

Figure 2-5: Potential Point-source Contaminant Sources, Fighting Island Intake Source Water Protection Area (SWAP, 2004)

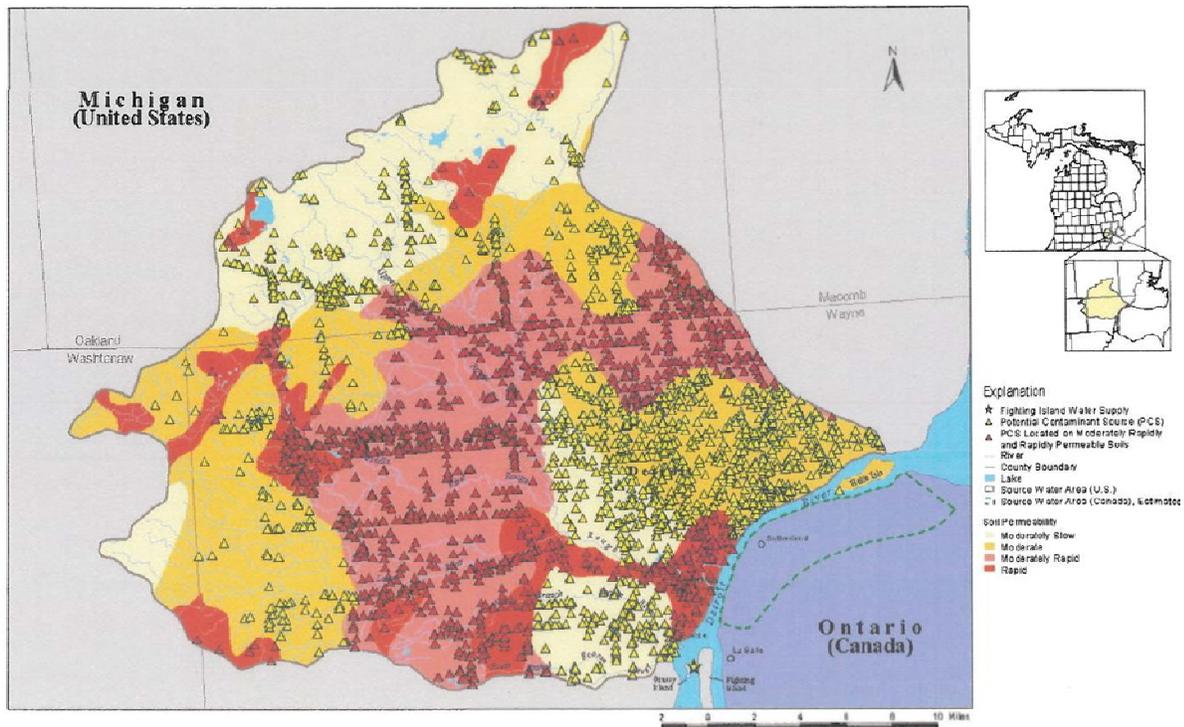


Figure 2-6: Potential Non-Point-source Contaminant Sources, Fighting Island Intake Source Water Protection Area (SWAP, 2004)

A summary of the contaminants is provided in **Table 2-2**. The major potential contaminant was shipping. The assessment identifies the following potential contaminants:

- 4,102 listed sources, including solid waste sites, industrial facilities, toxic release inventory and national priority list sites. 189 of these are in the susceptible area (within the US)
- 67 CSOs and SSOs
- Urban and agricultural runoff
- Shipping

In Canada, no national pollutant release sites were found and only one permit for a wastewater treatment plant is reported in the SWAP (2004).

Table 2-2: Summary of Contaminant Sources for Fighting Island Intake (SWAP, 2004)

Type of Potential Contaminant Source	Number of Potential Contaminant Sources	PCS within the Susceptible Area and the CAZ
Hazardous or Solid Waste Site	858	20
Industrial Facilities Discharge Site	8	4
National Priority List Sites	7	0
Permit Compliance System	6	1
Toxic Release Inventory	55	0
Canadian Wastewater Treatment Facilities	18	18
National Pollutant Release Inventory	261	5

This Fighting Island source water was rated as high sensitivity and high susceptibility based on the number of contaminant sources.

This intake resides in Canadian waters. As such, any operations or maintenance should be coordinated through Canada. In practically, DWSD has no access to this intake at the present time.

2.1.3 Belle Isle

The Belle Isle Intake provides water to the Water Works Park WTP, Northeast WTP and Springwells WTP. The critical assessment zone (CAZ) is shown in Figure 2-7. The CAZ for this intake extends 3,000 feet. A two-dimensional hydrodynamic model has been developed for the St. Clair River-Lake St. Clair-Detroit River Waterway. This model incorporated the effects of wind and circulation patterns in Lake St. Clair and the impact of the Detroit River on the Belle Isle Intake. This model was developed to assess the potential for contaminants to reach the water supply intake. Different contaminant release points were investigated and particle tracking analyzed. The 2004 SWAP reports concludes that “in most instances, only contaminants released into the Detroit River, immediately adjacent to, and in the flow path to, the Detroit-Belle Isle intake lagoon, would affect the water supply, and in most cases would likely bypass the intake lagoon. Advancements to the modeling effort are continuing with expansion of the model to three-dimensional. The goal of the next model development is to provide a more comprehensive spill forecast model. Several spill scenarios are being simulated and the results will provide information on spill travel times, peak concentration, lateral mixing and duration of spill exposure.

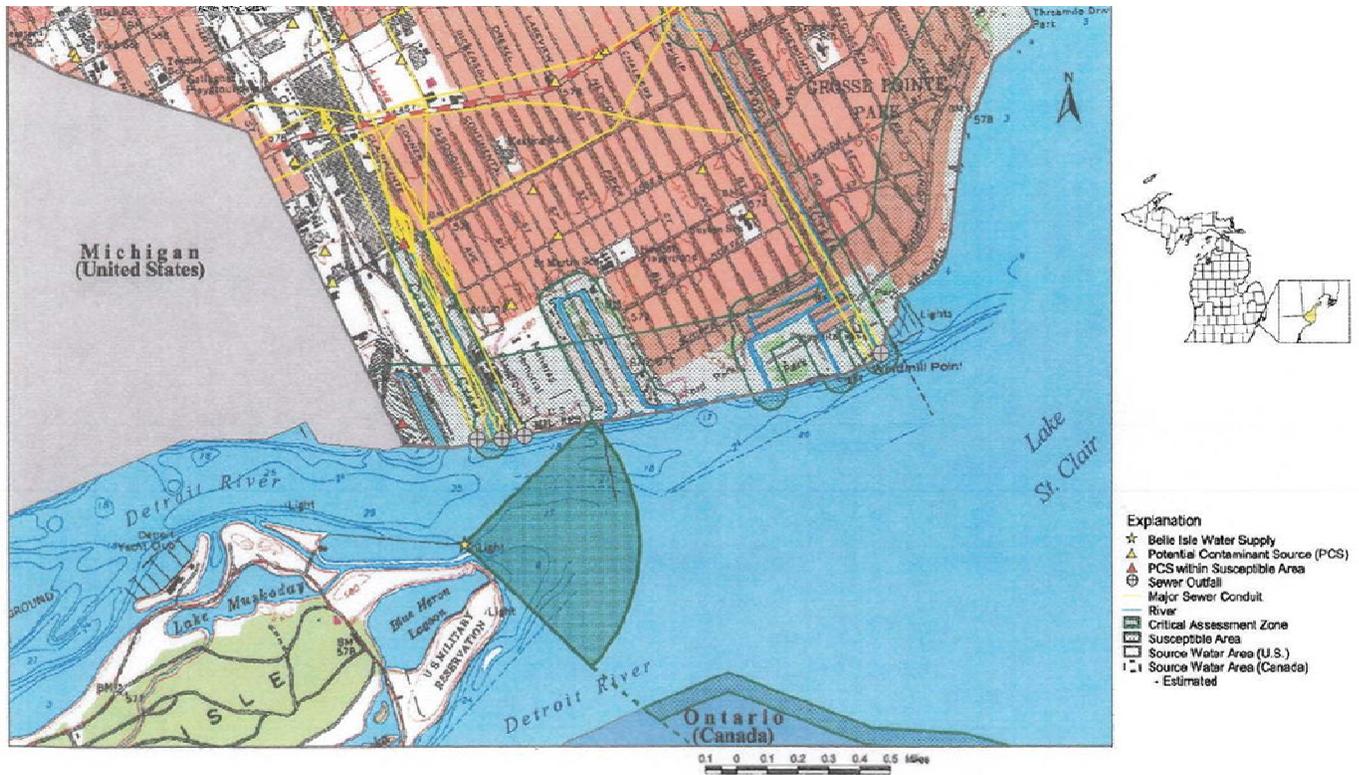


Figure 2-7: Critical Assessment Zone, Belle Isle Water Intake (SWAP, 2004)

The contaminant source locations are shown in **Figures 2-8 and 2-9**. **Table 2-3** summarizes the types of contaminant sources.

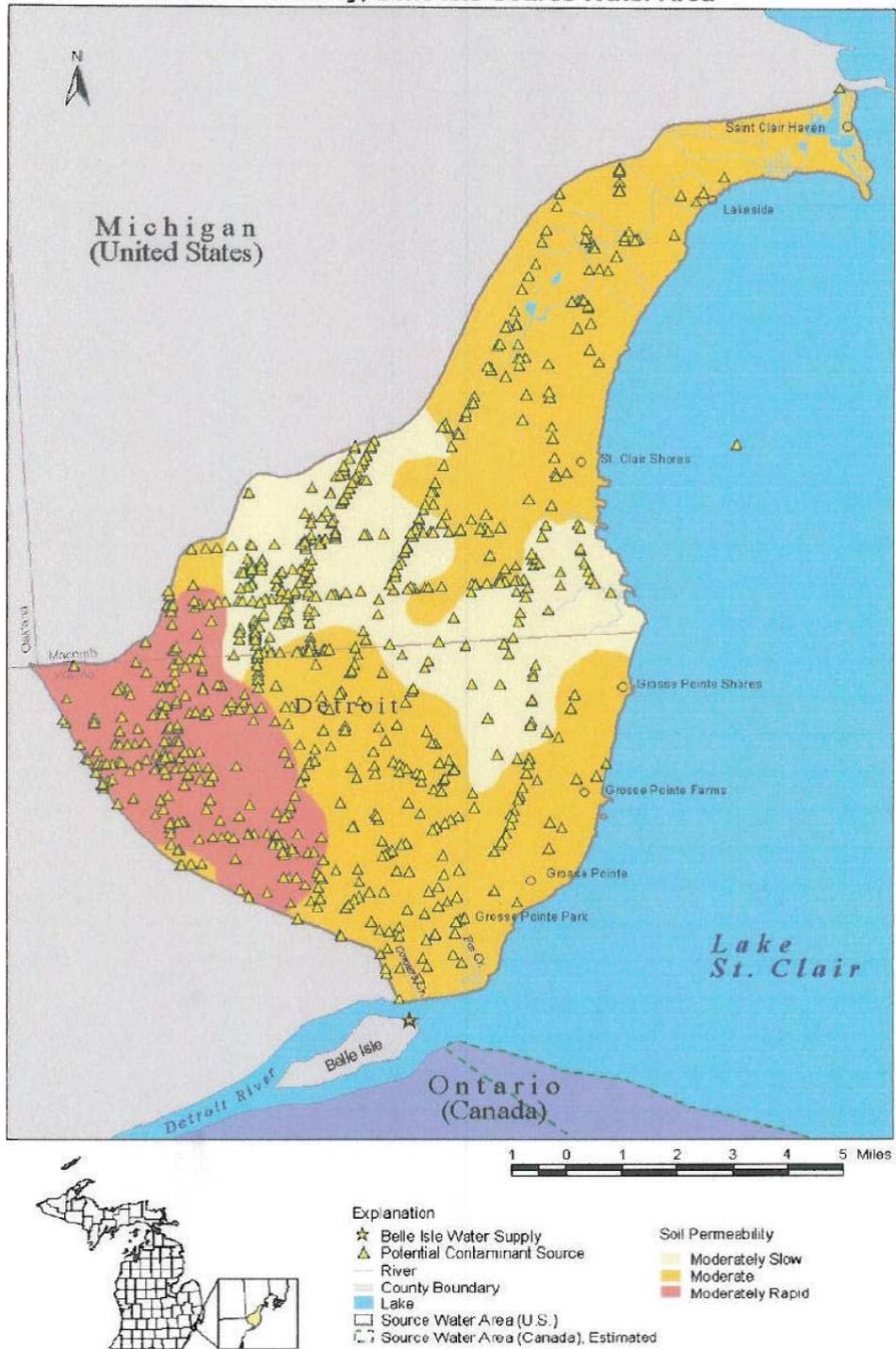


Figure 2-8: Potential Point-source Contaminant Sources, Belle Isle Source Water Protection Area (SWAP, 2004)



Figure 2-9: Potential Non-Point-source Contaminant Sources and Soil Permeability Belle Isle Source Water Protection Area (SWAP, 2004)

The assessment identifies the following potential contaminants:

- 321 listed sources, including solid waste sites, industrial facilities, toxic release inventory and national priority list sites; 24 of these are in the susceptible area
- In Canada, the source water included 5 watersheds with 5 national pollutant release sites and permits for 28 wastewater facilities
- Urban and agricultural runoff
- Shipping

Shipping was identified as the major potential contamination pathway.

The Belle Isle intake is potentially impacted by contaminant sources on the Canadian side of the Detroit River.

Table 2-3: Summary of Contaminant Sources for Belle Isle Intake (SWAP, 2004)

Type of Potential Contaminant Source	Number of Potential Contaminant Sources	PCS within the Susceptible Area and the CAZ
Hazardous or Solid Waste Site	858	20
Industrial Facilities Discharge Site	8	4
National Priority List Sites	7	0
Permit Compliance System	6	1
Toxic Release Inventory	55	0
Canadian Wastewater Treatment Facilities	18	18
National Pollutant Release Inventory	261	5

This Belle Isle source water was rates as high sensitivity and high susceptibility based on the number of potential contaminant sources.

2.2 Source Water Quality Regulations

This technical memorandum summarizes the current federal and state local regulations pertaining to source water quality and quantity that are relevant to DWSD. The regulatory information presented is based on current and historical literature published by the EPA, the MDEQ and the Ontario Ministry of the Environment (OME).

The Safe Drinking Water Act (SDWA) was passed in 1974 and amended in 1986 and 1996. The SDWA gives the EPA the authority to establish and implement national drinking water standards and regulations. Public water suppliers have the responsibility of meeting the standards set forth by the EPA. The 1996 amendments greatly enhanced the existing law by recognizing source water protection and public information as important components of safe drinking water. The OME regulates surface water protection plans under the Ontario Clean Water Act of 2006.

There are a limited number of regulations that directly address drinking water sources. Specifically, SWAP and SWIPP are discussed above. Both are voluntary programs, but completion and approval of

SWAP provides benefit when applying for DWRP. The Great Lakes Charters and Annexes address water withdrawal rates. Other source water related regulations, such as the Surface Water Treatment Rules are discussed in the TM No. 10 Drinking Water Regulations Present and Future. In addition, the Fighting Island intake lies within Canadian waters. This location complicates the source water protection assessment and implementation.

2.2.1 Great Lakes Charters and Annexes

The Great Lakes Charter was originally published February 18, 1995. It was developed to provide principles for management of the Great Lakes water resources.

The purposes of this Charter are:

- to conserve the levels and flows of the Great Lakes and their tributary and connecting waters
- to protect and conserve the environmental balance of the Great Lakes Basin ecosystem
- to provide for cooperative programs and management of the water resources of the Great Lakes Basin by the signatory States and Provinces
- to make secure and protect present developments within the region
- to provide a secure foundation for future investment and development within the region

The Great Lakes Charter Annex is a supplementary agreement developed June 18, 2001. The purpose of the Annex was for the Great Lakes Governors and Premiers to reaffirm their commitment to the five broad principles set forth in the Great Lakes Charter, and to further reaffirm that the provisions of the Charter would continue in full force and effect. Per the Annex “The Governors and Premiers commit to further implementing the principles of the Charter by developing an enhanced water management system that is simple, durable, and efficient, retains and respects authority within the Basin, and, most importantly, protects, conserves, restores, and improves the Waters and Water-Dependent Natural Resources of the Great Lakes Basin.”

On December 13, 2005, the Great Lakes Governors and Premiers signed the Great Lakes—St. Lawrence River Basin Sustainable Water Resources Agreement (Agreement). At the same time, the Governors endorsed the companion Great Lakes—St. Lawrence River Basin Water Resources Compact (Compact) which became law on December 8, 2008. These agreements, developed through the Council of Great Lakes Governors, detail how the States and Provinces will manage and protect the Basin and provide a framework for each State and Province to enact measures for its protection.

The objectives of this Agreement are:

- To act together to protect, conserve and restore the Waters of the Great Lakes—St. Lawrence River Basin because current lack of scientific certainty should not be used as a reason for postponing measures to protect the Basin Ecosystem
- To facilitate collaborative approaches to Water management across the Basin to protect, conserve, restore, improve and efficiently and effectively manage the Waters and Water Dependent Natural Resources of the Basin

- To promote co-operation among the Parties by providing common and regional mechanisms to evaluate Proposals to Withdraw Water
- To create a co-operative arrangement regarding Water management that provides tools for shared future challenges
- To retain State and Provincial authority within the Basin under appropriate arrangements for intergovernmental cooperation and consultation
- To facilitate the exchange of data, strengthen the scientific information upon which decisions are made, and engage in consultation on the potential effects of Withdrawals and losses on the Waters and Water Dependent Natural Resources of the Basin
- To prevent significant adverse impacts of Withdrawals and losses on the Basin Ecosystem and its watersheds
- To promote an Adaptive Management approach to the conservation and management of Basin Water resources, which recognizes, considers and provides adjustments for the uncertainties in, and evolution of, scientific knowledge concerning the Basin's Waters and Water Dependent Natural Resources

Through the Council of Great Lakes Governors, the Governors of Illinois, Indiana, Michigan, Minnesota, New York, Ohio, Pennsylvania and Wisconsin, and the Premiers of Ontario and Québec are taking the lead in protecting the Great Lakes and St. Lawrence River Basin. The Great Lakes Governors and Premiers stated that:

- There are threats to the Basin now, and they could increase in the future. We are looking ahead and taking protective steps to avoid conflicts and shortages.
- The Great Lakes and St. Lawrence River Basin is critical to our economy. We must use the water wisely to help ensure that it remains at healthy levels and to maintain our region's competitive economic advantage.

In April 2009, the Council of Great Lakes Governors launched the Great Lakes Water Resource Managers Initiative. As part of this initiative, a tool for assessing any water withdrawal was developed. The Water Withdrawal Assessment Tool (WWAT) was designed to estimate the likely impact of a water withdrawal on nearby streams and rivers. Use of the WWAT is required of anyone proposing to make a new or increased large quantity withdrawal (over 70 gallons per minute) from the waters of the state, including all groundwater and surface water sources, prior to beginning the withdrawal. The tool is available at <http://www.miwwat.org/>. The initiative also requires the development of water conservation and efficiency goals and objectives. This program may be either voluntary or mandatory. Additional information for assessing individual and cumulative impacts of water uses is available in the Resource Kit at: <http://wrmitoolkit.cglg.org/>

The withdrawal legislation could potentially impact DWSD if a source water intake was removed from use. Any formal decrease in water withdrawal capacity would be difficult to reverse in the future. A return to the former withdrawal allowance would require assessment and permission from the Great

Lakes Compact. Therefore it is recommended that DWSD retain all of the existing three intakes as operational and that withdrawal rated capacity be maintained.

2.2.2 Canadian Source Water Protection Program

DWSD's Fighting Island intake lies within Canadian waters. While the Belle Isle intake is in US waters, based on its protection area, potential contamination from Canadian activities could occur.

Jurisdiction for development of a SWAP and SWIPP remain with MDEQ (Brock Howard, personal communication, 2013). However, maintenance and repair activities should be communicated and approved by Ontario Ministry of the Environment. Further, it should be recognized that Canadian land uses and activities have the potential to impact water drawn from this intake. Therefore understanding the Canadian source water protection program is important.

Ontario's source water program is similar to the Michigan program. Ontario requirements are:

- Establishment of an intake protection zone
- Evaluation of the vulnerable areas of the intake protection zone
- Identification of existing and potential future land use activities that could be threats to source water quality
- Evaluation of water quality issues
- Evaluation of water quantity for inland watersheds and groundwater systems

It should be noted that Ontario's source water protection program is required whereas Michigan's is voluntary. Also, Ontario's program places emphasis on water usage and withdrawals.

The Canadian source water program is managed by the Province of Ontario. Proposed SWAPs have been developed for the entire Province (**Figure 2-10**). The source water protection area that could impact DWSD's intake in the Essex Region is shown in **Figure 2-11**. The predominant land use in this region is agricultural (**Figure 2-12**). Population is low in much of the area except for Windsor (**Figure 2-13**). Water quality of the streams and lakeshore areas is "generally poor, particularly in terms of nutrient, turbidity and E. coli" (Assessment Report – Essex Region Source Protection Area, 2011).