

Report on State and Provincial Water Use and Conservation Programs in the Great Lakes-St. Lawrence Basin

Prepared for: Water Withdrawal and Use Subcommittee, Project Management Team
Toward a Water Resources Management Decision Support System for the Great Lakes

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Executive Summary

This report examines the water withdrawal and use, water withdrawal and use reporting, and water conservation programs of the eight states and two provinces that form the Great Lakes-St. Lawrence Basin. Water use programs and their oversight vary greatly across the ten jurisdictions. In the U.S. a single agency oversees all water use programs in some states while multiple agencies are involved in water use programs in other states. The Canadian provinces have relatively more complex programs because municipalities hold some powers over water use, which multiplies the number of approaches taken.

Water use reporting programs also vary for the jurisdictions. Most states use either a water withdrawal registration program or a permitting program that allows for data collection on users of 100,000 gallons per day of water. Several jurisdictions go beyond the minimal requirements and collect data on facilities capable of withdrawing 100,000 gallon per day or that have lower usage rates. The survey results suggest that permitting programs ensure data collection in a more effective and timely manner than registration programs. The Canadian provinces do not have a standardized collection process, but some data may be collected at various levels. Most jurisdictions collect data on both surface and groundwater withdrawals, but

the programs in Illinois and Pennsylvania focus on surface water. Data is composed of estimates by the states or provinces themselves and estimates or measurements done by facilities. The assumption is that direct measurement is the most accurate approach to gathering data. Generally, water use categories in which the greatest amount of use occurs are the same categories that are more highly measured. The states and provinces report consumptive use based on facility measurements, facility estimates or jurisdiction estimates. Jurisdiction estimates are most common and involve multiplying withdrawal quantities by a water use category coefficient. States and provinces have difficulty collecting all the data they need if they have not received statutory or regulatory power to enforce registration or permitting processes. In any case, the resources for managing water use reporting programs often are scarce and must be stretched to get the most accurate data possible.

Water conservation is used in many jurisdictions to ensure the availability of adequate water supplies. In Illinois, conservation is required as part of the Supreme Court mandate that governs water withdrawals from Lake Michigan. Conservation efforts in most other jurisdictions are less formal, but several of them require or encourage water suppliers

to develop plans. Conservation also occurs at local levels, particularly in the provinces. Water conservation measures include use of low-flow plumbing fixtures, metering, outdoor water use restrictions, reports on water use and unaccounted-for flow, publicity and consumer education, rate structures, wellhead protection plans, and leak detection and repair. Several jurisdictions also have drought contingency plans in place. In most cases, the plan includes a tiered approach where increased drought severity progressively leads to a drought emergency declaration with mandatory reductions in water use. A few jurisdictions have no drought contingency plan.

The states and provinces of the Great Lakes basin have several areas where improvement can occur. Each jurisdiction should determine goals for improvement and determine how resources can be leveraged to reach these goals. To improve water use reporting, each jurisdiction needs to ensure that the most accurate information possible is provided for each water use category. Water conservation, drought contingency plans, and demand forecasting are areas that jurisdictions must consider improving to ensure availability of adequate water resources into the future.

Figure 1: Map of the Great Lakes-St. Lawrence Basin and Jurisdictional Boundaries



U.S. Army Corps of Engineers, Detroit District

Map available at <http://www.great-lakes.net/gis/maps/> (18 Jan 2002)

Introduction

Each state and province in the Great Lakes region has a unique approach to managing and implementing its water use and conservation programs. This variety of approaches can complicate the development of uniform regional management, called for under the Great Lakes Charter of 1985. The purpose of this report is to provide an overview of the various water use, water use reporting, and water conservation programs within each state and province so identified gaps and needs can begin to be addressed through future work and collaborative efforts.

To gather information on the variety of existing programs, a multi-part survey was distributed to members of the Water Withdrawal and Use technical subcommittee (TSC) of the Great Lakes Commission's Water Resources Management Decision Support System (WRMDSS) project, supported by the Great Lakes Protection Fund, of Evanston, IL. This survey was distributed in August of 2001. Each subcommittee member represents the agency involved with water supply management and water use reporting, and each state and province is represented on the subcommittee. The survey included information on water conservation, water use, water use reporting programs, staffing and budget. In cases where multiple agencies are involved with different aspects of these programs, members of the subcommittee consulted with other agencies to develop appropriate responses. Additional revisions

were made to earlier drafts of this written report based on the input of the states and provinces.

The following description of the water use, water use reporting, water conservation and drought contingency plans for each jurisdiction shows the region's diversity of approaches as well as some common trends. For example, the Great Lakes states generally provide water use reporting for all facilities that use 100,000 gallons per day or more.¹ However, some states expand the data collected by requiring reports for facilities that use less water or have a given capacity to withdraw water. Most jurisdictions collect data on both surface and groundwater withdrawals, but the programs in Illinois and Pennsylvania focus on surface water.

Conservation measures vary widely by state or province, and the states have drought contingency plans, but most are not involved in formal conservation measures. Very little demand forecasting is done, but Illinois and Pennsylvania provide periodic updates and some other jurisdictions take on this work sporadically. Overall, the Great Lakes provinces take a different approach to both water use reporting and

¹ This is the reporting level agreed to in the Great Lakes Charter. The Charter also included stipulations that consumptive uses or diversions in excess of 2 million gallons per day would be managed and regulated. Illinois, Minnesota, Ontario and Wisconsin have permitting processes at or below this level. New York has additional reporting requirements at this level.

water conservation: these activities are not as centralized within specific agencies and often are complemented by efforts at the local level.

In the following report, each state or province is examined individually for its overall water use approach, water use reporting program, water conservation, drought contingency planning, and demand forecasting. This organization allows for comparison between jurisdictions. Comparisons are also made among all jurisdictions in the conclusion. However, accurate comparisons are difficult since the information presented is based on the in-basin portions of a state or province's programs, and the amount of geographic area within the basin varies widely among jurisdictions. The map on the preceding page shows how much of the Great Lakes basin falls within each state and province.

A set of tables throughout the report provides jurisdictional summaries of agencies, authority, and other items for the individual water use reporting programs. Within this introduction, Tables 1 to 4 provide overall summaries. Tables 1 and 2 provide information on water use reporting programs and related authorities. Table 3 outlines water conservation programs. Table 4, which is drawn from the WRMDSS project's briefing paper on consumptive use, provides a good overview of this topic.

Table 1: Summary of All Jurisdictions' Overall Water Use Reporting Programs, January 1, 1998

Jurisdiction	Agencies Involved (lead agency in bold)	Authorizing Laws/Regulations	Permit/ Registration (all water sources unless specified)	Public Participation in Permit Process	Total Principal Facilities	Percent Principal Facilities Reporting	Data Reporting Frequency	Data Compilation Methods	Consumptive Use Compilation Methods	Specificity of Primary Data to G.L. Basin	Consistent with G.L. Charter	Funding	Staffing
Illinois	Department of Natural Resources ; State Water Survey	Level of Lake Michigan Act; Regulation Title 17 Chapter I (h), Part 3730; Voluntary Survey	Permits for Lake Michigan allocations (surface water)	Public hearings held for applications	33	N/A	Annual/Monthly	Facility measured	N/A (all water consumed)	Yes	Yes	\$80,000 (70 DNR, 10 Survey) (G.L. Basin)	1.35 FTEs (1 DNR, 0.35 Survey) (G.L. Basin)
Indiana	Department of Natural Resources	Indiana Code 14-25-7: Water Resource Management Act	Registration for more than 100,000 g/day capacity	None	540	100	Annual	Facility/state measured or estimated	State estimated	No	Mostly	\$10,000 (estimate) (G.L. Basin)	0.2 FTEs (G.L. Basin)
Michigan	Department of Environmental Quality	Public Act 451 of 1994, Part 327 Public Act 399 of 1976, Part 15	Registration for public supply, some 100,000 g/day capacity	None	2,221	Nearly 100	Annual	Facility/state measured or estimated	Facility/state estimated	Yes	Mostly	\$53,000 (annual fees) (G.L. Basin)	0.9 FTEs (G.L. Basin)
Minnesota	Department of Natural Resources	Statute 103G.265 to 103G.315; Rules 6115.0600 to 6115.0810	Permits for use of more than 10,000 g/day or 1 million g/year	Local units given 30 days for comments	118	Nearly 100	Annual with monthly data	Facility measured	State estimated	No	Yes	From State General Fund	0.4 FTEs (G.L. Basin)
New York	NYS Department of Environmental Conservation ; USGS; ACOE; NYSDOH	NYSECL 15-1609 and 15-1501, NYCRR Parts 675 and 601	Reg. for more than 100,000 g/day use; public supply permits	Water Supply Permit Program only	641	N/A	Annual/Biennial	Measured or estimated	Measured or estimated	Partially	Mostly	\$35,367 (G.L. Basin)	0.65 FTEs (G.L. Basin)
Ohio	Department of Natural Resources, Division of Water	Ohio Revised Code Sections 1521.15 and 1521.16	Registration for more than 100,000 g/day capacity	None	262	100	Annual	Measured and estimated	State estimated and facility measured	No	Yes	\$19,410 (G.L. Basin)	0.3 FTEs (G.L. Basin)
Ontario	Ministry of Natural Resources ; Ministry of Environment and Energy; Env't Canada	Ont. Water Res. Act: Sect. 34; Water Transfer and Taking Reg. 285/99. Other regs. may influence takings.	Permits for use of more than 50,000 L/day	Applications web posted for 30 days. Public can appeal decisions.	2,827	N/A	N/A	Measured and estimated	Province est. and facility measured (industrial)	Partially	Mostly	No specific, stable funding	1 FTE (G.L. Basin)
Pennsylvania	Department of Env'tal Protection's Bureau of Watershed Management	Chapter 109.701 (b) Rules and Regulations; Administrative Code Section 1904-A(3)	Surface withdrawal permits for public supply	Public comment for public supply	26	N/A	Annual	Facility estimated or measured	State estimated/fac. est. or measured	Yes	Mostly	\$6,700 (G.L. Basin)	0.1 FTEs (G.L. Basin)
Québec	Municipalities; Ministry of Agriculture and Fisheries; Industry; Hydro-Québec	Ministry of the Environment; Watercourses Act; Environment Quality Act; other ministries	Permit needed for public supply	Municipality gives public supply comments	171	70-100	When requested	Facility measured (industrial, electric only)	N/A (no systematic mechanism)	Only for hydro	No	\$0	0 FTEs
Wisconsin	Department of Natural Resources	State Statute 281.35; Natural Resources 142, Administrative Code	Registration for more than 100,000 g/day use	None	414	100	Annual	Facility measured or estimated	Facility estimated	Yes	Yes	\$14,000 (state-wide)	0.2 FTEs (state-wide)

*See appendix for description of categories used in this table.

Table 2: Summary Characterization of Water Use Permitting, Registration, and Reporting Programs

Jurisdiction	Characteristic	Water Use Category								
		Public Supply	Self-Supply Domestic	Self-Supply Irrigation	Self-Supply Livestock	Self-Supply Industrial	Self-Supply Thermolectric	Self-Supply Nuclear	Hydroelectric	Other
Illinois	Permit/Req.	Permit		N/A		Permit		N/A		Permit
	Water Source	Surface		-		Surface		-		Surface
	Threshold	All		-		All		-		All
	Capacity/Use	All		-		All		-		All
	Req'd Reporting	Yes		-		Yes		-		Yes
	Data Source	Permit program		No existing uses		Permit program		No existing uses		Permit program
Indiana	Permit/Req.	Registration						N/A	None	Registration
	Water Source	All						-	-	All
	Threshold	100,000 g/day						-	-	100,000 g/day
	Capacity/Use	Facility capacity						-	-	Facility capacity
	Req'd Reporting	Yes						-	-	Yes
	Data Source	Registration program						No existing uses	Volunt. reporting	Reg. program
Michigan	Permit/Req.	Registration	None	None	None	Registration			None	
	Water Source	All	-	-	-	All			-	
	Threshold	All	-	-	-	100,000 g/day			-	
	Capacity/Use	All	-	-	-	Facility capacity			-	
	Req'd Reporting	Yes	-	-	-	Yes			-	
	Data Source	Reg. program	Not reported	Modelling	Not reported	Registration program			Not reported	
Minnesota	Permit/Req.	Permit ¹								
	Water Source	All								
	Threshold	10,000 g/day or 1 million g/yr.								
	Capacity/Use	Actual use								
	Req'd Reporting	Yes								
	Data Source	Permit program								
New York	Permit/Req.	Permit				Registration			None	Registration
	Water Source	All				All			-	All
	Threshold	All				100,000 g/day			-	100,000 g/day
	Capacity/Use	All				Actual use			-	Actual use
	Req'd Reporting	No				Yes			-	Yes
	Data Source	Est. with permits				Registration program			Power agencies	Reg. program
Ohio	Permit/Req.	Registration								
	Water Source	All								
	Threshold	100,000 g/day								
	Capacity/Use	Facility capacity								
	Req'd Reporting	Yes								
	Data Source	Registration program								
Ontario	Permit/Req.	Permit	Permit ²	None	None	Permit		Permit		
	Water Source	All	All	-	-	All		All		
	Threshold	50,000 L/day	50,000 L/day	-	-	50,000 L/day		50,000 L/day		
	Capacity/Use	Allowable use	Allowable use	-	-	Allowable use		Allowable use		
	Req'd Reporting	No	No	-	-	No		No		
	Data Source	Federal survey	Federal census	Federal census	Federal census	Federal survey		Voluntary reporting		
Pennsylvania	Permit/Req.	Permit	None	None	None	None		N/A	None	
	Water Source	Surface	-	-	-	-		-	-	
	Threshold	All	-	-	-	-		-	-	
	Capacity/Use	All	-	-	-	-		-	-	
	Req'd Reporting	Yes	-	-	-	-		-	-	
	Data Source	Permit program	State estimated	Volunt. reporting	Not reported	Volunt. reporting		No existing uses	Not reported	
Quebec	Permit/Req.	Permit	None			None	None	N/A	None	N/A
	Water Source	All	-			-	-	-	-	-
	Threshold	All	-			-	-	-	-	-
	Capacity/Use	All	-			-	-	-	-	-
	Req'd Reporting	No	-			-	-	-	-	-
	Data Source	Prov. estimated	Province estimated			Env. Canada	Hydro-Quebec	No existing uses	Hydro-Quebec	No existing uses
Wisconsin	Permit/Req.	Approval ³	Approval/Req. ³	App/Reg Permit	Permit	Approval/Registration ³				
	Water Source	All	All	gwater swater	All	All				
	Threshold	All	100,000 g/day	100,000	All	100,000 g/day				
	Capacity/Use	All	Facility capacity	Fac. cap	All	Facility capacity				
	Req'd Reporting	Yes	Yes	Yes No	Yes	Yes				
	Data Source	Approval	Approval/Req.	App/Req Volunt.	Volunt.	Approval/Registration				

KEY TO CHARACTERISTICS

Permit/Reg.: Does the jurisdiction have a water use permitting or registration program? If neither, the box for the category is marked "None" for no program or "N/A" for no existing uses and the next four categories are left blank.

Water Source: What water sources (i.e., groundwater, surface water, all) are included in the program?

Threshold: What is the use threshold for inclusion in the program?

Capacity/Use: Does the threshold apply to facility capacity, actual use, or allowable use? If the threshold applies to all uses, "All" is repeated.

Req'd Reporting: Is water use reporting required under the permit or registration program?

Data Source: What is the source of water use data for the 1998 Great Lakes Regional Water Use Data Base?

NOTES

¹ The hydropower category of Minnesota's water use permitting program only covers facilities that divert water out of the river channel. Currently, all Minnesota hydroelectric water uses in the Great Lakes watershed are in the river channel, so reporting comes from FERC licensed operators.

² Permits for the self-supply domestic category do not include individual residential use.

³ Wisconsin has an approval process for many water uses that goes beyond registration but is not a complete permitting process.

Table 3: Summary of All Jurisdictions' Water Conservation Programs, January 1, 1998

Jurisdiction	Conservation Program	Local Conservation Efforts	Drought Contingency Plan	Demand Forecasting
Illinois	For Lake Michigan water, conservation required and outdoor rules apply during growing season. System owners and end users both required to conserve. Promotion through printed materials. Permittees cannot exceed unaccounted-for-flow of 8 percent.	Municipal permittees have adopted ordinances and building codes requiring conservation.	None, but individual plans encouraged for permitted users. Governor's Drought Task Force discusses drought conditions.	Department of Natural Resources conducts every 8-10 years for a 20-40 year period.
Indiana	None, except during drought.	Local governments support conservation efforts during drought.	Three water shortage phases used with recommendations for action. First phases use voluntary reductions and public outreach. Phase III uses mandatory restrictions. Water Shortage Task Force can be formed to advise the governor.	None
Michigan	None	Individual municipalities and local governments use drought measures as necessary.	None, but ad hoc interdepartmental task forces have been formed.	None
Minnesota	Permits require all users to be efficient. Public water suppliers and agricultural irrigators must have conservation plans.	Local demand management measures are required to obtain approvals for new municipal wells or increases in authorized water volumes.	Current plan specific to Mississippi River, but being updated to whole state. Public suppliers and surface water users must have contingency plans. Drought plan includes mandatory restrictions. Multi-agency/stakeholder task force implements the plan.	Done in Twin Cities Metro Area, but not statewide.
New York	Water suppliers required to have conservation programs. Goal to maintain unaccounted-for water below 15 percent. Publicity and consumer education efforts required.	Local entities may provide additional support.	State Drought Management Task Force recommends four different drought stages. The first two stages focus on voluntary reductions. The final two stages use mandatory restrictions.	None
Ohio	None, except during drought.	Local entities may provide additional support.	Four phases of drought are used. The second two phases use voluntary conservation and public education; phase four uses mandatory restrictions after governor declaration. Drought Executive Committee is activated in phase three.	Done periodically, most recently in 1986 and 1988.
Ontario	Provincial permitting program considers conservation. Planning laws and building code require conservation for new developments. Provincial education initiatives promote conservation.	Municipal may make conservation by-laws and are involved in education. Local stakeholders are leaders in low water conditions.	Three drought indicator levels used. First two levels are voluntary, and third is mandatory. Ontario Low Water Response Plan guides partnerships between local and provincial agencies. Local Water Response Teams develop conservation plans.	Done periodically. Current demand forecasting is part of comprehensive water use project.
Pennsylvania	Public water suppliers using surface water required to have conservation program. Various conservation efforts are used.	Local entities may provide additional support.	Three drought stages used. The first two stages have voluntary restrictions of various levels. The third stage may also include mandatory restrictions. Water suppliers and commercial and industrial users required to have drought plans.	Done for public water supply systems on 5-10 year basis.
Québec	None, but provincial ministries provide financial support to local efforts and NGOs. The organization RÉSEAU-Environment promotes conservation through a variety of methods.	A range of conservation occurs at local scale, including infrastructure replacement, restrictions on water use, and education programs.	None	None
Wisconsin	None, but conservation plans recommended as part of wellhead protection plans (required for municipal wells). System losses regulated by Public Service Commission. Plumbing flows regulated by Department of Commerce.	Local entities may provide additional support.	Declaration determines the presence of drought emergency. Formal plan, stages not used. Mandatory restrictions imposed with declaration of drought emergency.	None

Table 4: State/Provincial Consumptive Use Reporting and Information

Final Draft June 27, 2002	Consumptive Use Reporting	Reporting Mechanism	Response rate for facilities that report consumptive use	Consumptive Use Estimates/ Calculations	Basis of Coefficient (e.g., statute, regulation, guidance)	Obstacles to Required Consumptive Use Reporting	Recommended Improvements	Notes
Illinois	Not required	None	N/A	N/A	N/A	Mandatory consumptive use reporting is not feasible	Detailed studies to compile accurate water budgets	Illinois has a water allocation permit program for all withdrawals from Lake Michigan. All (approximately 201) permittees under this program must annually report their water use, but not consumptive use. However, since none of this water is returned to the basin, under certain definitions, it could be considered consumptive. Water use data is measured by individual facilities.
Indiana	Not required	Water withdrawal registration form provided by state for all facilities that use more than 100,000 gal/day. Registration form includes return flow, which could be used to calculate consumptive use, but is not. Annual withdrawal report form does not request consumptive use data.	Only a small percentage of facilities report return flow.	State estimates consumptive use based on withdrawal data multiplied by established coefficients for each water use category. Withdrawal data is either facility measured or estimated except for those facilities with more than 100,000 gal/day capacity	Consensus of Technical Work Group of a Great Lakes Commission Water Resources Management Committee in late 1980s	Lack of technical information/data to adequately support specific coefficients for each user type; new legislation required; significant state monies and personnel to ensure data collection and accuracy that does not match potential benefits.	Continue to apply existing coefficients to withdrawal measurements or estimates. Conduct field research by water use category to determine whether coefficients are appropriate.	Hydroelectric power is an instream use and is assumed to result in zero consumptive use for all jurisdictions
Michigan	Required for thermoelectric power and self-supplied industrial categories only.	Annual water withdrawal reports required for facilities that have the capacity to withdraw over 100,000 gal/30days (Public Act 451 of 1994)	Approx. 90 percent response rate for thermoelectric. Approx 30 percent response rate for self-supplied industrial.	Facility estimates consumptive use for thermoelectric and self-supplied industrial categories based on facility estimates and measurements. State estimates consumptive use for other categories based on facility-measured withdrawal data (public supply and nuclear) and estimates for all other categories multiplied by established coefficients	USGS and Great Lakes Commission guidance as well as regional consultation with Michigan State University agricultural experts	Uncertainties over facility data and reporting accuracy	Evaluate possible regulatory requirements to more accurately measure or estimate consumptive use, including state/regional guidance and site specific (facility) research	Need more research to establish more accurate consumptive use measurement methodologies and rates. USGS, USDA and Universities are good choices for conducting such research.
Minnesota	Not required	Annual water use reports with monthly data required as part of state water appropriation permit program; applies to all users with withdrawals exceeding 10,000 gal/day. (State statute 103G255-315)	N/A	State estimates consumptive use based on facility-measured withdrawal data multiplied by established coefficients for each water use category.	Unknown	State has authority to require consumptive use reporting, but it is not a policy priority.	Great Lakes jurisdictions should develop coefficients for each water withdrawal category that all jurisdictions can agree upon.	State statutory definition of consumptive use is water that is taken from a source and not immediately returned to that source. As such, all groundwater withdrawals are considered 100% consumptive. This definition is very different from the definition used by the GLC and USGS.
New York	Not required, but is done voluntarily by registered water users	Biennial water withdrawal reports include water consumed, which could be used by state, but is not due to concerns over accuracy. Reports required for registered users that withdraw over 100,000 gal/day. Self-supply irrigation reports 1/yr. Public water supply is subject to the state permit program and does not report.	Nearly 100% of registrants report consumptive use.	State estimates consumptive use using established coefficients multiplied by water withdrawal data. Water withdrawal data is either facility measured or estimated	Past USGS and GLC guidance	Mandatory consumptive use reporting is not feasible; unreliability over facility reported data accuracy	Great Lakes jurisdictions should develop coefficients for each water withdrawal category that all jurisdictions can agree upon.	
Ohio	Not required, but is done voluntarily by nuclear and thermoelectric power supply users.	Annual water withdrawal reports required for facilities that have the capacity to withdraw over 100,000 gal/day (1521.56 Oh Revised Code). Reports include return flow info, but state does not use this information to estimate consumptive use due to concerns over data accuracy.	Approx. 100% of nuclear and thermoelectric users report their consumptive use.	Facilities measure consumptive use for nuclear and thermoelectric power. Methodology of this measurement procedure is unknown. State estimates consumptive use using established coefficients multiplied by water withdrawal data. Water withdrawal data is either facility measured or estimated	Consensus of Technical Work Group of a Great Lakes Commission Water Resources Management Committee in late 1980s	Uncertainties over accuracy of facility data and reporting accuracy; lack of agreement of what constitutes consumptive use and how to estimate/measure it	Need basin-wide method for estimating consumptive uses; assumptions about water losses need to be reassessed; provide users with opportunity to demonstrate alternate methods of measuring/estimating consumptive use for incorporation into policy	Coefficients used for nuclear and thermoelectric power generation were provided by utilities.
Ontario	Not required; measurements done voluntarily by many industrial facilities	Industrial water use data is collected through federal surveys every 5 yrs.	From 68% to 80% depending on industry. Of those respond to survey, nearly 100% report consumptive use	Province estimates consumptive use for all categories except industrial and "other."	Coefficients are consistent with Water Use in Ontario, 1991 and 1996 by Harris and Tate. Public supply and domestic coefficients consistent those used by GL states and are thought to represent well-run systems. Irrigation coefficient is based on a Ministry of Food and Ag. study. Power generation coefficients are based on thermal power sections of the Environment Canada industrial water use survey.	Mandatory reporting would significantly increase actual reporting of consumptive use, but cannot guarantee quality of information reported; may result in facilities estimating consumptive use which may not be substantially more reliable than coefficients used by the Province.	Improved coefficients and better water use data more valuable than mandatory reporting. Certain water use categories (e.g., industrial, irrigation) would benefit from developing sub-categories to provide further detail. Such subcategories would have their own coefficients. Need to work with facilities to develop improved coefficients for such subcategories.	Consumptive use information could be improved by improving the quality of coefficients and requiring detailed water use reporting. Consumptive use should account for the quality of discharged water. Where discharges are severely degraded, the water discharged may effectively be "lost to the watershed" due to quality concerns. Current definitions of consumptive use do not consider such losses.
Pennsylvania	Not required, but is done voluntarily by nuclear, thermoelectric, hydroelectric and self-supply industrial users.	Annual water use reports required for public water supply using more than 100,000 gal/day and for bottled, vended, retail and bulk water users (Chapter 109 PA Rules) do not require consumptive use. State rules provide for other users to report withdrawals, but this is not enforced.	Unknown	Unknown for users that report consumptive use (thermoelectric, industrial, hydroelectric and nuclear). State estimates public supply, self-supply domestic, irrigation and livestock using established coefficients.	Unknown	Requiring facilities to report not likely to improve understanding of consumptive use	Comprehensive survey of PA use/return of Great Lakes basin water.	
Quebec	Not required	None	N/A	N/A	N/A	Uncertainties over accuracy of facility data and reporting accuracy; lack of agreement of what constitutes consumptive use and how to estimate/measure it	Need basin-wide method for estimating consumptive uses.	
Wisconsin	Required for all water withdrawal categories	Annual water reports required for all nine user categories (Wisconsin statute NR 142).	Very low	Facilities estimate consumptive use using state-mandated coefficients for irrigation, livestock, and industrial categories. Facilities for other categories estimate consumptive use using coefficients they have established pursuant to NR 142 or state mandated coefficient. Facilities that establish own coefficients provide methodology to the state.	State statute (NR 142)	Compliance very low and no enforcement for non-compliance; no reporting requirement for domestic self-supply, which is inherently difficult to measure. Users have not understood law; feared higher consumption reporting would lead to greater regulation and/or fines. In most cases, the state has developed generic coefficients using figures based on the best available knowledge (e.g., USGS and GLC coefficients).	Accurate measurements and/or metering of water withdrawals is a necessary precursor to calculating consumptive use. Mandated consumptive use reporting is set up to fail without established and reliable methods for measuring and reporting water withdrawals.	NR 142 was a response to the 1985 Great Lakes Charter, but the law was confusing for users and agency personnel. Due to costs of compliance and enforcement as well as scientific uncertainties, mandated consumptive use reporting is not an efficient use of public resources. Absent hard data or scientific studies, existing consumptive use coefficients become the only and best option for calculating consumptive use.

Based on Great Lakes Commission Consumptive Use Survey, 2002.

Prepared by Victoria Pebbles, Great Lakes Commission

Illinois

Water Use

Based on the state's "Level of Lake Michigan Act," the Illinois Department of Natural Resources, Office of Water Resources (DNR) is the agency that controls and regulates water coming from Lake Michigan for all purposes. This agency administers regulatory programs dealing with construction in a variety of water bodies and takes the lead on water resources planning, navigation, and floodplain management. The agency is also involved in interagency activities on the state water plan, drought response, flood emergencies and state water law review.

The Lake Michigan Management Section manages Illinois' interests relating to Lake Michigan and issues permits for activities affecting Lake Michigan and the allocation of Lake Michigan water. A 1967 U.S. Supreme Court Decree limits Illinois' diversion of water from Lake Michigan and the state's General Assembly has tasked the DNR with the allocation in the Level of Lake Michigan Act (615 ILCS 50). The DNR's administrative code, which outlines the process involved in issuing these permits is found in Title 17 Chapter I (h) Part 3730, "Allocation of Water from Lake Michigan." All entities desiring to divert water from Lake Michigan must have an allocation permit. In making allocation decisions, the agency looks at competing needs of all water users and makes decisions that will encourage efficient use and conservation of the resource.

To ensure fairness in decisions, the DNR identifies available water supply sources, performs long-range demand forecasting, and monitors water use and consumption. The DNR also holds public hearings for each water allocation application within 90 days of receiving the application. The DNR sends invitations to current permittees and the applicants, and posts announcements in area newspapers. In the event of an emergency, the DNR can grant an allocation as needed. If Lake Michigan water use occurs without a permit, the DNR can enforce penalty provisions and seek a court injunction to discontinue the use. However, this process is used rarely. If a permitted facility uses 15 percent more than its allocation in a year, the DNR can issue a notice of violation.

For water not coming from Lake Michigan (other surface water and groundwater), there is no allocation permit; however, permit conditions on the construction permit can include restrictions on withdrawals. Permits to drill wells can be issued, with no limits placed on quantity. Courts settle disputes over excessive use of water that reduces the amount available to others. The Illinois State Water Survey (ISWS) provides general research and service programs related to water and atmospheric resources. The ISWS is within the DNR's Office of Scientific Research and Analysis and is affiliated with the University of Illinois at Urbana-Champaign. The ISWS has no regulatory authority.

The DNR maintains a website that provides information on department water use programs, including allocation of Lake Michigan water (dnr.state.il.us/waterresources).

Water Use Reporting Program

The Lake Michigan Management Section of the Illinois DNR collects data for all entities that divert Lake Michigan water. There is no trigger level; all water systems diverting Lake Michigan water must have an allocation permit. The Lake Michigan Management Section receives monthly data from the 21 facilities that take water directly from Lake Michigan. All permittees (approximately 201) must report their water use annually. Water use is metered by each individual facility. The annual water use report provides information on how public supply water is used, including a breakdown of total water use into categories of residential, commercial/industrial, municipal, hydrant uses, unavoidable leakage and unaccounted-for-flow. Consumptive use reporting does not occur because no water withdrawn under the allocation program is returned to the basin, so it is entirely consumed. All data is specific to Lake Michigan, so it is also specific to the Great Lakes basin. The Lake Michigan Management Section has one staff member (1 full time equivalent (FTE)) responsible for processing the water use data. The section allocates about \$70,000 to the program and is remaining constant.

In addition to the data collection efforts for Lake Michigan water, the ISWS maintains the Illinois Water Inventory Program. This program monitors water use in the state through an annual voluntary questionnaire that targets all public water suppliers and industrial facilities using more than 70 gallons per minute. The ISWS breaks down information by both county and watershed. Data comes from a combination of facility reports and estimates about water use. The ISWS allocates \$10,000 in funding and has 3 staff with a total 0.35 FTE working on its statewide inventory program. The funding for this program has been decreasing, but efforts are underway to revitalize this important program.

Water Conservation

The State of Illinois and the Supreme Court decree that governs Illinois' Lake Michigan diversion direct the DNR to require efficient use and conservation of Lake Michigan water. Since water conservation requirements are part of the Lake Michigan water allocation permit, the DNR's Office of Water Resources oversees the program. Water conservation requirements are in effect the entire year, and outdoor water use rules apply during the growing season (May 15 - September 15).

The state's water conservation program requires conservation by the end user and the owners of water distribution systems. For end users, requirements include items such as metering of all new services, low-flow plumbing fixtures, lawn sprinkling restrictions and recycling on automatic car wash

facilities. All of the municipal permittees have adopted the required ordinances and building codes pertaining to water conservation, so there is no direct monitoring of these conservation efforts by the state. Distribution system owners, or permittees, report annually the amount of Lake Michigan water used along with the amount lost due to unaccounted-for-flow. If a permittee's unaccounted-for-flow exceeds 8 percent, a plan of action must be submitted explaining how unaccounted-for-flow will be brought below the 8 percent standard. In addition to these requirements, water conservation is promoted by a variety of pamphlets and booklets the DNR makes readily available.

Drought Contingency Plan

The DNR encourages all permittees to have an emergency water conservation plan in case of temporary failure of the lake water supply. However, the state has no drought contingency plan. Rather, a Governor's Drought Task Force discusses current situations affected by drought conditions and makes recommendations. The ISWS provides background natural resource information to help make necessary decisions.

Demand Forecasting

The DNR does demand forecasting every 8 to 10 years, at which time the long-term demands of all permittees is reevaluated for a 20 to 40 year period.

Table 5: Summary of Illinois' Water Use Reporting Program, January 1, 1998

Water Use Category	Agencies Involved	Authorizing Laws/Regulations	Permit/ Registration	Public Participation in Permit Process	Total Principal Facilities	Percent Principal Facilities Reporting	Data Reporting Frequency	Data Compilation Methods	Consumptive Use Compilation Methods	Specificity of Primary Data to G.L. Basin	Consistent with G.L. Charter	Funding	Staffing
Overall Program	Department of Natural Resources; State Water Survey	Level of Lake Michigan Act; Regulation Title 17 Chapter I (h), Part 3730; Voluntary Survey	Permits for Lake Michigan allocations (surface water)	Public hearings held for applications	33	N/A	Annual/Monthly	Facility measured	N/A (all water consumed)	Yes	Yes	\$80,000 (70 DNR, 10 Survey) (G.L. Basin)	1.35 FTEs (1 DNR, 0.35 Survey) (G.L. Basin)
Public Supply	Department of Natural Resources; State Water Survey	Level of Lake Michigan Act; Regulation Title 17 Part I (h), 3730	Permits for Lake Michigan allocations (surface water)	Public hearings held for applications	21	100	Annual	Facility measured	N/A	Yes	Yes		
Self-Supply Domestic	State Water Survey	Voluntary Survey	N/A	N/A	3	N/A	Annual	State estimated	N/A	Yes	Yes		
Self-Supply Irrigation	State Water Survey	N/A	N/A	N/A	0	N/A	N/A	N/A	N/A	N/A	N/A		
Self-Supply Livestock	State Water Survey	N/A	N/A	N/A	0	N/A	N/A	N/A	N/A	N/A	N/A		
Self-Supply Industrial	Department of Natural Resources; State Water Survey	Level of Lake Michigan Act; Voluntary Survey	Permits for Lake Michigan allocations (surface water)	Public hearings held for applications	5	100	Monthly and Annual	Facility measured	N/A	Yes	Yes		
Self-Supply Fossil Fuel	State Water Survey	Voluntary Survey	N/A	N/A	2	100	Annual	Facility measured	N/A	N/A	Yes		
Self-Supply Nuclear	State Water Survey	Voluntary Survey	N/A	N/A	1	100	Annual	Facility measured	N/A	N/A	Yes		
Hydroelectric	State Water Survey	N/A	N/A	N/A	0	N/A	N/A	N/A	N/A	N/A	N/A		
Other	Department of Natural Resources; State Water Survey	Level of Lake Michigan Act; Voluntary Survey	Permits for Lake Michigan allocations (surface water)	Public hearings held for applications	1	100	Monthly	Facility measured	N/A	N/A	Yes		

Indiana

Water Use

The Indiana Department of Natural Resources (DNR), Division of Water maintains, regulates, collects data on, and evaluates the state's water resources. The agency regulates construction affecting the state's waterways, provides planning services such as hydrologic modeling, and evaluates engineering structures. Indiana's Water Resource Management Act (Indiana Code 14-25-7), enacted in 1983, requires facilities of all water types with a withdrawal capacity of more than 100,000 gallons per day to register and file annual reports on water usage. This registration must occur within 3 months after the facility is completed. Indiana's programs are consistent with the requirements of the Great Lakes Charter except for the regulation of facilities associated with the operation or construction of landfills, which are exempt under state law. In most cases withdrawal permits are not required and there are no limits on the amount of water pumped. If an unregistered facility is identified, the DNR sends a notice requesting registration. After continued noncompliance, the DNR can issue a citation and a fine.

Water Use Reporting Program

The DNR collects annual data from the principal facilities for all of the categories used by the Great Lakes Regional Water Use Database except for self-supply nuclear since the state has no nuclear facilities. Principal facilities are defined as those withdrawing 100,000 U.S. gallons/day (380,000 liters/day)

averaged over a 30 day period. Authority for data collection comes from Indiana Code 14-25-7 for all of the categories but hydroelectric power generation. Indiana has four hydroelectric facilities, which provide the necessary data voluntarily. The DNR gathers data on a statewide basis, but extracts data specific to the Great Lakes basin.

All consumptive use reporting is estimated by the state based on water withdrawal data and coefficients established for each water use category. Facilities estimate their total water use for the categories of public supply, self-supply irrigation, self-supply thermoelectric (fossil fuel), and hydroelectric. Facilities measure and estimate water use data for the self-supply industrial and other categories, and the state estimates the majority of this data for self-supply domestic and self-supply livestock uses. The Indiana Business Research Center at Indiana University provides county population estimates that are used in calculating self-supplied domestic withdrawals and the USGS Water Resource Division estimates the percent of population by county on domestic wells. The Indiana Agricultural Statistics Service at Purdue University provides livestock estimates by county.

The estimated expense for the water use reporting program is about \$10,000 per year within the Great Lakes basin. This includes personnel of 0.2 full time equivalents.

Water Conservation

Indiana has no formal ongoing water conservation activities. However, the state, through its Water Shortage Plan, encourages and promotes water conservation as a way to decrease the number of constraints required during a water shortage.

Drought Contingency Plan

Indiana's Water Shortage Plan provides criteria for determining the severity of a drought and recommendations on actions that should be taken during three water shortage phases. The plan recommends approaches for individuals, utilities, and local and state governments to conserve water during different stages of drought and establishes relative priorities for water use. Also, during times of inadequate water, a Water Shortage Task Force can be formed with representatives from several agencies, including the DNR, to advise the governor.

Phase I (Water Shortage Watch) and Phase II (Water Shortage Warning) occurs through a joint declaration of the DNR and the State Emergency Management Agency. During these phases, voluntary reductions in water use are recommended, and public outreach works toward providing information on the need for conservation. Phase III involves an emergency declaration by the governor and mandatory restrictions on certain water uses.

Table 6: Summary of Indiana’s Water Use Reporting Program, January 1, 1998

Water Use Category	Agencies Involved	Authorizing Laws/Regulations	Permit/Registration	Public Participation in Permit Process	Total Principal Facilities	Percent Principal Facilities Reporting	Data Reporting Frequency	Data Compilation Methods	Consumptive Use Compilation Methods	Specificity of Primary Data to G.L. Basin	Consistent with G.L. Charter	Funding	Staffing
Overall Program	Department of Natural Resources	Indiana Code 14-25-7: Water Resource Management Act	Registration for more than 100,000 g/day capacity	None	540	100	Annual	Facility/state measured or estimated	State estimated	No	Mostly	\$10,000 (estimate) (G.L. Basin)	0.2 FTEs (G.L. Basin)
Public Supply	Department of Natural Resources	Indiana Code 14-25-7: Water Resource Management Act	Registration for more than 100,000 g/day capacity	None	62	100	Annual	Facility measured	State estimated	No	Yes		
Self-Supply Domestic	Department of Natural Resources	Indiana Code 14-25-7: Water Resource Management Act	Registration for more than 100,000 g/day capacity	None	19	100	Annual	State estimated (mostly)	State estimated	No	No (does not include landfills)		
Self-Supply Irrigation	Department of Natural Resources	Indiana Code 14-25-7: Water Resource Management Act	Registration for more than 100,000 g/day capacity	None	375	95	Annual	Facility estimated	State estimated	No	Yes		
Self-Supply Livestock	Department of Natural Resources	Indiana Code 14-25-7: Water Resource Management Act	Registration for more than 100,000 g/day capacity	None	5	100	Annual	State/facility estimated	State estimated	No	Yes		
Self-Supply Industrial	Department of Natural Resources	Indiana Code 14-25-7: Water Resource Management Act	Registration for more than 100,000 g/day capacity	None	67	100	Annual	Facility measured or estimated	State estimated	No	Yes		
Self-Supply Fossil Fuel	Department of Natural Resources	Indiana Code 14-25-7: Water Resource Management Act	Registration for more than 100,000 g/day capacity	None	5	100	Annual	Facility estimated	State estimated	No	Yes		
Self-Supply Nuclear	N/A (no facilities)	N/A	N/A	N/A	0	N/A	N/A	N/A	N/A	N/A	N/A		
Hydroelectric	Department of Natural Resources	None (data obtained by request)	None	N/A	4	100	When requested	Facility estimated	State estimated	Yes	Yes		
Other	Department of Natural Resources	Indiana Code 14-25-7: Water Resource Management Act	Registration for more than 100,000 g/day capacity	None	3	100	Annual	Facility estimated or measured	State estimated	No	Yes		

Michigan

Water Use

The Michigan Department of Environmental Quality (MDEQ) is the lead agency responsible for oversight of water use in the state, and water use reporting occurs through the agency's Drinking Water and Radiological Protection Division. The MDEQ's Office of the Great Lakes is also involved in overseeing water use in the state and coordinating efforts with other states. There is no general regulation by statute of water use in Michigan, and instead the right to withdraw and use water is governed by riparian or reasonable use doctrine and the civil courts resolve any water use conflicts.

Under Public Act 451 of 1994, Part 327, certain industrial, power generation, and non-agricultural irrigation facilities that have the capacity to withdraw over 100,000 gallons of water in a 30-day period are required to register with the MDEQ and report water withdrawals annually. The act includes both surface water and groundwater. To ensure compliance with water use registration requirements, the MDEQ can request that the Attorney General file a civil action for violation. Each violation carries a potential fine of up to \$1,000.

Public Act 399 of 1976, Part 15, which focuses on water quality, governs public supply water of all types. Each public supplier must register with the MDEQ, and the agency approves construction permits.

Water Use Reporting Program

The MDEQ collects water use data on the following Great Lakes water withdrawal and use categories: public supply, self-supply irrigation (non agricultural), self-supply industrial, self-supply fossil fuel, and self-supply nuclear. Registration of the previously mentioned facilities under Public Act 451 of 1994 allows for annual collection of the data. The act also directs MDEQ and the Michigan Department of Agriculture to estimate water use for agricultural irrigators based on a model developed by the agencies. Public Act 399 of 1976 allows for data collection from public supply facilities. For the categories of self-supply domestic, self-supply livestock, hydroelectric, and other, data is not currently collected because the MDEQ has no authority to do so.

Facilities measure their water use entirely within the categories of public supply, self-supply fossil fuel, and self-supply nuclear. For the self-supply industrial category, data is a mixture of facility measurements and facility estimations. For the self-supply irrigation category, agricultural water use data is largely estimated by the state. Golf course irrigation is a mixture of facility measurements and facility estimations. Facilities estimate consumptive use for the fossil fuel and industrial water use categories based on facility estimates and/or measurements. The state estimates consumptive use for total sectors in reports to the Great Lakes Regional Water Use Database for the public supply, irrigation, and nuclear

categories. This is done with established coefficients and/or facility measured data for the public supply and nuclear categories and estimates for irrigation.

The MDEQ funds the water use reporting program with \$53,000 per year from a \$50 annual fee paid by facilities registering under Public Act 451. The state also has allocated general funds of \$100,000 per year beginning in fiscal year 2002 (Oct. 1, 2001-Sept. 30, 2002). The program has 0.9 full time equivalent personnel on the water use reporting program, and the majority of the work involves data compilation. The U.S. Geological Survey, Water Resources Division, supports data collection activities in a general sense, and the Michigan Agricultural Statistics Service collaborates in gathering irrigation data. Data is specific to the Great Lakes basin since the entire state lies within the basin. The state also publishes single sector water use reports periodically.

Water Conservation

Michigan has no formal water conservation activities.

Drought Contingency Plan

Michigan has no formal statewide water conservation or drought management plan. When drought conditions have occurred in the past, interdepartmental task forces were formed to address the problem. In addition, individual municipalities or local governments implement drought management measures as necessary.

Table 7: Summary of Michigan's Water Use Reporting Program, January 1, 1998

Water Use Category	Agencies Involved	Authorizing Laws/Regulations	Permit/Registration	Public Participation in Permit Process	Total Principal Facilities	Percent Principal Facilities Reporting	Data Reporting Frequency	Data Compilation Methods	Consumptive Use Compilation Methods	Specificity of Primary Data to G.L. Basin	Consistent with G.L. Charter	Funding	Staffing
Overall Program	Department of Environmental Quality	Public Act 451 of 1994, Part 327 Public Act 399 of 1976, Part 15	Registration for public supply, some 100,000 g/day capacity	None	2,221	Nearly 100	Annual	Facility/state measured or estimated	Facility/state estimated	Yes	Mostly	\$53,000 (annual fees) (G.L. Basin)	0.9 FTEs (G.L. Basin)
Public Supply	Department of Environmental Quality	Public Act 399 of 1976, Part 15	Registration for all public suppliers	None	573	100	Annual	Facility measured	State estimated	Yes	Yes		
Self-Supply Domestic	Department of Environmental Quality; USGS	None	N/A	N/A	N/A	0	None	None	None	Yes	No		
Self-Supply Irrigation	DEQ; Michigan Agricultural Statistics Service	None	N/A	N/A	1,448	100	Annual (model estimate)	Facility/state measured or estimated	State estimated	Yes	No		
Self-Supply Livestock	Department of Environmental Quality; USGS	None	N/A	N/A	N/A	0	None	None	None	Yes	N/A		
Self-Supply Industrial	Department of Environmental Quality	Public Act 451 of 1994, Part 327	Registration for more than 100,000 g/day capacity	None	163	99	Annual	Facility measured or estimated	Facility estimated	Yes	Yes		
Self-Supply Fossil Fuel	Department of Environmental Quality	Public Act 451 of 1994, Part 327	Registration for more than 100,000 g/day capacity	None	33	100	Annual	Facility measured	Facility estimated	Yes	Yes		
Self-Supply Nuclear	Department of Environmental Quality	Public Act 451 of 1994, Part 327	Registration for more than 100,000 g/day capacity	None	4	100	Annual	Facility measured	State estimated	Yes	Yes		
Hydroelectric	Department of Environmental Quality	None	N/A	N/A	N/A	0	None	None	None	Yes	No		
Other	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Yes	N/A		

Minnesota

Water Use

Minnesota Statute 103G.265 requires the Department of Natural Resources (DNR) “to assure an adequate [water] supply to meet long-range seasonal requirements for domestic, municipal, industrial, agricultural, fish and wildlife, recreational, power, navigation, and quality control purposes from waters of the state.” A water appropriation permit from the DNR’s Waters Division (DNR Waters), is required for all water withdrawals of any water type exceeding 10,000 gallons per day or 1 million gallons per year.

Minnesota Statutes (103G.255 to 103G.315) and Minnesota Rules (6115.0600 to 6115.0810) provide authority for implementation of the Water Appropriation Permit Program. Water for domestic uses serving less than 25 persons, test pumping of a groundwater source, and agricultural field drainage are exempt from permit requirements. Water appropriation permits have not been required for “run of the river” hydropower operations. To ensure all water users have permits, the DNR uses information from applications to the Minnesota Pollution Control Agency for discharge permits. Additionally, letters sent to new well owners by the Minnesota Department of Health contain information about water use permit requirements. To ensure accurate data on water volumes appropriated, Minnesota Statutes require permittees to use flow meters, unless another method of measurement is approved by the DNR.

As the lead agency for water use, the DNR coordinates its efforts with other entities in the state. For example, soil and water conservation districts, watershed districts and cities receive copies of new permit applications for comment and can make recommendations. After the DNR receives an application for a permit, the agency forwards the application to the local soil and water conservation district, watershed district, and city for a review. These units have 30 days to submit comments to the DNR. Coordination also occurs with the Department of Health on water emergency and conservation plans, which are required for new wells, wellhead protection plans and Drinking Water Revolving Fund applications.

Water Use Reporting Program

All water users in the Water Appropriation Permit Program are required to submit annual water use reports with monthly data. Water data is collected for the nine categories used in the Great Lakes Regional Water Use Database, with the exception of private residential water users in the self-supply domestic category. Also, Minnesota has no nuclear facilities in its portion of the Great Lakes basin. Of those facilities registered, 100 percent report for all categories but hydroelectric. Hydroelectric water use that is “run of the river,” or remains in the waterway to produce power, is not considered a water use in the state. Currently, all Great Lakes basin hydroelectric water uses are run of the river. Information for this category

reported to the Regional Water Use Database is based on the U.S. Geological Survey’s five year reports. Future reports will use data directly from FERC licensed dam operators. Overall, data are measured by facility for all categories since this is required under Minnesota law. The state estimates consumptive use based on facility measured withdrawal data and coefficients established for each water use category. The water use reporting program occurs statewide, but data for the Great Lakes basin can easily be extracted.

Funding for most DNR Waters programs including the water use reporting program comes as a lump sum from the State General Fund, so actual amounts are difficult to break out. The Water Appropriation Permit Program includes a staff of four and about 10 percent of their time (0.4 FTE) is spent on activities relating to the Great Lakes basin.

Water Conservation

Minnesota has a formal water conservation program that includes both planning and permitting requirements. All permittees are required to use water efficiently, but Minnesota Statutes require conservation plans for public water suppliers and for agricultural irrigators. The state Department of Natural Resources is the lead agency, and it coordinates with the Minnesota Department of Health for well approvals, Drinking Water Revolving Fund requests and wellhead protection requirements. The DNR coordinates with the Metropolitan Council for local

comprehensive planning conservation requirements in the seven county Twin Cities Metropolitan Area. Information on Minnesota's water conservation efforts can be found on the DNR Waters website (www.dnr.state.mn.us/waters).

Water emergency and conservation plans are required for all public water suppliers serving more than 1,000 people. Water emergency and conservation plans must be updated and approved by the DNR every 10 years. Approaches to water conservation include education, conservation rate structures, planning, and the elimination of wasteful uses. Much of the education on conservation occurs at local levels.

Public water suppliers must also implement demand reduction measures before requesting permit approvals for new municipal wells and increases in water withdrawals. A DNR approved water emergency and conservation plan is also required for wellhead protection plans and applications for the state's Drinking Water Revolving Fund. Public water suppliers with unaccounted-for water volumes that exceed 20 percent are required to establish a goal and reduce unaccounted-for water to less than 20 percent within three years.

Applicants for irrigation permits must obtain approval from the county soil and water conservation district, which may require a site-specific soil and water conservation plan. The University of Minnesota Extension Service also provides information on crop irrigation needs.

Annual water use reports help to evaluate the effectiveness of conservation efforts.

Drought Contingency Plan

The state's current drought contingency plan is specific to the Mississippi River, but the plan is being updated to reflect all resources in the state. As part of the drought plan, public water suppliers serving more than 1,000 people must have an approved water emergency and conservation plan. All surface water appropriators must have an approved contingency plan. As the plan goes into effect, water is suspended for certain water uses based on statutory water use priorities. To help in implementation of the plan, the DNR chairs a multi-agency and stakeholder task force.

To help keep the public informed, press releases have been used at times. In 2000, a special mailing on drought conditions was sent to all surface water users. The DNR's Climatology Office provides frequent status reports to the public.

Demand Forecasting

Demand forecasting is done for the Twin Cities Metro Area, but not statewide. Projections of water demands are required for new permit requests.

Table 8: Summary of Minnesota's Water Use Reporting Program, January 1, 1998

Water Use Category	Agencies Involved	Authorizing Laws/Regulations	Permit/ Registration	Public Participation in Permit Process	Total Principal Facilities	Percent Principal Facilities Reporting	Data Reporting Frequency	Data Compilation Methods	Consumptive Use Compilation Methods	Specificity of Primary Data to G.L. Basin	Consistent with G.L. Charter	Funding	Staffing
Overall Program	Department of Natural Resources	Statute 103G.265 to 103G.315; Rules 6115.0600 to 6115.0810	Permits for use of more than 10,000 g/day or 1 million g/year	Local units given 30 days for comments	118	Nearly 100	Annual with monthly data	Facility measured	State estimated	No	Yes	From State General Fund	0.4 FTEs (G.L. Basin)
Public Supply	Department of Natural Resources	Statute 103G.291; Rules 6115.0600 and 6115.0690	Permits for use of more than 10,000 g/day or 1 million g/year	Local units given 30 days for comments	30	100	Annual with monthly data	Facility measured	State estimated	No	Yes		
Self-Supply Domestic	Department of Natural Resources (excludes private residential)	Statute 103G.271; Rules 6115.0600	Permits for use of more than 10,000 g/day or 1 million g/year	Local units given 30 days for comments	12 (no residential)	100	Annual with monthly data	Facility measured	State estimated	No	Yes		
Self-Supply Irrigation	Department of Natural Resources	Statute 103G.295; Rules 6115.0600 and 6115.0680	Permits for use of more than 10,000 g/day or 1 million g/year	Local units given 30 days for comments	15	100	Annual with monthly data	Facility measured	State estimated	No	Yes		
Self-Supply Livestock	Department of Natural Resources	Statute 103G.271; Rules 6115.0600	Permits for use of more than 10,000 g/day or 1 million g/year	Local units given 30 days for comments	1	100	Annual with monthly data	Facility measured	State estimated	No	Yes		
Self-Supply Industrial	Department of Natural Resources	Statute 103G.271; Rules 6115.0600	Permits for use of more than 10,000 g/day or 1 million g/year	Local units given 30 days for comments	41	100	Annual with monthly data	Facility measured	State estimated	No	Yes		
Self-Supply Fossil Fuel	Department of Natural Resources	Statute 103G.271; Rules 6115.0600	Permits for use of more than 10,000 g/day or 1 million g/year	Local units given 30 days for comments	7	100	Annual with monthly data	Facility measured	State estimated	No	Yes		
Self-Supply Nuclear	Department of Natural Resources	Statute 103G.271; Rules 6115.0600	Permits for use of more than 10,000 g/day or 1 million g/year	Local units given 30 days for comments	0	100	Annual with monthly data	Facility measured	N/A	No	Yes		
Hydroelectric	Department of Natural Resources; USGS; FERC	Statute 103G.271; Rules 6115.0600 (non run-of-the river)	Permits for use of more than 10,000 g/day or 1 million g/year	Local units given 30 days for comments	5	0 (gathered from USGS report)	Every five years	Facility measured	State estimated	No	Yes		
Other	Department of Natural Resources	Statute 103G.271; Rules 6115.0600	Permits for use of more than 10,000 g/day or 1 million g/year	Local units given 30 days for comments	7	100	Annual with monthly data	Facility measured	State estimated	No	Yes		

New York

Water Use

In New York, the Department of Environmental Conservation (DEC) is the lead agency on water use, and the Susquehanna River Basin Commission (SRBC) and the Delaware River Basin Commission (DRBC) oversee water use in their drainage basins. In these basins, water supply permits require approval by the DEC and DRBC or SRBC. Before the DEC issues Public Water Supply Permit Program permits, the Department of Health (DOH) reviews all applications. Information on the PSWPP can be found at www.dec.state.ny.us/website/dcs/water/index.html.

New York State has several pieces of legislation dealing with water use. Environmental Conservation Law (ECL) Articles 15-1501 and 15-1609 give authority to the DEC to regulate certain water withdrawals. New York Codes, Rules and Regulations Parts 601 and 675 specify the requirements for these withdrawals. All community-type public water suppliers serving piped, potable water need a water supply permit issued by the DEC that allows for development of any new source of water. In addition, since 1989, all withdrawals of any water type from New York's portion of the Great Lakes basin that exceed 100,000 gallons per day in a 30-day period must be registered with the DEC. This registration, which includes a \$200 two-year fee, must occur at least 45 days before withdrawals occur. New withdrawals of greater than 5 million gallons per day over a 30-day period from the Great Lakes basin

require consultation with other Great Lakes states. Facilities that do not register withdrawals can be subject to a fine. The governor and legislature must give approval to diversions proposed within the state, which can only occur after hearings have been held.

Water Use Reporting Program

Under NYCRR Part 675, water users withdrawing more than 100,000 gallons per day must file a report with the DEC. Public water suppliers are exempt, but based on the authority of NYCRR Part 601, the DEC issues permits to public water suppliers and uses the permit quantities to estimate water use. The DEC collects water use data for each of the water use categories used in the Great Lakes Regional Water Use Database except for hydroelectric, which occurs separately. The U.S. Geological Survey, Water Resources Division, supports the DEC in water use reporting activities for most categories. The Department of Health is involved in the public supply category and the Army Corps of Engineers is involved in the reporting of data for other uses.

Most information is reported every other year, but reports occur annually for self-supply irrigation. The quality of information is best for the categories of self-supply industrial, self-supply thermoelectric (fossil fuel), and self-supply nuclear. All facilities registered in these categories make the required reports with partially measured data. Registration information on public supply and self-supply livestock categories is

less exact, and the data includes more estimation. Most of the information gathered is specific to the Great Lakes because of legislative requirements. Public supply information is statewide, but includes sub-basin information that allows Great Lakes basin information to be extracted. New York estimates consumptive use based on facility measured or estimated withdrawal data and established coefficients.

Collection of data for approximately 50 hydropower facilities occurs separately in New York. The New York Power Authority and the International Niagara Committee's "Report of Niagara River Diversions" provide measurements of hydropower water use for New York State's two largest hydropower facilities on the Niagara and St. Lawrence Rivers. Data for other hydroelectric facilities involves the DEC, the Federal Energy Regulatory Commission and the Army Corps of Engineers.

The water use reporting program has funding of \$35,367 and two staff at 0.65 full time equivalents. The funding amount has decreased over the past 10 years. Overall, the New York program is partially consistent with the requirements of the Great Lakes Charter.

Water Conservation

The Department of Environmental Conservation's Public Water Supply Permit Program requires all

applicants of new water supply permits to have a water conservation program. The responsibility for implementing each program rests with the water supplier, and the PWSPP monitors compliance with the programs that are developed. The PWSPP requires permittees to develop and implement long-term water conservation measures such as metering, meter replacement/calibration, system water audits and leak detection and repair. The goal of each program is to keep unaccounted-for water to 15 percent or less. The PWSPP also requires publicity and consumer education to be included in water conservation efforts.

Drought Contingency Plan

The State Drought Management Task Force, a group of several state agencies, evaluates drought conditions and makes recommendations to the governor and State Disaster Preparedness Commission on drought stages that should be announced. During “Watch” and “Warning” stages, press releases are issued with recommendations on conservation focused on outdoor use, but no mandatory statewide restrictions occur. The governor can declare an “Emergency” stage and mandate necessary water conservation measures. Restrictions can be more severe in the “Disaster” stage, and the governor may request federal assistance. The DEC also coordinates efforts with the Delaware River Basin Commission and the Susquehanna River Basin Commission during drought events. Information about drought events can be found at www.dec.state.ny.us/website/dow/droughtfacts.html.

The state Department of Health requires all community water supply systems with more than \$125,000 in annual gross operating revenues to have an approved Water Supply Emergency Plan. This plan details what actions occur under specific conditions, including initiatives to educate consumers about the need for water conservation. As with the DEC’s water conservation program, implementation is the responsibility of the local water supplier, and the DOH monitors compliance.

Table 9: Summary of New York's Water Use Reporting Program, January 1, 1998

Water Use Category	Agencies Involved (lead agency in bold)	Authorizing Laws/Regulations	Permit/Registration	Public Participation in Permit Process	Total Principal Facilities	Percent Principal Facilities Reporting	Data Reporting Frequency	Data Compilation Methods	Consumptive Use Compilation Methods	Specificity of Primary Data to G.L. Basin	Consistent with G.L. Charter	Funding	Staffing
Overall Program	NYS Department of Environmental Conservation ; USGS; ACOE; NYSDOH	NYSECL 15-1609 and 15-1501, NY CRR Parts 675 and 601	Reg. for more than 100,000 g/day use; public supply permits	Water Supply Permit Program only	641	N/A	Annual/Biennial	Measured or estimated	Measured or estimated	Partially	Mostly	\$35,367 (G.L. Basin)	0.65 FTEs (G.L. Basin)
Public Supply	NYSDEC ; USGS; NYSDOH	NYSECL 15-1501, NYCRR PART 601	Permits for all public suppliers	Yes	500 (estimated)	N/A	N/A	State estimated	State estimated	No	Partially		
Self-Supply Domestic	NYSDEC ; USGS;	NYSECL 15-1609, NYCRR PART 675	Registration for use of more than 100,000 g/day	None	5	100 (of registered)	Biennial	Facility measured or estimated	State estimated	Yes	Partially		
Self-Supply Irrigation	NYSDEC ; USGS;	NYSECL 15-1609, NYCRR PART 675	Registration for use of more than 100,000 g/day	None	14	100 (of registered)	Annual	Facility measured or estimated	State estimated	Yes	Partially		
Self-Supply Livestock	NYSDEC ; USGS;	NYSECL 15-1609, NYCRR PART 675	Registration for use of more than 100,000 g/day	None	N/A	N/A	Biennial	State estimated	State estimated	Yes	Partially		
Self-Supply Industrial	NYSDEC ; USGS;	NYSECL 15-1609, NYCRR PART 675	Registration for use of more than 100,000 g/day	None	50	100 (of registered)	Biennial	Facility measured or estimated	State estimated	Yes	Partially		
Self-Supply Fossil Fuel	NYSDEC ; USGS;	NYSECL 15-1609, NYCRR PART 675	Registration for use of more than 100,000 g/day	None	15	100	Biennial	Facility measured or estimated	State estimated	Yes	Partially		
Self-Supply Nuclear	NYSDEC ; USGS;	NYSECL 15-1609, NYCRR PART 675	Registration for use of more than 100,000 g/day	None	3	100	Biennial	Facility measured or estimated	State estimated	Yes	Partially		
Hydroelectric	NY Power Authority; FERC; NYSDEC ; ACOE	N/A	N/A	N/A	50 (estimated)	N/A	N/A	Facility measured or estimated	N/A	No	Partially		
Other	NYSDEC ; USGS; ACOE	NYSECL 15-1609, NYCRR PART 675	Registration for use of more than 100,000 g/day	None	4	?	Biennial	Facility measured or estimated	State estimated	Yes	Partially		

Ohio

Water Use

The Ohio Department of Natural Resources (DNR), Division of Water, manages the state's surface and groundwater resources. Agency activities include collection of hydrologic data, development of water resource maps, issuing permits for dam construction, administration of floodplain management, and conducting water supply studies. Sections 1521.15 and 1521.16 of the Ohio Revised Code require facilities or combination of facilities with the capacity to withdraw more than 100,000 gallons of water per day to register with the DNR. The agency uses the Water Withdrawal Registration Program to carry out this withdrawal registration program. If a facility fails to register, the DNR can send letters requesting it to do so. Ultimately, the situation can be turned over to the state attorney general to pursue. Similar procedures apply for annual reports of water use.

Water Use Reporting Program

Collection of data occurs through the Water Withdrawal Registration Program. The DNR's Division of Water collects data on all of the nine water use categories used in the Great Lakes Regional Water Use Database on an annual basis, and 100 percent of facilities registered file reports. Additional information is gathered on some non-principal facilities. For example, all public water supply sources file reports with the EPA.

The state estimates data for the categories of self-supply domestic and hydroelectric. Facilities measure data for the public supply, self-supply irrigation, self-supply thermoelectric (fossil fuel), and self-supply nuclear categories, and facilities estimate data for the self-supply livestock category. Data for the self-supply industrial and other categories combine facility measurements and estimations. Consumptive use is measured by facilities for the fossil fuel and nuclear categories and estimated by the state using established coefficients for all other categories. The water use reporting program is not specific to the Great Lakes basin, but data carries the 8-digit USGS watershed code and can be easily extracted.

Ohio provides \$19,410 and 0.30 full time equivalent personnel for its water use reporting program in the Great Lakes basin. The funding amount has decreased over the past 10 years.

Water Conservation

Ohio has no formal water conservation plan, but implements water conservation measures as part of its drought contingency plan.

Drought Contingency Plan

Ohio's Drought Response Plan has four phases of drought, with various amounts of water conservation associated with each. Various levels of voluntary water conservation measures are requested during Phase 2 and Phase 3 Drought Alerts. At these levels,

public water suppliers, their customers, and private withdrawers are asked to restrict non-essential uses and reduce essential uses. Public awareness and education activities also begin. A Phase 4 Drought Emergency, which involves mandatory restrictions on water use, occurs with a declaration by the governor. The emergency is declared when water supplies will not meet projected demands and the Palmer Drought Severity Index is at -4.0 or lower.

The Ohio Emergency Management Agency heads Ohio's drought response team and enforces water use restrictions ordered by the governor. In addition, the Drought Executive Committee, which is activated during Phase Three, includes relevant agencies and interest groups that assist in monitoring water use to identify non-compliance. The various agencies involved have specific responsibilities assigned to them in the Drought Response Plan.

Demand Forecasting

Ohio periodically produces regional water plans that include water use demand forecasting. The most recent forecasts were done in 1988 for northeast Ohio and 1986 for northwest Ohio. Other forecasts were done in the 1970s.

Table 10: Summary of Ohio's Water Use Reporting Program, January 1, 1998

Water Use Category	Agencies Involved	Authorizing Laws/Regulations	Permit/Registration	Public Participation in Permit Process	Total Principal Facilities	Percent Principal Facilities Reporting	Data Reporting Frequency	Data Compilation Methods	Consumptive Use Compilation Methods	Specificity of Primary Data to G.L. Basin	Consistent with G.L. Charter	Funding	Staffing
Overall Program	Department of Natural Resources, Division of Water	Ohio Revised Code Sections 1521.15 and 1521.16	Registration for more than 100,000 g/day capacity	None	262	100	Annual	Measured and estimated	Facility measured and state estimated	No	Yes	\$19,410 (G.L. Basin)	0.3 FTEs (G.L. Basin)
Public Supply	Department of Natural Resources, Division of Water	Ohio Revised Code Sections 1521.15 and 1521.16	Registration for more than 100,000 g/day capacity	None	120	100	Annual	Facility measured	State estimated	No	Yes		
Self-Supply Domestic	Department of Natural Resources, Division of Water	Ohio Revised Code Sections 1521.15 and 1521.16	Registration for more than 100,000 g/day capacity	None	0	100	Annual	State estimated	State estimated	No	Yes		
Self-Supply Irrigation	Department of Natural Resources, Division of Water	Ohio Revised Code Sections 1521.15 and 1521.16	Registration for more than 100,000 g/day capacity	None	30	100	Annual	Facility measured	State estimated	No	Yes		
Self-Supply Livestock	Department of Natural Resources, Division of Water	Ohio Revised Code Sections 1521.15 and 1521.16	Registration for more than 100,000 g/day capacity	None	2	100	Annual	Facility estimated	State estimated	No	Yes		
Self-Supply Industrial	Department of Natural Resources, Division of Water	Ohio Revised Code Sections 1521.15 and 1521.16	Registration for more than 100,000 g/day capacity	None	92	100	Annual	Facility measured or estimated	State estimated	No	Yes		
Self-Supply Fossil Fuel	Department of Natural Resources, Division of Water	Ohio Revised Code Sections 1521.15 and 1521.16	Registration for more than 100,000 g/day capacity	None	9	100	Annual	Facility measured	Facility measured	No	Yes		
Self-Supply Nuclear	Department of Natural Resources, Division of Water	Ohio Revised Code Sections 1521.15 and 1521.16	Registration for more than 100,000 g/day capacity	None	2	100	Annual	Facility measured	Facility measured	No	Yes		
Hydroelectric	Department of Natural Resources, Division of Water	Ohio Revised Code Sections 1521.15 and 1521.16	Registration for more than 100,000 g/day capacity	None	0	100	Annual	State estimated	State estimated	No	Yes		
Other	Department of Natural Resources, Division of Water	Ohio Revised Code Sections 1521.15 and 1521.16	Registration for more than 100,000 g/day capacity	None	7	100	Annual	Facility measured or estimated	State estimated	No	Yes		

Ontario

Water Use

Federal, Provincial and Municipal governments each have distinct roles in regulating water use in Ontario. The provincial Ministry of Environment and Energy (MOEE) regulates all types of water withdrawals with the Permit to Take Water (PTTW) program under Section 34 of the Ontario Water Resources Act (OWRA). Withdrawals in excess of 50,000 liters per day require a permit, including short-term takings such as pumping tests. Withdrawals that interfere significantly with other users but are less than 50,000 liters per day also require permits. Water withdrawals for domestic, farm or fire fighting do not require permits.

Regional MOEE Directors issue permits, which define the maximum water taking allowance. The issuing Director and the Minister of Environment and Energy have the authority to refuse or cancel permits, and to impose terms and conditions on permits at any time, even after issuance. The MOEE involves the public in the permitting decision by soliciting comment on permit requests, which are posted on the MOEE website for 30 days. This public comment process is driven by the Environmental Bill of Rights, which provides for public notification about proposed legislation, policies, regulations and other legal instruments. Under the EBR, the Environmental Registry enables Ontario residents to access information on environmentally significant proposals and decisions of prescribed Ontario ministries.

Permit holders who withdraw significantly less than their permitted amount are required to notify MOEE so that the permit amount may be lowered. Compliance is monitored through inspections, registering complaints and other review processes. MOEE reviews non-compliance situations and sets out a schedule for abatement. Compliance may be voluntary or mandatory depending on the violation.

Several pieces of legislation are in place to protect the ecological integrity of aquatic ecosystems with respect to water takings. MOEE's Water Taking and Transfer Regulation ensures that PTTW applications give consideration to ecosystem functions and effects on water resources. In addition, permit holders must comply with other relevant water protection legislation. These include the *Fisheries Act* under the Canadian Department of Fisheries and Oceans; the *Lakes and Rivers Improvement Act* and the *Conservation Authorities Act* under the Ontario Ministry of Natural Resources (MNR); the *Municipal Act* and the *Planning Act* under the Ontario Ministry of Municipal Affairs and Housing; and the *Environmental Protection Act* and the *Environmental Assessment Act* under the Ontario Ministry of Environment and Energy. The Federal government is responsible for regulating water use in navigational waterways.

Water Use Reporting Program

Water Use Reporting involves efforts at both the national and provincial level. The MNR is the lead agency responsible for water use reporting under the Great Lakes Charter. MNR does not have the authority to require mandatory water use reporting, and users who provide information do so on a voluntary basis. The MOEE has the authority to require mandatory reporting on water use under the PTTW program. No mandatory reporting for water quantity is in place at this time. Environment Canada and Statistics Canada collect water use data every two to three years for municipal users and every five years for industrial users. MNR has access to published data stored at Environment Canada through data sharing agreements.

To submit the required information to the Great Lakes Regional Water Use Database, data is compiled from several different sources. Environment Canada maintains the Municipal Water Use Database, which stores water use information for municipalities with populations of 1,000 or more. This national survey program provides data on public supply water and some information on domestic self-supply for survey years. In non-survey years public supply data is available through direct contact with water works. A one time Rural Water Use Survey was conducted in 1996 by researchers at the University of Guelph. This survey applied coefficients to agricultural census data and provided data on self-supply domestic, self-supply livestock and self-supply irrigation categories.

Environment Canada provides access to the Industrial Water Use Survey Database that collects data every five years. MNR collects water use data for power generation categories through direct contact with station operators. Navigation data from the National Canal survey makes up the bulk of water use for the other category.

There is no mandatory reporting on consumptive uses. Industrial users report consumptive use to Environment Canada. In all other categories, the province uses coefficients to calculate consumptive use.

Data collection is specific to the Great Lakes basin for the power generation, self-supply domestic, and other categories. Industrial and public supply categories are collected nationally but are geo-referenced and easily extracted for the Great Lakes. Basin related data for rural and agricultural uses is more difficult to extract.

The MNR has the equivalent of one full time employee working on water use reporting. Other staff and consultants have been brought in to assist with these efforts. Funding requests to support changes in the water use reporting program are under consideration.

Water Conservation

Federal, provincial and local governments employ a variety of strategies to promote and impose water conservation through regulations, incentives and education. No formal conservation program operates

in Ontario, but excellent work occurs at the local level. Provincial and federal governments support and guide these efforts.

At the provincial level a number of regulations impact water conservation. The PTTW program gives consideration to water conservation. Water conservation is a requirement for permit applications in the Greater Toronto Area. Public consultations on all permit applications serve as an incentive for voluntary conservation. The Ontario Ministry of Natural Resources launched a *Water Efficiency Strategy for Ontario* in 1992. This resulted in changes to the Ontario Building Code to require low-flow plumbing fixtures in new buildings as well as other projects, including retrofits of public buildings, education programs and support for municipal conservation efforts. The Provincial Planning Act requires regard for water conservation during planning.

The Ministry of Environment and Energy undertakes provincial 'water conservation' education initiatives, through programs, information fact sheets, and publications on best management practices. Examples of these are Green Tips and Water Efficient Guide for Small and Medium Communities. The Ministry of Agriculture and Food has developed and promoted best management practices for agriculture and Environmental Farm Plans.

The federal government has taken a supportive role in water conservation through research, information

sharing and funding local conservation efforts. The Canadian Council of Ministers of the Environment prepared the *National Action Plan to Encourage Municipal Water Use Efficiency* in the mid 1990s. This plan offers direction and recommendations on ways to achieve greater water use efficiency. Additional examples of federal initiatives include a water conservation education website and a database of municipal conservation practices to promote information sharing between local governments.

Local governments are embracing conservation measures to ensure adequate water supply. Certain communities are leaders in conservation and have used bylaws to restrict outdoor water use, require meter installation on new connections, restrict interior water use equipment and require conservation plans before issuing building permits. In addition, efforts such as awareness campaigns, and public distribution of low flow plumbing fixtures work in combination with water conserving rate structures, building retrofit projects and leak prevention in municipal infrastructure. Watershed-based Conservation Authorities have contributed to local efforts. Some are involved in water budgeting, a process that considers water use and supply in water management decisions.

Drought Contingency Plan

Drought is managed through the Ontario Low Water Response Plan for which MNR is the lead agency. This response plan involves partnerships between local and provincial agencies, including Conservation Authorities, municipalities, and multiple provincial

ministries. The plan draws on existing legislation to ensure provincial preparedness and to support and coordinate local response in the event of low water conditions.

The plan involves three drought indicator levels. MNR monitors streamflow and precipitation at a tertiary watershed level and alerts the local Conservation authority during low flow conditions. Level indicators are confirmed by local observations. A local Water Response Team is formed of stakeholders, and they work with provincial ministries to formulate a plan for the watershed. At Level I, the target is for a voluntary 10 percent reduction in water use. At Level II a voluntary 20 percent reduction is sought, and municipal bylaws may be enacted to restrict or prohibit non-essential uses. At Level III mandatory water use restrictions are implemented and recommendations are made on allocation priorities. Under the OWRA, permits to take water can be limited at the discretion of the Minister of Environment and Energy. However, the Ontario Low Water Response Plan builds support for restrictions at the local level.

Current Activities/Demand Forecasting

MNR, MOEE, Conservation Authorities and Environment Canada are involved in a multi-year study on water use and supply in the Ontario portion of the Great Lakes basin, and this could lead to development of a more permanent strategy for water use that would alter some of the information in this report. The first phase of the water use portion

involved collecting 1996 water use data on a tertiary watershed level and looking at seasonal changes in use. The second phase began in fall 2001 and involves demand forecasting at this same spatial scale. Previous demand forecasting has been undertaken at irregular intervals by the federal government.

Table 11: Summary of Ontario's Water Use Reporting Program, January 1, 1998

Water Use Category	Agencies Involved (lead agency in bold)	Authorizing Laws/Regulations	Permit/Registration	Public Participation in Permit Process	Total Principal Facilities	Percent Principal Facilities Reporting	Data Reporting Frequency	Data Compilation Methods	Consumptive Use Compilation Methods	Specificity of Primary Data to G.L. Basin	Consistent with G.L. Charter	Funding	Staffing
Overall Program	Ministry of Natural Resources ; Ministry of Environment and Energy; Env't Canada	Ont. Water Res. Act: Sect. 34; Water Transfer and Taking Reg. 285/99. Other regs. may influence takings.	Permits for use of more than 50,000 L/day	Applications web posted for 30 days. Public can appeal decisions.	2,827	N/A	N/A	Measured and estimated	Province est. and facility measured (industrial)	Partially	Mostly	No specific, stable funding	1 FTE (G.L. Basin)
Public Supply	Ministry of Natural Resources ; Ministry of Environment and Energy; Env't Canada	Ont. Water Res. Act – Sect. 34; Water Trnsfr. and Taking Reg. 285/99; Drinking Water Prot. Reg. 459/00	Permits for use of more than 50,000 L/day	Applications web posted for 30 days. Public can appeal decisions.	249	N/A	N/A	Facility measured; reported in MUD	Province estimated	No	Mostly		
Self-Supply Domestic	Ministry of Natural Resources ; Ministry of Environment and Energy; Env't Canada	Ontario Water Resources Act: Section 34; Water Transfer and Taking Regulation 285/99	Permits for use of more than 50,000 L/day except residential	Applications web posted for 30 days. Public can appeal decisions.	Unknown	N/A	N/A	Estimated	Province estimated	Yes	Mostly		
Self-Supply Irrigation	Ministry of Natural Resources ; Ministry of Environment and Energy; Env't Canada	Ontario Water Resources Act: Section 34; Water Transfer and Taking Regulation 285/99	Permits for use of more than 50,000 L/day	Applications web posted for 30 days. Public can appeal decisions.	Unknown	N/A	N/A	Estimated	Province estimated	No	Mostly		
Self-Supply Livestock	Ministry of Natural Resources ; Ministry of Environment and Energy; Env't Canada	Ontario Water Resources Act: Section 34; Water Transfer and Taking Regulation 285/99	None	N/A	Unknown	N/A	N/A	Estimated	Province estimated	No	Mostly		
Self-Supply Industrial	Ministry of Natural Resources ; Ministry of Environment and Energy; Env't Canada	Ontario Water Resources Act: Section 34; Water Transfer and Taking Regulation 285/99	Permits for use of more than 50,000 L/day	Applications web posted for 30 days. Public can appeal decisions.	N/A, but EC survey had 2,043 responses	N/A	N/A	Facility measured	Facility measured	No	Mostly		
Self-Supply Fossil Fuel	Ministry of Natural Resources ; Ministry of Environment and Energy; Env't Canada	Ontario Water Resources Act: Section 34; Water Transfer and Taking Regulation 285/99	Permits for use of more than 50,000 L/day	Applications web posted for 30 days. Public can appeal decisions.	9	N/A	N/A	Facility measured	Province estimated	Yes	Mostly		
Self-Supply Nuclear	Ministry of Natural Resources ; Ministry of Environment and Energy; Env't Canada	Ontario Water Resources Act: Section 34; Water Transfer and Taking Regulation 285/99	Permits for use of more than 50,000 L/day	Applications web posted for 30 days. Public can appeal decisions.	6	N/A	N/A	Facility measured	Province estimated	Yes	Mostly		
Hydroelectric	Ministry of Natural Resources ; Ministry of Environment and Energy; Env't Canada	Ontario Water Resources Act: Section 34; Water Transfer and Taking Regulation 285/99	Permits for use of more than 50,000 L/day	Applications web posted for 30 days. Public can appeal decisions.	61	N/A	N/A	Facility measured	Province estimated	Yes	Mostly		
Other	Ministry of Natural Resources ; Ministry of Environment and Energy; Env't Canada	Ontario Water Resources Act: Section 34; Water Transfer and Taking Regulation 285/99	Permits for use of more than 50,000 L/day	Applications web posted for 30 days. Public can appeal decisions.	67	N/A	N/A	Estimated by MNR	N/A (navigation)	Yes	Mostly		

Pennsylvania

Water Use

The Pennsylvania Department of Environmental Protection (DEP) takes the lead on water use in the commonwealth. The DEP's Division of Water Use Planning within the Bureau of Watershed Management administers Pennsylvania's Water Allocation Program. This includes the development of policies and procedures for the issuance of permits, monitoring activities, permit compliance, technical assistance, training, and instream flow needs assessments. The division is also involved in water planning and administers the Water Resources Data System.

The Administrative Code of 1929, Section 1904-A, provides the DEP with powers to oversee water use. Under the Water Rights Act of 1939, public supply agencies must obtain a permit before withdrawing surface waters. Once applications are submitted, the DEP forwards the proposal to appropriate agencies for comment; there is also a 15-day public comment period. The DEP maintains a Water Use Database System (WUDS) that tracks information on sources for public water supply and other use types. WUDS provides information about water users downstream of projects and is used to monitor any public water supply surface withdrawals done without a permit. The 1939 law does not provide clear enforcement powers, but enforcement actions are generally not needed. There are no rules and regulations for the water allocation process.

Water Use Reporting Program

Water use data is collected based on two regulations. Chapter 109.701 (b) Rules and Regulations, administered by the DEP's Bureau of Water Supply and Waste Water Management, provides authority for collection of surface water public supply water use information. The Bureau of Watershed Management has been delegated the Annual Water Supply Report effort. Public suppliers are required to submit annual data by the end of the first quarter of the subsequent year. Beginning with the 2001 report, the agency will also collect information on bottled water, vended water systems, retail water facilities, and bulk water hauling systems. Administrative Code Section 1904-A(3) provides for data collection for other use categories. However, this is done for inventory purposes, and the DEP has no ability to require submission of the data.

Data is collected for facilities using 100,000 gallons per day or more, but for non-public supply categories, the DEP does not have the statutory power to force users to report data. Legislation introduced in late 2001 would strengthen the agency's data collection powers. The DEP goes beyond the 100,000 gallon per day cutoff in many instances because if facilities desire to share information, it is entered into WUDS. Data is collected on all public supply facilities, both principal and non-principal. Between 80 percent and 100 percent of other principal facilities report their water use. Data is compiled through facility

measurements and estimates. Facilities measure or estimate consumptive use for the fossil fuel, industrial and nuclear categories. Pennsylvania estimates consumptive use for other categories using established coefficients.

The state-wide portion of the program has 5.5 full time equivalents and the Great Lakes portion of Pennsylvania has 0.1 full time equivalents for water use reporting, and efforts are focused on program administration. About \$6,700 is spent annually on the Great Lakes basin portion of the program.

Water Conservation

In Pennsylvania, public water supply agencies withdrawing or using surface water are required to develop a water conservation program. The Department of Environmental Protection provides its Drought Information Center guidelines to assist in development of these programs. The elements of water conservation programs are reviewed under a Permit Compliance Report to ensure that a variety of conservation efforts are occurring. The Delaware and Susquehanna River Basin Commissions have jurisdiction for the water conservation programs within their watersheds.

The state investigates public water supply systems that do not have water use that falls between 40 and 70 gallons per capita per day. The last comprehensive study of per capita usage indicated a statewide average

of 62 gallons per capita per day for metered systems. The state also investigates unaccounted-for-flows that exceed 20 percent by looking at domestic connection per capita usage.

Drought Contingency Plan

The state has drought regulations, which require water supply systems with more than 50 connections to provide the Department of Environmental Protection with drought contingency plans. Within these plans, agencies must identify measures they will take to respond to drought conditions. These can include providing public notice of the situation, implementing a conservation program, and rationing. Additionally, commercial and industrial water users that use more than 100,000 gallons per day in any 30-day period must have a plan that includes information on water conservation measures taken, potential measures that could be taken, and a plan of action for phased reduction of water use.

Streamflow, groundwater levels, reservoir storage, precipitation, and the Palmer index are all used as drought triggers to determine one of three stages of drought. Within each stage various levels of water conservation are targeted: Each water user reduces water use by 5 percent in Drought Warning, 10 to 15 percent in Drought Watch and at least 15 percent in Drought Emergency. The third stage may also include mandatory restrictions. Water suppliers in a drought

emergency area can ration water during the emergency stage with approval from the Commonwealth Drought Coordinator.

Demand Forecasting

Demand forecasting is done for public water supply systems on a five to ten year basis with 50-year projections. The last demand forecasts were made in 1995 using the 1990 U.S. Census. With the assistance of the Pennsylvania State Data Center, the Division of Water Use Planning projects municipal populations for counties, which are applied to public water supply service areas with a system per capita usage.

Table 12: Summary of Pennsylvania's Water Use Reporting Program, January 1, 1998

Water Use Category	Agencies Involved	Authorizing Laws/Regulations	Permit/Registration	Public Participation in Permit Process	Total Principal Facilities	Percent Principal Facilities Reporting	Data Reporting Frequency	Data Compilation Methods	Consumptive Use Compilation Methods	Specificity of Primary Data to G.L. Basin	Consistent with G.L. Charter	Funding	Staffing
Overall Program	Department of Env'tal Protection's Bureau of Watershed Management	Chapter 109.701 (b) Rules and Regulations; Administrative Code Section 1904-A(3)	Surface withdrawal permits for public supply	Public comment for public supply	26	N/A	Annual	Facility estimated or measured	State estimated/ Fac. est. or measured	Yes	Mostly	\$6,700 (G.L. Basin)	0.1 FTEs (G.L. Basin)
Public Supply	DEP's Bureaus of Watershed Mgmt., and Water Supply and Waste Water Mgmt.	Chapter 109.701 (b) Rules and Regulations	Permit needed for surface withdrawals	15 days for public comment; input by agencies	10	100	Annual	Facility measured	State estimated	Yes	Yes		
Self-Supply Domestic	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	State estimated	N/A	N/A		
Self-Supply Irrigation	DEP's Bureau of Watershed Management	Administrative Code Section 1904-A(3)	None	N/A	11	80-100	Annual	Facility estimated or measured	State estimated	Yes	Yes (mostly)		
Self-Supply Livestock	DEP's Bureau of Watershed Management	Administrative Code Section 1904-A(3)	None	N/A	0	80-100	Annual	Facility estimated or measured	State estimated	Yes	Yes (mostly)		
Self-Supply Industrial	DEP's Bureau of Watershed Management	Administrative Code Section 1904-A(3)	None	N/A	5	80-100	Annual	Facility estimated or measured	Facility estimated or measured	Yes	Yes (mostly)		
Self-Supply Fossil Fuel	DEP's Bureau of Watershed Management	Administrative Code Section 1904-A(3)	None	N/A	0	80-100	Annual	Facility estimated or measured	Facility estimated or measured	Yes	Yes (mostly)		
Self-Supply Nuclear	DEP's Bureau of Watershed Management	Administrative Code Section 1904-A(3)	None	N/A	0	80-100	Annual	Facility estimated or measured	Facility estimated or measured	Yes	Yes (mostly)		
Hydroelectric	DEP's Bureau of Watershed Management	Administrative Code Section 1904-A(3)	None	N/A	0	80-100	Annual	Facility estimated or measured	N/A	Yes	Yes (mostly)		
Other	DEP's Bureau of Watershed Management	Administrative Code Section 1904-A(3)	None	N/A	0	80-100	Annual	Facility estimated or measured	N/A	Yes	Yes (mostly)		

Québec

Water Use

The Ministry of the Environment oversees most of the water use in Québec (quality, hydrology), but several other ministries, agencies and municipalities share responsibilities for water use issues. The Ministry of Natural Resources and Hydro-Québec oversee power-related water use, the Ministry of Agriculture and Fisheries is responsible for agriculture-related water use, the Ministry of Municipal Affairs deals with water supply infrastructure. Coordination of the functions carried out by these several agencies occurs through inter-ministerial committees and agreements. The nomination of a Minister of State for Environment and Water and the anticipated National Water Policy are designed to better coordinate efforts in water management.

Under the Environment Quality Act, Québec has several different regulations dealing with water use, mostly related to impacts on the environment and water quality. A certificate of authorization (permit) is required from the Environment Minister before a variety of activities can occur on water bodies. This includes, but is not limited to, operation of a public water facility (surface and groundwater) and hydroelectric projects. The regulations also deal with impacts associated with alterations to waterways. Transporting water outside Québec is not allowed under the Water Resources Preservation Act. Some exceptions include production of electric power, drinking water in containers 20 liters or smaller, and

supplying water to areas bordering the basin. Also, under the Policy on Ecological Flow for Fish Habitat Protection, models are used to determine whether minimum flows are being maintained that allow for various demands on the water, such as habitat protection.

Water Use Reporting Program

Quebec has no formal water use reporting program. In view of what was needed to fulfill the provisions of the Great Lakes Charter, the Ministry of the Environment proceeded in 1994 to collect available data from other ministries and agencies.

Water Conservation

The province has no regulatory or mandatory water conservation program, but conservation efforts occur at the local level, and provincial ministries provide financial support to some non-governmental organizations that focus on water conservation, such as RÉSEAU Environment, which along with other activities promotes water conservation through a variety of publications, conferences, programs, publicity campaigns and a website (www.reseau-environnement.com). Programs also provide financial support to municipalities for replacement or improvement of drinking and wastewater infrastructure. Municipalities take measures such as limiting hours when lawns can be watered. Also, some municipalities and organizations, such as the Montreal Urban Community, have education programs in

schools and awards for institutions that improve their water management.

Drought Contingency Plan

Québec has no formal drought contingency plan, but some municipalities take measures such as limiting hours when lawns can be watered.

Table 13: Summary of Québec's Water Use Reporting Program, January 1, 1998

Water Use Category	Agencies Involved	Authorizing Laws/Regulations	Permit/Registration	Public Participation in Permit Process	Total Principal Facilities	Percent Principal Facilities Reporting	Data Reporting Frequency	Data Compilation Methods	Consumptive Use Compilation Methods	Specificity of Primary Data to G.L Basin	Consistent with G.L. Charter	Funding	Staffing
Overall Program	Municipalities; Ministry of Agriculture and Fisheries; Industry; Hydro-Québec	Ministry of the Environment; Watercourses Act; Environment Quality Act; other ministries	Permit needed for public supply	Municipality gives public supply comments	171	70-100	When requested	Facility measured (industrial, electric only)	N/A (no systematic mechanism)	Only for hydro	No	\$0	0 FTEs
Public Supply	Municipalities	Ministry of Municipal Affairs; Ministry of the Environment; Environment Quality Act	Permit needed for all quantities	Municipality can comment	N/A	N/A	N/A	N/A	N/A	No	N/A		
Self-Supply Domestic	Municipalities	Ministry of the Environment; Environment Quality Act	None	N/A	N/A	N/A	N/A	N/A	N/A	No	N/A		
Self-Supply Irrigation	Ministry of Agriculture and Fisheries	Ministry of Agriculture and Fisheries	None	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		
Self-Supply Livestock	Ministry of Agriculture and Fisheries	Ministry of Agriculture and Fisheries	None	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		
Self-Supply Industrial	Municipalities-Industries	Ministry of the Environment; Environment Quality Act	None	N/A	155	100	Once every 5 years	Facility measured (Environment Canada)	Estimated through EC survey	No	No		
Self-Supply Fossil Fuel	Hydro-Québec	Ministry of Natural Resources; Watercourses Act; Environment Quality Act	None	N/A	2	N/A	N/A	Facility measured (Hydro-Québec)	N/A	No	No		
Self-Supply Nuclear	N/A	N/A	N/A	N/A	0	N/A	None	None	None	N/A	N/A		
Hydroelectric	Hydro-Québec	Ministry of Natural Resources; Watercourses Act; Environment Quality Act	None	N/A	14	70- 80	When requested	Facility measured (Hydro-Québec)	Facility measured	Yes	No		
Other	N/A	N/A	N/A	N/A	0	N/A	None	None	None	N/A	N/A		

Wisconsin

Water Use

The Wisconsin Department of Natural Resources (DNR) is the sole agency overseeing water use in the state. The state's regulations for water use cover installation of high capacity wells, surface water diversions, instream flows and water conservation. The Wisconsin legislature passed Act 60 in 1985, largely in response to the Great Lakes Charter. This act provides for regulation of water withdrawals, diversions, and consumptive use, and deals with both surface and groundwater. Act 60 was designed to meet the legislative test set forth by the Supreme Court in *Sporhase*, so the state must demonstrate the need for conserving and protecting its water resources to provide for the health and welfare of the state's citizens.

A water withdrawal must be registered if it will average more than 100,000 gallons per day in any 30-day period. The state tries to ensure registration of facilities through existing programs, such as permits for well construction. Registration exemptions are granted if a permit has been issued for the withdrawal and reported information includes the volume and rate of water withdrawal. In addition, Wisconsin diversions resulting in a 2 million gallon loss in a 30-day period require approval under Wisconsin State Statute 30.18.

Water Use Reporting Program

The DNR collects water use data based on the authority in Wisconsin State Statute 281.35 and the

associated rules in Natural Resources 142, Wisconsin Administrative Code. Wisconsin receives information that is either measured or estimated by facilities on an annual basis for all of the nine water use categories used in the Great Lakes Regional Water Use Database. All consumptive use data is estimated by facilities. Facilities in the irrigation, livestock, and industrial categories use state-mandated coefficients. Facilities in the other water use categories provide the DNR with their coefficient and the method used for its calculation. The data that is gathered has specificity to the Great Lakes basin, although data is collected across the state. Wisconsin has one person, or 0.2 full time equivalent, involved in the statewide water use reporting program, and activities focus mostly on data review and evaluation. The statewide program is funded with \$14,000 per year, a decrease from 10 years before.

Water Conservation

Wisconsin has no required formal water conservation plan, but the state recommends water conservation plans as part of wellhead protection plans, which are required for all new municipal wells. Part of a conservation plan includes self-reporting, but there are no formal compliance provisions. Agencies involved in water conservation include the Department of Natural Resources, the Public Service Commission (PSC), and the Department of Commerce. The DNR regulates supply sources and users such as community water supplies and hydroelectric facilities. The PSC

regulates water rates, pressure standards and system losses, and the Department of Commerce regulates the maximum water use for newly installed plumbing fixtures. To help coordinate tasks among the agencies, ad hoc interagency committees can be formed when necessary.

Drought Contingency Plan

In addition to these efforts, water conservation is part of the state's statewide drought contingency plan. This statewide drought contingency plan, which can include mandatory conservation measures, takes effect when the governor declares an Emergency Executive Order. This plan can include mandatory water conservation measures that occur as a drought increases in severity, but there are no compliance provisions. A statewide technical advisory committee has given consideration to the criteria for determining the stages of a drought, but no statute or rule has been adopted.

Table 14: Summary of Wisconsin's Water Use Reporting Program, January 1, 1998

Water Use Category	Agencies Involved	Authorizing Laws/Regulations	Permit/Registration	Public Participation in Permit Process	Total Principal Facilities	Percent Principal Facilities Reporting	Data Reporting Frequency	Data Compilation Methods	Consumptive Use Compilation Methods	Specificity of Primary Data to G.L. Basin	Consistent with G.L. Charter	Funding	Staffing
Overall Program	Department of Natural Resources	State Statute 281.35; Natural Resources 142, Administrative Code	Registration for more than 100,000 g/day use	None	414	100	Annual	Facility measured or estimated	Facility estimated	Yes	Yes	\$14,000 (state-wide)	0.2 FTEs (state-wide)
Public Supply	Department of Natural Resources	State Statute 281.35; Natural Resources 142, Administrative Code	Registration for more than 100,000 g/day use	None	234	100	Annual	Facility measured or estimated	Facility estimated	Yes	Yes		
Self-Supply Domestic	Department of Natural Resources	State Statute 281.35; Natural Resources 142, Administrative Code	Registration for more than 100,000 g/day use	None	0	N/A	Annual	Facility measured or estimated	Facility estimated	Yes	N/A		
Self-Supply Irrigation	Department of Natural Resources	State Statute 281.35; Natural Resources 142, Administrative Code	Registration for more than 100,000 g/day use	None	111	100	Annual	Facility measured or estimated	Facility estimated	Yes	Yes		
Self-Supply Livestock	Department of Natural Resources	State Statute 281.35; Natural Resources 142, Administrative Code	Registration for more than 100,000 g/day use	None	0	N/A	Annual	Facility measured or estimated	Facility estimated	Yes	N/A		
Self-Supply Industrial	Department of Natural Resources	State Statute 281.35; Natural Resources 142, Administrative Code	Registration for more than 100,000 g/day use	None	40	100	Annual	Facility measured or estimated	Facility estimated	Yes	Yes		
Self-Supply Fossil Fuel	Department of Natural Resources	State Statute 281.35; Natural Resources 142, Administrative Code	Registration for more than 100,000 g/day use	None	11	100	Annual	Facility measured or estimated	Facility estimated	Yes	Yes		
Self-Supply Nuclear	Department of Natural Resources	State Statute 281.35; Natural Resources 142, Administrative Code	Registration for more than 100,000 g/day use	None	2	100	Annual	Facility measured or estimated	Facility estimated	Yes	Yes		
Hydroelectric	Department of Natural Resources	State Statute 281.35; Natural Resources 142, Administrative Code	Registration for more than 100,000 g/day use	None	16	100	Annual	Facility measured or estimated	Facility estimated	Yes	Yes		
Other	Department of Natural Resources	State Statute 281.35; Natural Resources 142, Administrative Code	Registration for more than 100,000 g/day use	None	0	N/A	Annual	Facility measured or estimated	Facility estimated	Yes	N/A		

Conclusion

In the 1985 Great Lakes Charter: Principles for the Management of Great Lakes Water Resources, the Great Lakes states and provinces were charged with pursuing the development and maintenance of a common base of data and information regarding the use and management of basin water resources. The Charter also called for the establishment of a basin-wide water resources management program to guide the coordinated conservation, development, use and management of the water resources of the Great Lakes basin.

The state/provincial water resources management programs survey and this written report show that each jurisdiction in the Great Lakes basin has its own unique approach in the development and conduct of its water use, water use reporting, and water conservation programs. Most states have water withdrawal and use programs that are fairly consistent with the principles of the Great Lakes Charter. Gaps in state/provincial programs vary based on the level of significance and priority given to them. Many areas of state/provincial programs can be further developed and coordinated, particularly as important regional initiatives continue to unfold. In areas where there are shortcomings and gaps, lessons can be learned that will help inform the basin-wide process. Ideally, this document will help each state or province learn more about approaches occurring elsewhere in the basin so that current efforts to coordinate will continue and improve.

Many of the states and provinces have problems collecting and reporting annual water use data for one or more categories of use and this needs to be corrected as an important first step in developing a consistent and uniform regional program. Approaches to water use data reporting can and must be improved and made more consistent. More metering and direct measurements of withdrawals need to occur, and consolidation of the data collection at the state/provincial level should be pursued to establish a more methodical and consistent process.

The survey results suggest that permitting programs ensure data collection in a more effective and timely manner than registration programs. Jurisdictions may therefore wish to consider using permitting programs as an effective tool to gather water use data called for under the Great Lakes Charter.

Despite known shortcomings and inadequacies in the current state/provincial water use data and collection programs, future regional management efforts should build upon progress that has been made and should focus on the continuing need to establish consistent and uniform programs that address the requirements of the Great Lakes Charter and Charter Annex. A comparison of similar information on water use data collection and reporting programs that was presented in the 1986 USGS report, "Water-Use Data-Collection Programs and Regional Data Base of the Great Lakes-St. Lawrence River Basin States and Provinces,"

suggests that the region is moving in the right direction (albeit slowly) regarding the development of programs necessary to facilitate a coordinated regional approach to water use data collection and reporting.

The survey also shows that water conservation efforts occur in the basin, but are not pursued aggressively or consistently between jurisdictions or water use sectors. Most Great Lakes jurisdictions only implement conservation efforts during drought conditions; some do not even have state/provincial level drought contingency plans. Great opportunities exist to develop more robust conservation programs in nine of the ten jurisdictions and to establish programs consistent with the conservation requirements that may be developed under the Charter Annex process. Illinois has a successful water conservation program that could be viewed as a model for other jurisdictions.

Areas in which program improvements can be made easily and efficiently and that would be most beneficial to overall Great Lakes water management efforts should be top priorities for state/provincial action. The Water Resources Management Decision Support System project and the Annex implementation activities should help each jurisdiction establish priorities to meet the regional goals. State/provincial water resources agencies should work with their legislatures to establish jurisdiction-specific goals and determine an appropriate level of resources to attain those goals.

Appendix

- **Notes on Water Use Tables**
- **Descriptive Survey of State/Provincial Water Use Programs in the Great Lakes-St. Lawrence System**
- **Matrix Portion of the Water Use Program Survey**
- **Membership List of Water Withdrawal and Use Technical Sub-committee**
- **Websites Related to Water Use Reporting Programs**
- **Websites Containing State/Provincial Water Use and Water Use Reporting Laws and Regulations**

Notes on Water Use Tables

- 1) References to authorizing laws/regulations may not be comprehensive, but do include information on the statutes or regulations that allow water use reporting to occur.
- 2) Principal Facilities are defined as those that withdraw 100,000 gallons or more per day. The percent facilities reporting category is based on those facilities that pump this quantity. A principal facility is defined as a facility that withdraws or consumes in excess of the Great Lakes Charter uniform trigger level of 100,000 U.S. gal/day (380,000 L/day) averaged over a 30-day period. A principal facility is determined by the total withdrawal (or consumption) of all sources combined (Great Lakes surface water, other surface water, and groundwater) rather than a single source. The combined withdrawals (or consumption) of separate wells or operations undertaken by the same facility or company will be evaluated separately for the purpose of determining principal facility status unless those operations are covered under the same registration (or permit) or are physically contiguous. (Annual Report of the Great Lakes Regional Water Use Data Base Repository, 1995, representing 1992 data)
- 3) Data compilation methods refer to whether data is measured or estimated by the state or the facilities. In many cases a mixture of approaches is used.
- 4) Consumptive use compilation methods refers to how consumptive use data is processed for the report provided to the Great Lakes Regional Water Use Database.
- 5) Specificity of primary data to Great Lakes Basin refers to whether the data is collected specifically for the Great Lakes basin as opposed to a jurisdiction-wide program that requires basin data to be extracted. For those categories that are not basin specific, the data can usually be extracted from larger data sets quite easily. The ability jurisdictions have to extract this information is included in the body of the report.
- 6) Consistent with Great Lakes Charter refers to whether the jurisdiction has a common base of data for water uses above the 100,000 gallon per day trigger level, as described in the Great Lakes Charter. These determinations were subjectively determined based on claims by the states and provinces.
- 7) Funding and staffing amounts are basin specific, so these figures are often estimates based on a larger data processing effort.
- 8) For the most part, the tables provide a snapshot of information on Jan. 1, 1998. In a few cases, other information has been included so tables are more complete.

Descriptive Survey of State/Provincial Water Use Programs in the Great Lakes-St. Lawrence System

July 2001

Please answer the following questions, as well as the accompanying matrix. If a particular question does not apply to your jurisdiction, please mark N/A and provide any further explanation as necessary.

WATER CONSERVATION

1. Is there a formal water conservation regulatory program/mandated policy in your state/province? Or, is water conservation associated more with a drought contingency plan?

2. If there is a jurisdiction-wide emergency water conservation plan associated with drought conditions, when does it take effect? Are there specific trigger levels built into the plan?

3. What institutional arrangements are in place to oversee water conservation efforts (i.e. task force), and how do they operate?

a. for the water conservation program

b. for the drought contingency plan

4. If multiple agencies are involved in the water conservation program/plan, how are functions coordinated among agencies, and what specific tasks are assigned to each agency?

a. for the water conservation program

b. for the drought contingency plan

5. What sectors/industries are regulated by the water conservation regulatory program?

6. Does your state/province have the ability to monitor program compliance? If so, how does monitoring occur?

a. for the water conservation program

b. for the drought contingency plan

7. What additional functions are involved in the water conservation program (such as publicity, consumer education)?

a. for the water conservation program

b. for the drought contingency plan

8. What types of water conservation measures are pursued under the formal regulatory program/mandated policy?

9. What is the main purpose of the formal regulatory program/mandated policy (i.e. is the specific aim water conservation, or is there another purpose?)?

10. Is there a specific emphasis or preferred approach for conserving water under the formal water conservation regulatory program (such as use of technology, improved water quality)?

GENERAL WATER USE

11. Describe the regulatory framework for water use in your state/province. Include within this description the sectors/industries regulated and the minimum quantities of water use/withdrawal for each sector that require regulation.

12. What water use regulations, if any, will be needed to implement the Great Lakes Charter and Annex 2001?

13. What is the lead agency that oversees water use in the state or province?

14. If multiple agencies are involved in the water use programs, how are functions coordinated among agencies, and what specific tasks are assigned to each agency?

15. What types of mechanisms are used for coordinating communication among agencies that share jurisdiction over an area of water use? How do these mechanisms work and what drives them?

16. What level of staffing and funding for jurisdiction-wide water use programs comes from federal sources, and what portion of the whole is provided through federal and other non-state/provincial resources? Include in your response a description of any in-kind contributions and/or other unique arrangements.

17. What problems are involved in the coordination and interaction of state/provincial water use programs with regional programs, such as the Great Lakes Regional Water Use Data Base? Are there institutional changes at the state/provincial or regional levels that would help resolve any of these problems?

18. Does your state/province/agency do demand forecasting? If so, how frequently?

19. Does your agency have a website or newsletter for your water use program?

20. What additional functions not addressed in the survey are involved in the water use program (such as publicity, consumer education)?

21. Following are two matrices that solicit additional information on staffing and funding issues for the data portions of water use reporting programs. Please fill them in using fiscal year 2001 information.

STAFFING FY 2001		Program Administration		Database Management		Data Compilation		Data Review/Evaluation		Report Preparation		Total	
		State-wide	In-Basin	State-wide	In-Basin	State-wide	In-Basin	State-wide	In-Basin	State-wide	In-Basin	State-wide	In-Basin
Allocations													
Lead Agency Staff	No. Staff												
	Total FTE*												
Other Agencies	No. Staff												
	Total FTE*												
Consultants	No. Staff												
	Total FTE*												

BUDGET FY 2001		Program Administration		Database Management		Data Compilation		Data Review/Evaluation		Report Preparation		Total	
		State-wide	In-Basin	State-wide	In-Basin	State-wide	In-Basin	State-wide	In-Basin	State-wide	In-Basin	State-wide	In-Basin
Allocations													
Annual/Biennial Allocation													
Change in 10 years**													

* Full-time equivalent. For example 5 full-time employees devoting 20% of their time equals 1 FTE.

**Adjusting for inflation, has the budget increased, decreased or remained constant over the last 10 years?

Attachment #1: Relevant Clauses Extracted from the Great Lakes Charter

(For determining Consistency of State/Provincial Water Use Reporting Programs with the Great Lakes Charter.)

Common Base of Data

The Great Lakes States and Provinces will pursue the development and maintenance of a common base of data and information regarding the use and management of Basin water resources and the establishment of systematic arrangements for the exchange of water data and information. The common base of data will include the following:

1. Each State and Province will collect and maintain, in comparable form, data regarding the location, type, and qualities of water use, diversion, and consumptive use, and information regarding projections of current and future needs.
2. In order to provide accurate information as a basis for future water resources planning and management, each State and Province will establish and maintain a system for the collection of data on major water uses, diversions, and consumptive uses in the Basin. The States and Provinces, in cooperation with the Federal Governments of Canada and the United States and the International Joint Commission, will seek appropriate vehicles and institutions to assure responsibility for coordinated collation, analysis, and dissemination of data and information.
3. The Great Lakes States and Provinces will exchange on a regular basis plans, data, and other information on water use, conservation, and development, and will consult with each other in the development of programs and plans to carry out these provisions.

Basin Water Resources Management Program

In order to guide the future development, management, and conservation of the water resources of the Great Lakes Basin, the signatory States and Provinces commit to the development of a cooperative water resources management program for the Great Lakes Basin.

Such a program should include consideration of the following elements:

1. An inventory of the Basin's surface and groundwater resources;
2. An identification and assessment of existing and future demands for diversions, into as well as out of the Basin, withdrawals, and consumptive uses for municipal, domestic, agricultural, manufacturing, mining, navigation, power production, recreation, fish and wildlife, and other uses and ecological considerations;
3. The development of cooperative policies and practices to minimize the consumptive use of the Basin's water resources; and
4. Recommended policies to guide the coordinated conservation, development, protection, use, and management of the water resources of the Great Lakes Basin.

Matrix Portion of the Water Use Program Survey (initially presented in Excel format)

Descriptive Survey of State/Provincial Water Use Reporting Programs in the Great Lakes/St. Lawrence System as of January 1, 1998														
	Lead Agency	Other Agencies	Legislative Authority	Regulations	Funding Amount	Staffing	Total Number of Principal Facilities*	% Registered/Reporting	Data Reporting Frequency	Data Compilation Methods**	Consumptive Use Reporting**	Specificity to Great Lakes Basin	Consistent with G.L. Charter***	
Overall Water Use/Supply Program														Overall Water Use/Supply Program
Public Supply														Public Supply
Self-Supply Domestic														Self-Supply Domestic
Self-Supply Irrigation														Self-Supply Irrigation
Self-Supply Livestock														Self-Supply Livestock
Self-Supply Industrial														Self-Supply Industrial
Self-Supply Thermoelectric														Self-Supply Thermoelectric
Self-Supply Nuclear														Self-Supply Nuclear
Hydroelectric														Hydroelectric
Other														Other
	Lead Agency	Other Agencies	Legislative Authority	Regulations	Funding Amount	Staffing	Total Number of Principal Facilities*	% Registered/Reporting	Data Reporting Frequency	Data Compilation Methods**	Consumptive Use Reporting**	Specificity to Great Lakes Basin	Consistent with G.L. Charter	

*Definition of principal facility: Facilities withdrawing or consuming in excess of the Great Lakes Charter uniform trigger level of 100,000 U.S. gal/day (380,000 L/day) average over a 30-day period. A principal facility is determined by the total withdrawal (or all sources combined (Great Lakes surface water, other surface water, and groundwater) rather than a single source. The combined withdrawals (or consumption) of separate wells or operations undertaken by the same facility or company will be evaluated purpose of determining principal facility status unless those operations are covered under the same registration (or permit) or are physically contiguous. (Annual Report of the Great Lakes Regional Water Use Data Base Repository, 1995, representing 1992 data)

**Please provide percentages for the following categories: Facility Measured, Facility Estimated, Estimated by State/Province, and Partially Measured

*** For a description of relevant sections of the Charter, consult Attachment #1 in the Descriptive Survey. This contains the Charter's provisions titled "Common Base of Data" and Basin Water Resources Management Program."

A Water Resources Management Decision Support System for the Great Lakes Water Withdrawal and Use Technical Sub-committee

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Websites Related to Water Use Reporting Programs

Illinois

Office of Water Resources (Dept. of Natural Resources)

http://dnr.state.il.us/owr/content/OWR_index.htm

Division of Water Resource Management (Dept. of Natural Resources)

<http://dnr.state.il.us/waterresources/index.htm>

Illinois State Water Survey

<http://www.sws.uiuc.edu/>

Indiana

Division of Water (Dept. of Natural Resources)

<http://www.in.gov/dnr/water/>

Michigan

Drinking Water and Radiological Protection Division (Dept. of Environmental Quality)

http://www.michigan.gov/deq/1,1607,7-135-3306_3334_3563---,00.html

Office of the Great Lakes (Dept. of Environmental Quality)

http://www.michigan.gov/deq/1,1607,7-135-3306_3335_6739---,00.html

Minnesota

Division of Waters (Dept. of Natural Resources)

<http://www.dnr.state.mn.us/waters/index.html>

New York

Great Lakes Program (Dept. of Environmental Conservation)

<http://www.dec.state.ny.us/website/greatlakes/index.html>

Division of Water (Dept. of Environmental Conservation)

<http://www.dec.state.ny.us/website/dow/index.html>

Public Water Supply Program (Department of Environmental Conservation)

<http://www.dec.state.ny.us/website/dcs/water/index.html>

Ohio

Division of Water (Dept. of Natural Resources)

<http://www.dnr.state.oh.us/water/>

Ontario

Ministry of Natural Resources

<http://www.mnr.gov.on.ca/MNR/>

Ministry of Environment and Energy

<http://www.ene.gov.on.ca/>

Pennsylvania

Office of Water Management (Dept. of Environmental Protection)

<http://www.dep.state.pa.us/dep/deputate/watermgt/watermgt.htm>

Bureau of Watershed Management (Dept. of Environmental Protection)

<http://www.dep.state.pa.us/dep/deputate/watermgt/WC/wc.htm>

Bureau of Water Supply and Wastewater Management (Dept. of Environmental Protection)

<http://www.dep.state.pa.us/dep/deputate/watermgt/Wqp/ws-wm.htm>

Québec

Ministry of the Environment

<http://www.menv.gouv.qc.ca/eau/index-en.htm>

Wisconsin

Division of Water (Dept. of Natural Resources)

<http://www.dnr.state.wi.us/environmentprotect/water.html>

Bureau of Watershed Management (Dept. of Natural Resources)

<http://www.dnr.state.wi.us/org/water/wm/>

USGS

Water Resources Division

<http://water.usgs.gov/>

Websites Containing State/Provincial Water Use and Water Use Reporting Laws and Regulations

Illinois

Level of Lake Michigan Act (615 ILCS 50)

<http://www.legis.state.il.us/ilcs/ch615/ch615act50.htm>

Allocation of Water from Lake Michigan (17 Ill. Adm. Code Part 3730)

<http://dnr.state.il.us/waterresources/3730rule.htm>

Indiana

Water Resource Management Act (IC 14-25-7)

<http://www.in.gov/legislative/ic/code/title14/ar25/ch7.html>

Michigan

Natural Resources and Environmental Protection Act (P.A. 451 of 1994, Part 327)

<http://www.michiganlegislature.org/mileg.asp?page=getObject&objName=mc1-451-1994-III-1-THE-GREAT-LAKES-327&highlight=>

Michigan Safe Drinking Water Act (P.A. 399 of 1976, Part 15)

http://www.michigan.gov/deq/1,1607,7-135-3313_3675_3691-9638--CI,00.html#part15

Minnesota

Water Law (Minnesota Stat. 103G)

<http://www.revisor.leg.state.mn.us/stats/103G/>

Public Water Resources (Minnesota Rules 6115)

<http://www.revisor.leg.state.mn.us/arule/6115/>

New York

Great Lakes Water Conservation and Management (NYSECL 15-1609)

<http://caselaw.lp.findlaw.com/scripts/getcode.pl?frame=right2&code=NY&ls=claws&law=37&art=50>

Great Lakes Water Withdrawal Registration Regulations (6 NYCRR, Part 675)

<http://www.dec.state.ny.us/website/regs/675.htm>

Water Supply (NYSECL 15-1501)

<http://caselaw.lp.findlaw.com/scripts/getcode.pl?frame=right2&code=NY&ls=claws&law=37&art=49>

Water Supply Applications (6 NYCRR, Part 601)

<http://www.dec.state.ny.us/website/regs/601.htm>

Ohio

Division of Water (ORC 1521)

<http://onlinedocs.andersonpublishing.com/revisedcode/toc3.cfm?GRDescription1=revised%20code&GRDescription2=title%2015&GRDescription3=&TextField=%3CJD%3A%221521%22%3ECHAPTER%201521%3A%20DIVISION%20OF%20WATER&GRStructure1=1521&GRStructure2=>

Ontario

Ontario Water Resources Act (Chapter O.40, R.S.O. 1990)

<http://www.ert.gov.on.ca/pdfs/owra.pdf>

Pennsylvania

Safe Drinking Water (25 Pa. Code 109)

<http://www.pacode.com/secure/data/025/chapter109/chap109toc.html>

Québec

Environment Quality Act (R.S.Q. Chapter Q-2)

http://publicationsduquebec.gouv.qc.ca/fr/cgi/frameset.cgi?url=/documents/lr/Q_2/Q2_A.html

Watercourses Act (R.S.Q. Chapter R-13)

http://publicationsduquebec.gouv.qc.ca/fr/cgi/frameset.cgi?url=/documents/lr/R_13/R13_A.html

Water Resources Preservation Act (Bill 73, 1999 Chapter 63)

http://publicationsduquebec.gouv.qc.ca/en/cgi/telecharge.cgi/73A9950.PDF?table=gazette_pdf&doc=73A9950.PDF&gazette=4&fichier=73

Wisconsin

Water Resources Conservation and Management (Wisconsin Statutes 281.35)

http://folio.legis.state.wi.us/cgi-bin/om_isapi.dll?clientID=85985&infobase=stats.nfo&record={1F09D}&softpage=Document

Wisconsin Water Management and Conservation (Wisconsin Administrative Code NR 142)

<http://www.legis.state.wi.us/rsb/code/nr/nr142.pdf>