

PENNSYLVANIA GREAT LAKES WATER MANAGEMENT PROGRAM
Five Year Report
December 8, 2014

The following information is included in the report submitted by the Commonwealth of Pennsylvania to the Regional Body and Compact Council pursuant to the requirements in the Agreement Articles 200, 201, 206-208, 300, 301, and 304 and the Compact Sections 3.4, 4.1-11, and 4.13

GENERAL INFORMATION

1. Lead agency/agencies and contact person(s):

Pennsylvania Department of Environmental Protection (DEP): Tim Bruno, Chief, Office of the Great Lakes (814) 835-1477, David Jostenski, Assistant Director, Interstate Waters Office (717) 772-5659.

2. Citations to Pennsylvania’s Water Management Program implementing laws, regulations and policies that establish or implement programs meeting the requirements of provisions of the Compact and Agreement:

a. Laws and Regulations

COMPACT	AGREEMENT	IMPLEMENTING LAWS
Compact Section 3.4	Agreement Article 300	The Great Lakes-St. Lawrence River Basin Water Resources Compact of 2008 (P.L. No. 526, No.43), (“Act 43”) 32 P.S. § 817.22.3.4.
Compact Section 4.1	Agreement Article 301	Act 43, 32 P.S §§ 817.22.4.1; 817.25(1) The Water Resources Planning Act of 2002 (P.L. 1776, No. 220), (“Act 220”) 27 Pa. C. S. §§ 3117-3118. 25 Pa. Code §§ 110.201- .402.
Compact Sections 4.2(2), 4.2(4), and 4.2(5)	Agreement Article 304	Act 43, 32 P.S §§ 817.22.4.2.2; 817.22.4.4; 817.22.4.5; 817.25(2). Act 220, 27 Pa. C. S. §§ 3111-3112; 3115-3116. The Pa Safe Drinking Water Act of 1984 (P.L. 206, No. 43), (“Pa SDWA”) 35 P.S. § 721.7.

		<p>25 Pa. Code § 109.603. The Dam Safety and Encroachments Act of 1978 (P.L. 1375, No. 325), (“Dam Safety Act”) 32 P.S. § 2. 25 Pa. Code §§ 105.15; 105.113. The Emergency Management Services Code of 1978 (P.L. 1332, No. 323), (“EMS Code”) 35 Pa. C.S. § 7313. 4 Pa. Code §§ 118.4-.5; 119.2; 119.4; 120.3-.5</p>
Compact Section 4.3	Agreement Article 200	<p>Act 43, 32 P.S § 817.22.4.3 The Water Rights Act of 1939 (P.L. 842, No. 365), (“Water Rights Act”) 32 P.S. §§ 636-637. The Pa Clean Streams Law of 1937 (P.L. 1987, No. 396), as amended (“Clean Streams Law”) 35 P.S. §§ 691.402; 691. 611. The Oil and Gas Act (P.L. 87, No. 13), (O&G Act) 58 Pa. C.S. § 3211(m).</p>
Compact Sections 4.8, 4.9 and 4.13	Agreement Article 200, 201 and 208	<p>Act 43, 32 P.S §§ 817.22.4.8-4.9; 817.22.4.13. Water Rights Act, 32 P.S. §§ 636-637. Clean Streams Law, 35 P.S. §§ 691.611.</p>
Compact Section 4.10	Agreement Article 206	<p>Act 43, 32 P.S §§ 817.22.4.10. Act 220, 27 Pa. C. S. § 3118. 25 Pa. Code §§ 110.201-.402. Water Rights Act, 32 P.S. §§ 636-637. Clean Streams Law, 35 P.S. §§ 691.401-.402; 691.611. O&G Act, 58 Pa. C.S. § 3211(m). Dam Safety Act, 32 P.S. §§ 6-7; 9.</p>
Compact Section 4.11	Agreement Article 207	<p>Act 43, 32 P.S §§ 817.22.4.11; 817.24(3). Act 220, 27 Pa. C. S. § 3120. Pa SDWA, 35 P.S. § 721.7.</p>

		25 Pa. Code §§ 109.501; 109.503; 109.505-.506; 109.603; 109.713. Water Rights Act, 32 P.S. §§ 636-637. Clean Streams Law, 35 P.S. §§ 691.401-.402; 691.611. O&G Act, 58 Pa. C.S. § 3211(m). Dam Safety Act, 32 P.S. §§ 6-7; 9. 25 Pa. Code §§ 105.11; 105.14-.16; 105.21; 105.23; 105.112-.113; 105.122-123.
	Agreement Article 304	See 2.c above.

b. Policies:

- i. Susquehanna River Basin Commission’s Guidelines for Using and Determining Passby Flows and Conservation Releases for Surface-Water and Ground-Water Withdrawal Approvals, Policy No. 2003-01. This policy is being applied by DEP statewide. However, policy based on research by The Nature Conservancy (TNC) is being implemented by the Susquehanna River Basin Commission during low-flow conditions in the Susquehanna River basin, and similar policies based on TNC’s study are under development in other basins, including the Great Lakes.
- ii. Anti-degradation Manual. Water Quality Anti-degradation Implementation Guidance (ID# 391-0300-002) states that it is the policy of DEP to protect the existing uses of all surface waters, and the existing quality of High Quality (HQ) and Exceptional Value (EV) Waters.
- iii. Susquehanna River Basin Commission Policy No. 2007-01, December 5, 2007, Aquifer Testing Guidance.
- iv. DEP, Public Water Supply Manual- Part II, Community System Design Standards.

WATER MANAGEMENT PROGRAM REPORT

1. **Summary description of the State’s or Province’s water management program scope and thresholds, including current status of program implementation and a description of which New or Increased Withdrawals, Consumptive Uses and Diversions are subject to the program.**

The Pennsylvania Department of Environmental Protection’s (PADEP) Water Management Program implements the *Great Lakes – St. Lawrence River Basin Water Resources Compact*

(Compact) and the *Great Lakes – St. Lawrence River Basin Sustainable Water Resources Agreement (Agreement)*. The Water Management Program is responsible for guiding sustainable water use policy throughout the Commonwealth, though special practices and reporting for the Great Lakes Basin are incorporated into the general practices of the Program. The information included in this report is specific to the Great Lakes Basin.

Pennsylvania accomplishes water management activities through several statutes, regulations, and supporting case law. Providing a broad, contextual basis for water quantity management is The Water Rights Act of 1939, which governs the acquisition of water rights by public water supply agencies to divert water from rivers, streams, natural lakes, and ponds, and or other surface waters within the Commonwealth in the interest of securing an adequate and safe supply of water for the public. Section 3 of this statute assures that acquisitions of water rights for diversions made by water supply agencies allow for existing and future needs of the agencies as well as other entities requiring the procurement and use of water.

The Water Resources Planning Act of 2002 (Act 220) and its implementing regulations, Title 25 Pa. Code Chapter 110 (Chapter 110), establish registration, monitoring, recordkeeping and reporting requirements for purposes of obtaining accurate information to guide existing and future planning for water resources. Act 220 and Chapter 110 provide the contemporary framework for water management in Pennsylvania and created the Pennsylvania State Water Plan and avenues for registration and reporting of water withdrawals for those entities withdrawing greater than an average rate of 10,000 gallons per day.

Act 43 of 2008 implementing the Great Lakes – St. Lawrence River Basin Water Resources Compact in Pennsylvania establishes the threshold for management and regulation as follows: any new or increased withdrawal from the basin in an amount that equals or exceeds 100,000 gallons per day averaged over any 90-day period; any new or increased consumptive use of water withdrawn from the basin in an amount which equals or exceeds 5,000,000 gallons per day averaged over any 90-day period; or any new or increased diversion of water from the basin.

Water Use Registration and Reporting

Pennsylvania Act 220, Chapter 110, and Act 43 of 2008 set the registration and reporting requirements for water withdrawals, consumptive uses, and diversions.

Registration

Chapter 110, Subchapter B, Section 110.201 requires the following persons to register with the PADEP within 30 days following the initiation of a water withdrawal or withdrawal use:

- Each owner of a public water supply agency.
- Each owner of a hydropower facility.
- Each person whose total withdrawal from a point of withdrawal, or from multiple points of withdrawal operated as a system either concurrently or sequentially, within a watershed exceeds an average rate of 10,000 gallons per day in any 30-day period.

- Each person who obtains water through an interconnection with another person in an amount that exceeds an average rate of 100,000 gallons per day in any 30-day period.
- Within an area designated as a critical water planning area, each person who obtains water through interconnection with another person in an amount that exceeds an average rate of 10,000 gallons per day in any 30-day period.

Registrants are required to supply the following information by completing DEP Registration Form 3940-FM-BSDW0048 and submitting a hard copy by mail to PA DEP Bureau of Safe Drinking Water, PO Box 8467, Harrisburg, PA 17105-8467 or by email to epwaterreporting@pa.gov.

- Registrant identification and description information.
- For each source: Name, description, location, amount of water withdrawn or obtained through interconnection with another person, or instream hydropower use.

Reporting

Chapter 110, Subchapter C, 110.304 states that each person subject to registration in Chapter 110.201 shall provide an annual report to PADEP describing water use during the previous calendar year. Reports include industry-specific information as well the following items:

- The amount of consumptive and non-consumptive uses.
- Locations and amounts of any waters returned or discharged.
- Amounts of water transferred between public water supply agencies by means of interconnections.

All Chapter 110 and water management plan reporting is accomplished through an online data submission portal, DEP Greenport (www.depgreenport.state.pa.us). Public water suppliers are required to report by March 31 following the report year, and all other registrants are required to report by June 30. Water management plans report on a quarterly basis dependent upon the plan specifications.

Withdrawals

‘Withdrawal’ is defined in Act 43 of 2008, Article I as “the taking of water from surface water or groundwater.” Act 43 of 2008, Section 6 sets the threshold for management and regulation as follows: any new or increased withdrawal from the basin in an amount that equals or exceeds 100,000 gallons per day averaged over any 90-day period; any new or increased consumptive use of water withdrawn from the basin in an amount which equals or exceeds 5,000,000 gallons per day averaged over any 90-day period; or any new or increased diversion of water from the basin.

The permitting of withdrawals is accomplished through multiple PADEP permitting programs that focus on the type of activity and industry proposing the withdrawal. Public water supplies are governed by the Pennsylvania Safe Drinking Water Act which requires stringent source water quality standards and provides guidelines on water quantity, either

surface or ground water, through the PADEP Public Water Supply Manual- Part II, Community System Design Standards, Section III: Source Development and Construction.

Water withdrawals associated with unconventional oil and natural gas well drilling and development activities are subject to approval requirements of Section 3211(m) of the 2012 Oil and Gas Act which requires the creation and approval of a water management plan and quarterly withdrawal reporting.

Certain activities that involve surface water withdrawals and intake structures may require permitting through the Dam Safety and Encroachments Act of 1978 and its implementing regulations in Title 25 Pa Code Chapter 105.

Consumptive Use

‘Consumptive Use’ is defined in Act 43 of 2008, Article I as “that portion of the Water Withdrawn or withheld from the Basin that is lost or otherwise not returned to the Basin due to evaporation incorporation into Products, or other processes.” Water withdrawal registrants under Act 220 and 25 Pa Code §110.304 are required to report the amounts of consumptive and non-consumptive uses by a means or method accurate to within 10% of actual flow or through established scientific means as defined by Chapter 110.501.

Diversions

‘Diversion’ is defined in Act 43 of 2008, Article I as “a transfer of Water from the Basin into another watershed, or from the watershed of one of the Great Lakes into that of another by any means of transfer, including but not limited to a pipeline, canal, tunnel, aqueduct, channel, modification of the direction of a water course, a tanker ship, tanker truck or rail tanker but does not apply to Water that is used in the Basin or a Great Lake watershed to manufacture or produce a Product that is then transferred out of the Basin or watershed.” Currently in Pennsylvania, there are no existing or proposed diversions. Any proposed diversion would be reviewed through existing water withdrawal permitting programs.

2. Specific description of how water withdrawals in Pennsylvania are managed by sector, water source, quantity, and location.

Water withdrawals in Pennsylvania are regulated in a varying manner depending on Sector, Source, Quantity and Location.

a. Regulation by Sector

Under the registration process of 25 Pa. Code §§ 110.201-.206, withdrawal sources in the Great Lakes-St. Lawrence River Basin are assigned codes within Pennsylvania’s Water Use Data System (WUDS) that identifies a source use (Sector) type consistent with Great Lakes- St. Lawrence River Regional Water Use Database. Other data collected includes, but is not limited to, facility type and client-level information related to ownership and

location.

Public water supply (state-wide)

Under the authority and provisions of the Water Rights Act, 32 P.S. §§ 636-637, public water suppliers obtain water rights from DEP for all surface water withdrawals (no rate or volume thresholds) through the application of and approval of Water Allocation permits. Public water suppliers are also regulated by the Pa SDWA, 35 P.S. § 721.7. Public water suppliers are also subject to registration, recordkeeping, monitoring and reporting requirements as described in the 25 Pa. Code §§ 110.1-.603.

Gas well development in unconventional formations (state-wide)

Under the O&G Act, 58 Pa. C.S. § 3211(m), any person withdrawing or using water from a water source in the Commonwealth, for drilling or completing an unconventional gas well, are to obtain approval of a Water Management Plan from DEP prior to the withdrawal or use of water (no quantity or rate minimums). Water Management Plan approvals identify the maximum rate and volume of water that may be withdrawn. Holders of the approvals generally follow the recordkeeping, monitoring and reporting procedures of 25 Pa. Code §§ 110.1-.603.

Other sectors

The management and regulation of all other sectors within the Great Lakes-St. Lawrence River Basin (including Mineral, Industrial, Agriculture, Commercial, and Electric) fall under the provisions of Act 43, 32 P.S §§ 817.22.4.10 including any new or increased withdrawal from the basin in an amount that equals or exceeds 100,000 gallons per day averaged over any 90-day period; any new or increased consumptive use of water withdrawn from the basin in an amount which equals or exceeds 5,000,000 gallons per day averaged over any 90-day period; or any new or increased diversion of water from the basin.

As with Public Water Supply and Gas operations, water withdrawals for other sectors are subject to registration, recordkeeping, monitoring and reporting requirements of 25 Pa. Code §§ 110.1-.603.

b. Regulation by Water Source

Groundwater:

Groundwater withdrawals are managed and regulated within the Great Lakes-St. Lawrence River Basin under the provisions of Act 43, 32 P.S §§ 817.22.4.10 including any new or increased withdrawal from the basin in an amount that equals or exceeds 100,000 gallons per day averaged over any 90-day period; any new or increased consumptive use of water withdrawn from the basin in an amount which equals or

exceeds 5,000,000 gallons per day averaged over any 90-day period; or any new or increased diversion of water from the basin.

Groundwater withdrawals for public water suppliers (no minimum thresholds) are regulated under the authority of the Pa SDWA, 35 P.S. § 721.7, the DEP Water Supply Manual- Part II, Community System Standards, and the registration, recordkeeping, monitoring and reporting requirements of 25 Pa. Code §§ 110.1-.603.

Groundwater withdrawals for unconventional gas well development are regulated under the O&G Act, 58 Pa. C.S. § 3211(m), requiring DEP approval of Water Management Plans developed by unconventional gas well operators. Holders of the approvals generally follow the recordkeeping, monitoring and reporting procedures of 25 Pa. Code §§ 110.1-.603.

Withdrawals for groundwater withdrawals by other sectors (Mineral, Industrial, Agriculture, Commercial, and Electric) are subject to the registration, recordkeeping, monitoring and reporting requirements of 25 Pa. Code §§ 110.1-.603.

Surface Water:

In the Great Lakes Basin portion of Pennsylvania, all surface water withdrawals by public water suppliers are regulated under the Water Rights Act, 32 P.S. §§ 636-637 and for all withdrawals of 10,000 gallons per day or more over a 30-day average under 25 Pa. Code §§ 110.1-.603.

Surface water withdrawals for unconventional gas well development are regulated under the O&G Act, 58 Pa. C.S. § 3211(m), requiring DEP approval of Water Management Plans developed by unconventional gas well operators. Holders of the approvals generally follow the recordkeeping, monitoring and reporting procedures of 25 Pa. Code §§ 110.1-.603.

c. Regulation by Quantity

Withdrawals are managed and regulated within the Great Lakes-St. Lawrence River Basin under Act 43, 32 P.S §§ 817.22.4.10 including any new or increased withdrawal from the basin in an amount that equals or exceeds 100,000 gallons per day averaged over any 90-day period; any new or increased consumptive use of water withdrawn from the basin in an amount which equals or exceeds 5,000,000 gallons per day averaged over any 90-day period; or any new or increased diversion of water from the basin.

Act 220, 27 Pa. C. S. § 3118 and its implementing regulation 25 Pa. Code §§ 110.1-.603 requires registration, reporting and recordkeeping for water withdraws if an owner of a public water supply agency, hydropower facility or any person whose total withdrawal exceeds an average rate of 10,000 gallons per day in any 30-day period or 100,000 gallons per day in any 30-day period if obtaining water through an interconnections with

another person. Reports are to be submitted to DEP yearly. Depending on the sector, different user-specific contents are required in the report.

d. Regulation by Location

Regulation of water withdrawals vary somewhat between withdrawals and uses within and outside of the Great Lakes-St. Lawrence River Basin. While all the provisions under Act 220, 27 Pa. C. S. § 3118 and 25 Pa. Code §§ 110.1-.603 and those under O&G Act, 58 Pa. C.S. § 3211(m) apply Statewide, the provisions of Act 43 regarding the prohibition of new or increased diversions, new or increased withdrawals and consumptive uses apply only within Pennsylvania’s portion of the Great Lakes-St. Lawrence River Basin.

e. Exemptions as allowed in the Agreement and Compact

Act 43, 32 P.S §§ 817.22.4.9 and 4.13 provides for the full exemptions allowed in the Agreement and Compact.

i. Section 4.9 Exceptions to the prohibition of diversions

- Provisions for certain transfers of water to areas within “straddling communities”; and
- Provisions for certain transfers of water to communities within a “straddling county”.

ii. Section 4.13 Exemptions

- To supply vehicles, including vessels and aircraft, whether for the needs of the persons or animals being transported or for ballast or other needs related to the operation of the vehicles.
- To use in non-commercial project on a short-term basis for firefighting, humanitarian or emergency response purposes.

3. Description of how the provisions of the Standard of Review and Decision are applied, including information on how each criterion of the Decision Making Standard and Exception Standard is addressed.

The Standard of Review and Decision was codified in Pennsylvania in Act 43 and will be applied when DEP permits or regulates water withdrawals, within the Great Lakes-St. Lawrence River basins, under the statutes, regulations and/or policies described under “General Information.” No additional standards have been incorporated in the withdrawal review process.

a. Decision making standard for withdrawals, consumptive uses.

Section 4.11 of Act 43 details the requirements for proposals subject to the threshold level for management and regulations of all new or increased withdrawals of 100,000 gallons per day or greater average in any 90-day period.

- All water withdrawn shall be returned, either naturally or after use, to the source watershed less an allowance for consumptive use;
 - The withdrawal or consumptive use will be implemented so as to ensure that the proposal will result in no significant individual or cumulative adverse impacts to the quantity or quality of the waters and water dependent natural resources and the applicable source watershed;
 - The withdrawal or consumptive use will be implemented so as to incorporate environmentally sound and economically feasible water conservation measures;
 - The withdrawal or consumptive use will be implemented so as to ensure that it is in compliance with all applicable municipal, State and Federal laws as well as regional interstate and international agreements, including the Boundary Waters Treaty of 1909;
 - The proposed use is reasonable, based upon consideration of factors including efficiency, balance between economic development, social development and environmental protection, supply potential of the water source, and adverse impacts expected to be caused by the proposed withdrawal.
- b. Exception standard for diversions.
- i. Section 4.8 of Act 43 provides for the prohibition of new or increased diversions with Section 4.9 providing an exception standard for proposals subject to management and regulation under the Act as previously described in Item 2.e.
 - ii. The following diversion proposals are subject to more stringent standards as well as separate review and approval by the eight Great Lakes states who are members of the Compact Council and also review by the Regional Body composed of the Compact Council members plus representatives of the Canadian provinces of Ontario and Quebec, in accordance with the Great Lakes – St. Lawrence River Basin Sustainable Water Resources Agreement and the Compact:
 - Proposals to divert Great Lakes water to a community within a county that straddles the Great Lakes Basin; and
 - Proposals to transfer water from the basin of one Great Lake to that of another that result in more than 5 MGD consumptive use.

4. Overview of Pennsylvania’s reporting and database of Withdrawals, Consumptive Uses and Diversions including implementation status and database elements and capabilities and reporting mechanisms as well as methods of measurement:

Pennsylvania’s water withdrawal and use requirements are outlined in 25 Pa. Code §§ 110.1-.603. <http://www.pacode.com/secure/data/025/chapter110/chap110toc.html>

- a. § 110.201.
Registration of a water source is required of 1) each owner of a public water supply agency (no minimum threshold); 2) each owner of a hydropower facility (no minimum

threshold); 3) each person whose total withdrawals exceeds an average rate of 10,000 gallons per day in any 30-day period; 4) each person who obtains water through interconnection with another person that exceeds an average rate of 100,000 gallons per day; and 5) each person within an area designated as a critical water planning area who obtains water through interconnection with another person that exceeds 10,000 gallons per day.

- Registration is accomplished through submission of forms that identify ownership, source, use type, sector, location, source details, and measurement of water. Once accepted, the registration information is retained within the Commonwealth's Water Use Data Management System (WUDS). From this information, consumptive use coefficients are applied by sector based on published values.

b. § 110.302-.305.

Each person subject to the registration under § 110.201 is required to submit a report of their withdrawals or purchases. This is accomplished electronically through the DEP Greenport, a web-based application. <http://www.pawaterplan.dep.state.pa.us/StateWaterPlan/WaterUse/WaterUse.aspx#Link3>

- Monthly water withdrawals and use are reported on an annual basis by June 30 subsequent to the report year for all sectors except for Public Water Supply surface water sources which report daily values on a monthly basis and for unconventional gas operator sources which report monthly values on a quarterly basis.

c. § 110.401-.402

Each person subject to registration and reporting is to retain supporting data for at least 5 years.

d. § 110.501-.503

A public water supplier is to measure its withdrawals and transfers by means of a continuous recording device or flow meter accurate to within 5% of actual flow. A hydropower facility is to measure its withdrawals or in-stream uses by continuous recording device, by flow meter or by calculation based on electrical generation or turbine flow rates accurate to within 5% of actual flow. Each person whose total withdrawals equals or exceeds an average rate of 50,000 gallons per day in any 30-day period or obtains water by interconnection in excess of an average of 100,000 gallons per day in any 30-day period is to measure or calculate: 1) withdrawals and interconnection water by a continuous recording device or meter accurate to within 5% of actual flow; 2) consumptive use by means accurate to within 10% of actual flow. DEP may grant exceptions if standards are not technically feasible or economically practical. Withdrawals and uses are to be recorded on a daily basis with water obtained by interconnection recorded on a weekly basis. Voluntary registrants may record on a monthly basis. Provision is made for more accurate measurement or calculations in

“Critical Water Planning Areas” designated through State Water Planning processes.

5. Application Form(s) and related regulations, policies and manuals:

Water Allocation Permit form and instructions for public water supply surface water withdrawals:

<http://www.elibrary.dep.state.pa.us/dsweb/View/Collection-9484>

Water withdrawal registration and use forms and instructions of all withdrawals under 25 Pa. Code Chapter 110:

<http://www.elibrary.dep.state.pa.us/dsweb/View/Collection-10662>

Water Management Plan form and instructions for unconventional gas water withdrawals:

<http://www.elibrary.dep.state.pa.us/dsweb/View/Collection-10554>

Public Water Supply Permit Applications:

<http://www.elibrary.dep.state.pa.us/dsweb/View/Collection-9486>

<http://www.elibrary.dep.state.pa.us/dsweb/Get/Document-47843/01%20383-2125-108.pdf>

Title 25 Pa. Code Chapter 110

<http://www.pabulletin.com/secure/data/vol38/38-46/2057.html>

The Water Resources Planning Act of 2002 (Act 220)

http://www.pawaterplan.dep.state.pa.us/docs/Legislation/Act_220.pdf

Act 43, the Great Lakes- St. Lawrence River Basin Water Resources Compact

<http://www.legis.state.pa.us/WU01/LI/LI/US/HTM/2008/0/0043..HTM>

O&G Act, 58 Pa. C.S. § 3211(m)

<http://files.dep.state.pa.us/OilGas/BOGM/BOGMPortalFiles/OilGasReports/2012/act13.pdf>

DEP, Public Water Supply Manual

<http://www.elibrary.dep.state.pa.us/dsweb/Get/Document-47843/01%20383-2125-108.pdf>

- 6. Summary description of the State’s or Province’s initiatives to support an improved scientific understanding of the Waters of the Basin and an improved understanding of the groundwater of the Basin and the role of groundwater in Basin water resource management including a description of initiatives or mechanisms to support an improved understanding of individual or cumulative impacts of withdrawals, consumptive uses and diversions of the Basin:**
- a. Pennsylvania will be considering several important research projects towards the establishment of processes to evaluate instream flow needs and management in Pennsylvania’s portion of Great Lakes-St. Lawrence River Basin. A report submitted to the New York State Department of Environmental Conservation by The Nature Conservancy (TNC) in September 2013 entitled “Flow Recommendations for the Tributaries of the Great Lakes in New York and Pennsylvania” provides recommendations on defining and quantifying the ecological processes to maintain intact aquatic ecosystems. A concurrent report by The Nature Conservancy from March 2013 entitled “Ecosystem Flow Recommendations for the Upper Ohio River Basin in Western Pennsylvania” provided a summary of the TNC work for the Tributaries of the Great Lakes but also importantly offered information on some of the flow recommendations from the Upper Ohio Study to streams and rivers in the Great Lakes to supplement the Great Lakes Tributary recommendations.
 - b. Pennsylvania has developed and implemented a GIS-based application (Yield Analysis Tool or “YAT”) to support the review of water withdrawals on protection of instream flow needs that is used to estimate water needs of public water supply agencies, estimating water yields from streams, groundwater wells and reservoirs and establish passby/conservation releases as well as assess cumulative impacts of withdrawals.
 - c. Pennsylvania Coastal Resources Management Program staff is currently working on a Marine Spatial Plan that will provide baseline information on the waters of Lake Erie. Current field research involves new information pertaining to sediment transport and sediment quality, habitat, and shipwrecks in Pennsylvania waters.
 - d. Work is underway to develop a Lake Erie Integrated Water Resources Management Plan. This effort involves mapping features of the watershed that impact the water quality flowing into Lake Erie and Presque Isle Bay. Through this effort, we are gaining a better understanding of the water quality impacts from the land.
 - e. The Harmful Algal Bloom (HAB) Task Force continues to assess conditions that lead to algal bloom breakouts in Lake Erie. This study is being conducted to identify issues and projects in the watershed that need to be addressed, including land use issues, instream habitat work, and water quality needs. A Lake Erie harmful Algal Bloom Monitoring and Response Strategy for Recreational Waters was developed by DEP in May 2014 and is now implemented as a unified approach to identifying and addressing HABs in Lake Erie waters to protect people from cyanotoxins. This program is also coordinated with the City of Erie Water Works to monitor the raw intake water for cyanotoxins that could affect the drinking water supply.