 100 acres of the “buildable” area is the existing golf course, which was not identified as developed because it was not impervious surface. Golf courses typically have environmental impacts on natural resources and water quality, but not due to impervious surface runoff. At the current time, the golf course is unlikely to be converted to houses or businesses, lowering by 433 the total number of new developed lots, with an equivalent percentage reduction in impervious surface. The existing road network, furthermore, lowers the potential impact of new development, as the watershed is already absorbing these impervious surface impacts.



Figure 19

Minnesota Department of Transportation Environmental Impact Study The Orning/Digre Build Out Analysis

The results of the District’s build-out and water-quality analysis are partially corroborated by the build-out conducted by the Minnesota Department of Transportation. MnDOT conducted an Environmental Impact Study (EIS) for the proposed realignment and reconstruction of U.S. Highway 169. Like the sanitary sewer line, highways are infrastructure that affect the way that development occurs on the land. Changing the route or capacity of the highway will therefore have dynamic impacts on development patterns in the travel-shed, or the roads, homes, and businesses that would use Highway 169 over the next 30 years. As part of the EIS, MnDOT commissioned a land use study around the potential realignment sites for the purpose of determining what effect the realignment could have on the environment due to the secondary effects of changes in land use around the new highway. *Projected Development Analysis for Highway 169 Improvements* (2001) authored by George Orning (University of Minnesota) and Brad Digre (Short Elliot Hendrickson, Inc.), includes both a

detailed assessment of existing natural resource and development data, and five distinct build-out analyses based on five potential alignments of a reconstructed Highway 169, including the “no-build” scenario, in which the Highway was not re-aligned nor expanded in its current alignment.

While most data used in the EIS were also used in the Sanitary District’s build-out analysis, the two studies made some different assumptions, and had some distinct goals that lead to some methodology and presentation differences. The 169 study used the following assumptions that were not shared by the Sanitary District’s study:

- The independent variable was the location of U.S. Highway 169 where the District’s study used the existence of the sewer line as the independent variable.
- The 169 study assumed the District area would provide sewer services throughout the District. The District’s study made a similar assumption for the sewer scenario build-out, but recognizes in the discussion on mitigation that limiting the reach of the proposed sanitary line is not only consistent with District policy, but necessary in order to manage the constrained capacity of both the sewer line and the treatment facility.
- The 169 study assumed that a fixed number of new housing units would be built, and that only the location of the units would change with the change in highway alignment. Approximately a third of the future development housing was dependent on the location of the Highway. The total number of housing units, for instance, were dependent on an estimated market demand, and only the location, not the total number, would vary with the highway location. In contrast, the District’s build-out needed to examine the potential changes in the total number of units built as a result of the sewer line. The total number of housing units was assumed to be dependent on the allowed density under land use regulation.
- The 169 study examined not only the total build-out, but the likely build-out under reasonable market conditions. The likely build-out provided the basis for water quality impacts due to increases in impervious surface. The District’s study assumed that the construction of the sewer line would change the market demand for housing and commercial development, but did not attempt to forecast the extent of the change. Instead, the District’s study attempted to measure the risk from a worst-case build-out under its two scenarios (the sewer and unsewer scenarios).

Methodological or scope differences between the 169 study and the District’s study include the following distinctions:

- The 169 study estimated the impact from alternate locations of new impervious surfaces in each watershed rather than differences in the total amounts of impervious surface.
- The 169 study assigned zoning lot sizes to 40-acre tracts, rather than using each local government’s geographic zoning districts.
- The 169 study used primarily lot size, rather than regulatory limits, to set the impervious surface assumptions.
- The 169 study covers an area much larger than the District.

The two studies also have a number of similarities, including the following:

- The assumptions about impervious surface were largely consistent, with the exception of when regulations limited the amount of impervious surface per lot. Impervious surface assumptions are described below:

Table 10 - Comparison of Impervious Surface Coefficients

Name	Base Zoning Code	Shoreland Zone	Sewered Impervious % EAW/169 Study
Garrison City	C	General	25/25
Garrison City	O	General	25/40
Garrison City	O	Nat. Environment	25/40
Garrison City	O	Not a Shoreland	40/40
Garrison City	R-1	General	25/40
Garrison City	R-1	Nat. Environment	25/40
Garrison City	R-1	Not a Shoreland	40/40
Garrison City	R-2	Not a Shoreland	25/40
Garrison Town	A	General	2.5/2.5
Garrison Town	A	Nat. Environment	2.5/2.5
Garrison Town	A	Recreational	2.5/2.5
Garrison Town	C1	General	25/50
Garrison Town	C1	Not a Shoreland	25/50
Garrison Town	C2	General	25/50
Garrison Town	C2	Not a Shoreland	50/50
Garrison Town	F	General	2/2
Garrison Town	G	General	10/10
Garrison Town	G	Nat. Environment	10/10
Garrison Town	G	Recreational	10/10
Garrison Town	R	General	25/50
Garrison Town	R	Nat. Environment	25/40
Garrison Town	R	Not a Shoreland	25/50
Garrison Town	R	Recreational	25/50
Garrison Town	RR	General	10/10
Garrison Town	RR	Nat. Environment	10/10
Garrison Town	RR	Recreational	10/10
Garrison Town	WC	General	25/50
Garrison Town	WC	Not a Shoreland	50/50
Garrison Town	WC	Recreational	25/50
Kathio Town	R-1	General	25/25
Kathio Town	R-1	Recreational	25/25
Kathio Town	S-2	General	25/50
Kathio Town	S-2	Recreational	25/50
Kathio Town	S-4	General	25/50

- The Sanitary District’s sensitivity analysis in the Port Mille Lacs area adopted the 169 study assumptions for impervious surface by lot size.
- Baseline population and housing growth assumptions were consistent across the studies. These assumptions provide, however, the basis for the EIS’s development forecast, while only informing the mitigation discussion for the District’ study.
- The same GIS data sources provided background and natural resource information.
- Both studies used similar assumptions regarding buildable land. The assumptions are described below:

**Assumptions for Identifying Buildable Land
Sanitary District Analysis**

- Existing impervious surface;
- Water bodies (lakes and wetlands);
- 100 foot width around the streams*;
- Shoreland lake buffer setbacks**;
- Steep slopes (greater than 18%); and,
- Public lands.

** Each stream was buffered for general planning purposes. The buffer width given for all streams was 100 foot or 50 foot on each side from the center of the stream. Although these setbacks are not consistent with the zoning ordinances in the GWMLL, they were used as a general assumption to cover non-buildable areas riparian to the stream in order to help visual build-out scenarios.*

*** General development lakes received a 25 foot buffer (Mille Lacs, Borden, Captive). Recreational development lakes received a 37 foot buffer (Holt, Smith, Whitefish). Natural environment lakes received a 100 foot buffer (Sunfish, Maple).*

**Assumptions for Identifying Buildable Land
Hwy 169 EIS Analysis**

- Areas identified as existing urban or rural development;*
- Water bodies (lakes and wetlands);
- Land that is isolated by water or wetlands; and,
- Public lands.

** Urban and rural development were identified on the land use/land cover GIS data set compiled by the State of Minnesota*

*** Water or wetland locked parcels were manually eliminated from the data set.*

Conclusions

While there are a number of methodological differences between the two build-out analyses, the results show that some similar conclusions were reached by the two studies. Several similarities can be noted between the District’s “hot spots” for risk if the sewer line is built, and the likely development spots under the EIS’s no-build analysis. The EIS’s use of likely market pressure thus contributes greatly to the District’s analysis by showing that the hot spots for risk are also the places that market pressure for development is highest.

Areas at Greatest Risk

- 97 additional commercial lots in the C2 district;
- 278 additional lots in the Crow Wing's R (residential) district;
- 2,419 additional developed lots in the S-4 district (the Port Mille Lacs area) in Mille Lacs County;
- 407 additional lots in the S-2 shoreland area in Mille Lacs County;

Areas of Greatest Development Pressure



Source: *Projected Development Analysis for Highway 169 Improvements*

Figure 20

Some differences can also be noted, particularly in the Mille Lacs County areas of the District. The Port Mille Lacs area can be assumed to be largely developed due to the development along the shore and the coverage of the golf course. The District study did not assume these areas to be developed, except the riparian lots along Lake Mille Lacs. This area thus shows up as the primary risk “hot spot,” although the EIS study does not indicate it to be an area with significant development pressure.

Mitigating the Risks of Secondary Development

The Sanitary District and local governments have a number of options for mitigating the risk associated with secondary development due to the sewer line. Some efforts are already underway to limit harmful changes to water quality and community character. For example, the Sanitary District has been participating in the Lake Mille Lacs Clean Water Partnership Watershed Planning Project for the last two years. The background study is now drawing to a close and is preparing to enter the implementation phase. The Clean Water Partnership is coordinating with the Local Solutions Alliance, a state inter-agency assistance program for units of local government, to build coalitions among units of local government in the Mille Lacs watershed.

Furthermore, the Clean Water Partnership has been creating a stormwater ordinance for the Sanitary District, and is beginning to work with units of local government on adopting the ordinance. Other than a few provisions in the shoreland ordinances, the county and city local governments do not currently have stormwater ordinances.

A number of other options are available for mitigating other secondary development risks associated with the project. Secondary development risks include increased non-point pollution from inappropriately managed stormwater, loss of habitat, encroachment of development on sensitive areas and erodible shoreland, and increased traffic, noise, and air pollution from more intensive use of the project area. The options include education efforts, incentive-based programs, regulatory efforts, and management of public lands. A summary of the options for mitigating risk is shown below:

- Ensuring full enforcement of the Shoreland Ordinance limitations on impervious surface and reviewing the PUD options to ensure limitations to impervious surface increases;
- Managing access to public infrastructure (sewer capacity, road capacity, drinking water, utilities);
- Limiting the intensity and density of land development through voluntary actions by land owners and developers and through land use regulation (zoning, subdivision, and other land use ordinances);
- Establishing stormwater performance standards or new infrastructure that mitigates against specific risks, such as through on-site stormwater management or construction of regional stormwater infrastructure.

Mitigation

The sensitivity analysis reveals that in considering the potential impacts of impervious surfaces in the Port Mille Lacs area the single most critical mitigation effort is to ensure that new development complies with existing shoreland stormwater regulations. The S-4 District will have a minimum lot size of 10,000 sq. ft.; developers and builders could easily exceed the 25% impervious surface threshold unless local officials attend to enforcing this provision. This mitigation is equally important in other General Development shoreland areas (along Mille Lacs and Borden lakes) where the minimum shoreland district is the controlling factor on lot size.

Education and Incentive Programs

The Sanitary District, in cooperation with the units of local government, Soil and Water Conservation Districts, and State agencies, could sponsor a multi-phased education and incentive program, modeled after the Non-point Education for Municipal Officials (NEMO) program. Elements of the effort could include the following:

- Conducting ongoing education efforts for appointed and elected officials on the requirements of the State Shoreland Ordinance will help build recognition of the requirements that developers, builders, and homeowners must meet when acquiring building permits.

- Providing education or incentives for builders, developers, and homeowners to meet both impervious surface standards and best management practices for stormwater can ensure that the standards will hold up over time, as existing buildings undergo modifications and additions.
- Provide model development standards, showing how to minimize impervious surfaces on different lot sizes and configurations.
- Develop educational materials on shoreland standards to be handed out when the application for sewer hookups are approved, including notification that sewer hookups are contingent upon meeting state and local stormwater and land use standards.
- Structure the Sanitary District hookup fees to encourage combining of multiple lots in common ownership.

Manage Access to Public Infrastructure

The risk from secondary development, as portrayed in this build-out analysis, must be put in the context of the size of the proposed wastewater system. One of the assumptions of the build-out was that all new development would have access to the sanitary sewer line. While the proposed sewer system could result in more development than would occur in the absence of the sewer line, the line and treatment facility have capacity constraints. The sewer line project is designed to accommodate the initial 952 hookups, and an ultimate peak of 325,000 gallons per day, which will accommodate approximately 1,300 homes or businesses. The system has limited capacity to absorb new loads, relative to the above-described build-out scenario of an additional 6,000 developed lots. The limited capacity of the proposed system will need to be managed by the Sanitary District as a scarce resource, rather than a simple response to demand as if the capacity of the wastewater system was infinite.

In light of the real capacity limitations of the sanitary sewer, the District could mitigate risk from secondary development using some of the following tools:

- Adopt Sanitary District ordinance language regulating the extension of laterals from the sewer trunk or other laterals to be consistent with density goals and mitigation of secondary development. Require consistency with local Comprehensive Plans and Shoreland Ordinances, particularly the 25% impervious surface limitation. Consider taking over management of ISTS systems rather than extending sewer laterals.
- Limit, by ordinance, the number of new Sanitary hookups per year. The sewer system has limited capacity and should be conserved in order to minimize contract revisions, investment in new infrastructure, and additional discharges from the treatment plant.
- Encourage local governments to set regulatory standards for access management, or create capacity limits for public infrastructure to guide or phase development, such as through Adequate Public Facilities ordinances.

Adopt the Clean Water Partnership Recommendations

- The Mille Lacs Watershed Program, a Clean Water Partnership project overseen by the PCA, will be completing its Phase I recommendations in 2003. The Phase I report will, after a public participation effort, identify specific mitigation efforts for water quality problems in the Mille Lacs Watershed. The implementation effort will require participation of local governments, including the Sanitary District. Some of the implementation recommendations may mitigate against the risks from secondary development.

Support and Participate in the Local Solutions Alliance Planning Project

- The Local Solutions Alliance, a multi-agency collaborative effort to assist local governments in addressing local problems, has proposed to oversee a five phase land use planning effort for the Mille Lacs watershed. The watershed planning effort would dovetail with the Clean Water Partnership Phase II efforts, and would offer inter-jurisdictional solutions to land use and growth management efforts.

Stormwater and Performance Standards

- Create a model stormwater ordinance that meets National Pollution Discharge Erosion System (NPDES) Phase II standards, and address stormwater, erosion, sedimentation, wetlands, and vegetative management. Design the ordinance as an overlay district coincident with the Sanitary District, and encourage local governments to adopt the ordinance. Consider working with the Soil and Water Conservation Districts (SWCDs) to provide review and enforcement services.

Work with Local Governments to strengthen zoning, shoreland, and PUD ordinances

- Encourage local governments to make zoning, shoreland, and PUD ordinances for those sewered areas at risk for heavy development pressure more restrictive than State standards.

Permanent Protection of Land from Secondary Development

- Working with local governments, create and promote tax incentives for shoreland areas encouraging voluntary use of conservation easements. Consider setting up Transfer of Development Rights (TDR) and Purchase of Development Rights programs.