

Appendix A: References and Data Sources

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Additional Online Data Sources and Tools (Accessed by GLC in June 2017)

1. **Bank of Canada,** [Currency Converter](#)
2. **Government of Canada,** [Québec Sectoral Profile 2015-2017: Mining, Quarry Operations and Oil and Gas Extraction](#)
3. **Statistics Canada**
 - [Provincial Population Data](#)
 - [Tourism employment Data](#)
 - [Average weekly earnings \(including overtime\), by industry, monthly \(Ontario\)](#)
 - [Average weekly earnings \(including overtime\), by industry, monthly \(Québec\)](#)

Appendix A: References and Data Sources

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- [Average hourly wages of employees by selected characteristics and occupation, unadjusted data, by province \(monthly\)](#)
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- 5. **Emploi Québec**, [Agricultural service contractors, farm supervisors and specialized livestock workers \(NOC 8252\): Wages and statistics](#)

- 6. **U.S. Department of Labor-Bureau of Labor Statistics**
 - [CPI Inflation Calculator](#)
 - [2016 Occupational Employment Statistics](#)
 - [Quarterly Census of Employment and Wages](#)
- 7. **U.S. Census Bureau**, [U.S. State Populations for 2011 and 2012.](#)
- 8. **U.S. Department of Commerce- Bureau of Economic Analysis**, [State-level GDP](#)
- 9. **New York State, Environmental Facilities Corporation**, [Homepage](#)

Appendix B: Methods for Figures and Data

Figure 1: Total 20-Year Binational (CWIS) Needs

Total CWIS needs for each of the eight U.S. states were determined by aggregating data from the 2015 U.S. EPA Drinking Water Infrastructure Needs Survey (2013) and Clean Watersheds Needs Survey (2016). Data reflects needs over the next 20 years. All monetary values have been converted to 2016 dollars using the Bureau of Labor Statistics' inflation adjustment calculator.

Total CWIS needs for the two Canadian provinces were determined using data from the 2016 Canadian Infrastructure Report Card (Reference #42). The replacement costs for drinking, storm, and wastewater infrastructure classified in the report as being in "poor or very poor" or "fair" condition was used as a proxy for the 20-year needs values. Since data in this report represents the entire nation of Canada, GLC staff divided the populations of Ontario and Québec by the national population, and multiplied the needs estimates presented in the report by the resulting fraction of the Canadian population living in each of the Great Lakes provinces. Population data for 2016 was sourced from the Statistics Canada website. Canadian dollars were converted into USD using the exchange rate at the time of this study (**CAD\$ 1 = \$0.758 USD**).

Table 1 and Figure 2: Jobs and Wages Dependent on CWIS

The list of Great Lakes dependent industries was determined based on a 2011 Michigan Sea Grant report on Great Lakes jobs (Reference #22). While this report calculated the total wages and employment generated from all jobs within the Great Lakes basin that are directly dependent on CWIS for their daily operations, this Action Plan expanded the scope of these calculations to include jobs within the entire footprint of the Great Lakes states and provinces. Annual wages and employment data was culled from several provincial and federal online databases (from the U.S. and Canada) listed in Appendix A.

Figure 3: Projected Annual Investment Gap for CWIS in the Great Lakes States

The annual gap projection presented in this figure is the difference between estimated annual CWIS needs, based on a 20-year projected need, and total annual funding levels in 2016. Data for 2016 funding levels in Michigan, Ohio, and Illinois was supplied directly by CWIS Working Group members representing those jurisdictions. Data for the remaining jurisdictions was culled from recent state-specific reports when possible. When such data could not be identified, funding values were determined based on publicly available U.S. EPA DWSRF and CWSRF online data.

Annual state funding levels and data sources for CWIS projects are summarized in the following table. These values represent the best available data, and may not represent the entirety of a state's CWIS funding allocations.

2016 ANNUAL FUNDING ALLOCATION FOR CWIS BY STATE		
State	Total Funding	Source(s)
Pennsylvania	\$251,700,000	PENNVEST 2015-2016 Annual Report (Appendix A: Reference #34)
Ohio	\$756,000,000	Data provided from Working Group Member
Illinois	\$900,000,000	Data provided from Working Group Member
Wisconsin	\$305,550,000	Wisconsin Legislative Fiscal Bureau, Environmental Improvement Fund: Informational Paper 68, 2015 (Appendix A: Reference #58)
Michigan	\$1,177,000,000	Data provided from Working Group Member
New York	\$225,000,000	New York State Environmental Facilities Corporation (Appendix A: Additional Online Data Sources #9)
Minnesota	\$165,974,669	Minnesota Public Facilities Authority 2016 Annual Report (Appendix A: Reference #25)
Indiana	\$454,106,000	DWSRF + USDA RD Funds + CWSRF
Total Great Lakes State Funding	\$4,235,330,669	

For this projection, annual funding amounts were assumed to remain static at 2016 levels for the entire 20-year period of the projection. The orange portion of the column represents annual funding, and does not change from year to year. The investment gap is represented by the blue portion of the column. Total annual needs for all Great Lakes states is represented by the combination of the orange and blue sections of each column.

The value for the annual need in year 1 (2016) was determined by dividing the 20-year needs presented in Figure 1 by 20. The value for annual needs in years 2 (2017) and 3 (2018) were determined with the following formulas:

$$2017 \text{ Annual Needs} = \frac{(Total \ 20 \ year \ Needs - Annual \ Funding * 1)}{(20 - 1) \ years}$$

$$2018 \text{ Annual Needs} = \frac{(Total \ 20 \ year \ Needs - Annual \ Funding * 2)}{(20 - 2) \ years}$$

This pattern continued each subsequent year through 2035 (the final year of the projection). The two Great Lakes provinces were not included in this projection, since Canada is expected to eliminate their CWIS investment gap by 2030 (see Reference #20).

Additional Calculations

20-year Per Capita CWIS Needs

Per capita estimates were developed by dividing total state or provincial needs by the population of each state or province. State population estimates come from the United States Census Bureau for the years the needs estimates surveys were taken (2011 and 2012).

Combined Sewage Systems and Separated Sewer Systems

Percent of Great Lakes basin that relies on CSOs and SSOs: Population was considered the “Present Receiving Collection” field in the [CWNS Access database](#). Only systems within the Great Lakes basin (HUC 2 = 04) were used. Facilities considered CSOs were determined using the “Facility Type” field and selecting all collection facilities classified as “combined sewers” or “separate sewers.”