# Indiana Utility Regulatory Commission

## 2014 water utility resource report

# Acknowledgements

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- Alliance of Indiana Rural Water
- Indiana Association of Cities and Towns
- Indiana Chapter of American Water Works Association
- Indiana Department of Environmental Management
- Indiana Department of Natural Resources
- Indiana Rural Water Association

# Table of Contents

# Executive Summary & Recommendations

This is the second Water Utility Resource Report (Report) prepared by the Indiana Utility Regulatory Commission (IURC or Commission), regarding Indiana's water resources and utilities, as required by Ind. Code 8-1-30.5. This Report is intended to assist in better understanding the strengths and challenges facing water utilities and is based on data collected from Indiana's water utilities and from other state agencies. Information about the industry as a whole, data analysis, and specific recommendations are included.

Enacted in 2012 as Senate Enrolled Act 132 (SEA 132), Ind. Code 8-1-30.5 requires all water utilities, even those not regulated by the Commission, to provide information to the Commission about a number of topics, including water resources used, operational and maintenance costs, utility plant in service, number of customers, service territory, and the amount and types of funding received. While the statute requires water utilities to participate, there are no consequences in the statute for failure to provide the required information.

To encourage participation, the Commission conducted significant public outreach to educate water utility managers and staff about the statute and the information to be provided. A number of other organizations[1] also assisted in this effort by reaching out to their members on behalf of the Commission, such as through newsletter articles and emails using information provided by the Commission. Although the number of participating utilities is still lower than desired, the outreach performed by the Commission with assistance from these organizations was instrumental in getting so many non-jurisdictional utilities to participate.

For this Report, the percentage of water utilities providing information was slightly lower than last year, but the data and information submitted by the responding utilities was more complete. Last year 87% (487 out of 555) of water utilities responded to the Commission's request for information, but only 67% (374 of 555) of the submissions were complete. This year 85% (458 out of 537[2]) of water utilities responded; 76% (412 of 537) of the submissions were sufficiently complete to be included in the Report.

The data clearly indicates that water utilities should continue their efforts to improve planning regarding their water resources and the managerial aspects of their businesses. Overall, small utilities continue to have more planning and financial management challenges, and these challenges need to be addressed. While the responses also indicate that Indiana's water utilities are able to meet customer demand at this time, there continues to be a lack of planning for drought. In addition, most utilities have made no provision for obtaining additional water supplies, should demand significantly increase or an emergency occur.

An overarching issue is the complexity of Indiana's regulatory scheme. Currently, there are numerous different types of entities that provide water and wastewater utility service in Indiana. The statutes authorizing utility entities should be examined to determine whether legislative

[1] See Acknowledgements, page 3

[2] There are 18 entities that are not included in the 2014 numbers and that are not required to report, because those entities no longer fit the Commission's definition of a utility.

simplification would lead to more consistent standards for establishing and operating these utilities. Finally, greater coordination of water resources and conservation efforts should be led through the reactivation of the Water Shortage Task Force.

## Recommendations

Based on the information gathered and the Commission's analysis and experience, the Commissions' specific recommendations to the General Assembly are:

- **Study and reduce the complexity and inconsistency in the creation and regulation of water and wastewater utilities.** Currently, there are numerous types of utility entities. The legislature should analyze and evaluate the existing enabling statutes to determine whether each type of entity is necessary and whether modifications are needed to create more consistent and uniform regulations. (Page 12)

Further, the Commission continues to support the recommendations made in the 2013 Report and believes that these should still be at the forefront of the conversation regarding Indiana's water resources and water utilities. For example, planning continues to be a central theme and can take several different forms, such as utilities' water resource planning, drought planning, and financial and managerial planning. The following recommendations from the 2013 Report are discussed in further detail in this report:

- **Improve the managerial, financial, and technical requirements for forming water and wastewater utilities.** The IURC has seen many water and wastewater utilities fail over the years, largely due to poor management and inadequate business planning. In order to ensure high quality service for customers, a reliable operating systems, and stable utilities, the requirements for establishing water and wastewater utilities should be examined. (Page 12)
- **Begin integrated water resource management.** Indiana is uniquely positioned when it comes to water. This abundant resource should be leveraged through cooperation among water utilities to create efficiencies regarding water withdrawals and purchases. (Page 47)
- **Require drought planning by water utilities.** As the data shows, many utilities do not have a plan that could be implemented when a drought occurs. Since the 2012 drought, this lack of planning has become a greater concern. Every utility's operating plan should include a drought plan. (Page 56)
- **Promote efficiency, sound management, and best practices for water utilities.** Managing a water utility is a significant undertaking and it should be managed like a business. Special attention should be paid to providing relevant training and continuing education for operators and employees. In addition, pursuing economies of scale can lead to more efficient use of resources. (Page 58)

Whereas the prior recommendations focus on planning, the following recommendations from the 2013 report focus on monitoring, resource identification, and coordination at the state, regional, and local level.

- **Conduct a water symposium.** Many state and local leaders are interested in water resources. Bringing all interested parties together to discuss the state's strengths and weaknesses in the industry and to develop possible solutions could result in a clear direction for Indiana's future water industry. (Page 54)
- **Develop rules or laws to establish procedures for additional significant withdrawals from aquifers, surface waters, or interbasin transfers.** With many utilities utilizing the same set of resources, it is paramount that water withdrawals are monitored and a plan is put in place to ensure the resource is protected and can support the demand placed on it by utilities and others. (Page 70)
- **Conduct a cost-benefit analysis to determine if the benefits of obtaining more precise water supply data would exceed the cost.** As a state, Indiana has abundant water resources. However, various regions of the state have scarce or difficult-to-obtain water. The availability of precise water data could help both the state and water utilities best plan for their future needs, if the benefits of such a study would exceed the costs. (Page 77)
- **Use existing and underutilized water resources in southern Indiana.** As explained in the Report, what southern Indiana lacks in groundwater, it makes up for in man-made surface water. Reservoirs such as Brookville Lake present a unique opportunity for Southern Indiana's future water resource needs. Water utility resource plans should include these underutilized resources. (Page 82)
- **Evaluate the adequacy of existing monitoring.** In order to best prepare for the state's water future, existing water resource monitoring efforts should be evaluated. (Page 90)

Finally, the Commission asks that the Legislature continue to review SEA 132 to determine if reporting requirements and the scope of this Report should be updated, in order to provide the information and analysis of most use to the General Assembly.

- **Evaluate the scope of existing law.** In the Commission's second year of data collection, the Legislature should review SEA 132 to refine reporting requirements and frequency in relation to the quality of data received. (Page 63)

# Section I: Introduction

**The Statute**

Ind. Code 8-1-30.5 requires the Commission to gather the following information from each water utility:

- The amount and location of the water resources used by the water utility to provide water service to the water utility's Indiana customers;
- The availability and location of additional water resources that could be used, if necessary, by the water utility to provide water service to Indiana customers;
- The number of Indiana customers served by the water utility;
- Operations and maintenance costs;
- The total utility plant in service with respect to the water utility's Indiana customers;
- A description of the water utility's service territory in Indiana; and
- The amount of funding received, including the purpose of the funding, from the following sources:
  - A state revolving loan program under Ind. Code 13-18;
  - The Office of Community and Rural Affairs established by Ind. Code § 4-4-9.7-4;
  - United States Department of Agriculture rural development loans and grants;
  - The Indiana Bond Bank; and
  - The issuance of any debt instruments for the purpose of raising capital to fund infrastructure projects.

In addition to summarizing the data and information, the Commission was asked to include recommendations concerning the following:

- The efficient use of financial resources by water utilities;
- Necessary infrastructure investments by water utilities; and
- Actions designed to minimize impacts on the rates and charges imposed on water and wastewater customers.

**Last Year's Report**

Last year the Commission released its first report on water issues to the General Assembly pursuant to SEA 132.[3] It was based on utility data for the calendar year 2012. Given it was the first year of data collection, the information received could not be used by the Commission to identify trends within the industry or draw firm conclusions about the state of Indiana's water resources. The Commission did, however, make the following general findings:

- Very little research has been conducted on the nexus between water and economic development;

[3] Pub L. 87-2012, Sec.1

- Better coordination is needed at the state level among the various agencies so that water issues can be explored on a broader scale; and
- Strategic planning is lacking for many medium and small utilities.

The findings summarized the ten recommendations made the Commission, which relied somewhat on the data, but mostly on the collective experience of staff members and consultants. The recommendations ranged in complexity and timeline, as well as cost, and were stated as follows:

- Develop rules or laws to establish procedures for additional significant withdrawals from aquifers, surface waters or interbasin transfers;
- Begin Integrated Water Resources Management;
- Promote efficiency, sound management and best practices for water utilities;
- Require drought planning by water utilities;
- Improve the managerial, financial, and technical requirements for forming water and wastewater utilities;
- Evaluate the adequacy of existing monitoring;
- Conduct a cost-benefit analysis to determine if the benefits of obtaining more precise water supply data exceed the cost;
- Use existing and underutilized water resources in southern Indiana;
- Conduct a water symposium; and
- Evaluate the scope of the existing law.

**This Year's Report**

The scope of this year's report is similar to last year's and contains many of the same data points. As the Commission continues to gather information each year, the data will hopefully identify trends and become more useful from a technical standpoint.

When collecting the data for this year's report, the Commission built upon the stakeholder communication methods used previously and modified the questionnaire based on the feedback received during last year's effort. For example, the utilities can now print the form in PDF format once it's submitted and check off whether they submitted a service territory map in prior years. Further, logic checks and clarifying language have been added so that the utilities can better understand the needs of the Commission and whether the information submitted is technically correct. The survey was deployed online in February 2014, and the utilities were asked to respond by April 1, 2014. Utilities were asked to submit data regarding calendar year 2013. Throughout the process, the Commission dedicated staff to answering questions about the system and troubleshooting any issues encountered along the way.

The recommendations will require coordination at both the local and state level. This cooperation has already begun, but still needs further development. This is due to the fact that water is local in nature and the regulation of it is fragmented. For example, taking the total

number of water utilities in Indiana and dividing this number by the number of counties, there are nearly six water utilities for every Indiana county. This differs drastically from other utility industries, such as natural gas and electricity. Therefore, it can be challenging to coordinate, given the sheer number of utilities, the geographical and hydrological uniqueness of certain regions, and the existing framework in which utilities focus on individual needs as opposed to regional or state-wide objectives.

Taking this into consideration, the purpose of the Commission's Report is not to be prescriptive; rather, it is meant to serve as a resource and guide on areas that may be in need of attention. It also provides links to resources outside of the Commission, given there are many other partners and stakeholders involved in water policy. From the Indiana Department of Environmental Management (IDEM) to the U.S. Geological Survey (USGS), each organization has its separate functions. Consequently, the Commission's Report is based on the best available information and any specific questions about duties or responsibilities outside of the Commission's jurisdiction should be directed to the agency or organization directly responsible.

Given the legislation clearly defines the information to be requested, the Commission did not request data regarding the utilities' rates and charges or internal policies, with the exception of water conservation and curtailment. Further, the Commission did not reach out to entities responsible for large amounts of water consumption nor did the agency study existing water resources to determine whether they will be able to meet the state's needs in the future. The Commission did, however, request and report data on planned rate increases for the next five years and planned infrastructure improvements. The methodology that the Commission used in analyzing the data is discussed in further detail in Section III.

The final three sections of this Report stress the need for planning. As was the case last year, the data collected this year clearly reveals a significant lack of planning by many of the mid-sized and smaller Indiana water utilities. Therefore, this Report discusses resource planning (Section IV), drought planning (Section V), and financial and managerial planning (Section VI). The intent is to provide a framework for utilities to use in developing their plans, rather than a strict directive. Regardless of whether a utility is under Commission jurisdiction, the Commission and its staff are available as a resource in these planning efforts.

The sections in last years' Report dealing with state water resources, including such topics as Water Law in Indiana, Regional Availability and Characteristics, Physical Groundwater and Surface Water Supply, Demand for Water, and Water Use Classification have not significantly changed. For your reference, this information along with the recommendations relating to those topics are available in appendices B through G.

# Section II: Indiana's Statutory and Regulatory Process

**Enabling Statutes**

As specified by Ind. Code 8-1-30.5, there are six types of entities that are considered water utilities in Indiana:

- Investor-owned public utilities[4] – these utilities are privately owned by one or more investors. They are regulated by the IURC, with some exceptions.
- Municipal owned utilities[5] – these utilities are owned and operated by a municipal government and managed by public employees. As part of local government, they are not-for-profit. The IURC regulates rates and charges for some municipal utilities.
- Not-for-profit utilities[6] – these utilities are privately owned and profits are reinvested back into the utility.
- Cooperatively owned utilities – every customer of a cooperative is a member and owner. Profits are reinvested into infrastructure or distributed to the members.
- Conservancy districts[7] – these are typically a taxing district with the authority to plan, develop, and operate a water utility. Conservancy districts are established through a local court and the IDNR.
- Regional water districts[8] – these utilities are established by the IDEM and also operate on a not-for-profit basis.

Each of these water utility entity types has separate and unique enabling statutes. While these differing statutes may have seemed necessary at the time they were enacted, the result is a complex system of regulations that may be inconsistent and disjointed. In addition, each of these water utility entity types have a variety of statutes that may require or allow varying degrees of regulation by different state agencies.

One example of this complexity is the IURC's interaction with the Damon Run Conservancy District (Damon Run). In November 2010, Damon Run asked the Commission for approval to provide water and sewer service to properties located outside its boundaries under Ind. Code 14-33-20 and for the rates and charges to those new customers under Ind. Code 14-33-1.[9] In October 2011, the Commission granted these approvals and required Damon Run to file all of its water and sewer rates and charges and its annual reports, as required under Ind. Code 14-33-20.[10] In January 2012, Damon Run made the required filing, which indicated as in its earlier petition, that it had elected to furnish water under Ind. Code 14-33-20 and was therefore subject

[4] Defined in Ind. Code § 8-1-2-1(a).
[5] Defined in Ind. Code § 8-1-2-1(h); *see also* Ind. Code § 8-1.5.
[6] Defined in Ind. Code § 8-1-2-125(a).
[7] Established under Ind. Code 14-33.
[8] Established under Ind. Code 13-26.
[9] Damon Run Conservancy District, IURC Cause No. 43966, 2011 Ind. PUC LEXIS 301 (Oct. 19, 2011).
[10] Id.

to the Commission's jurisdiction.[11] However, in the course of the second proceeding, it was discovered that Damon Run had not actually made the election to provide water service under Ind. Code § 14-33-20-4.[12] As a result, the Commission found that it did not have jurisdiction over any of Damon Run's water rates. On the other hand, under Ind. Code § 14-33-1-2, the Commission did have jurisdiction over Damon Run's rates and charges for sewer service outside its territorial boundaries.[13]

**Recommendation:**

Study and reduce the complexity and inconsistency in the creation and regulation of water and wastewater utilities

Examples such as this highlight the need for a comprehensive look at the existing regulatory system. One question to be asked is whether certain types of utilities are being established because regulations are perceived as being less onerous than the regulations for another type. As discussed in Section VIII, owners and operators of new utilities should be required to have certain fundamental competencies, such as utility accounting, operations, and capital planning, regardless of which type of utility entity they operate.

At this time, no study has been performed to determine if it is possible to eliminate any one of the existing types of water utilities or to modify existing statutes to create more consistent and uniform regulations across the different types of entities currently available.

**Recommendation:**

Improve the managerial, financial, and technical requirements for forming water and wastewater utilities

Another way to address these issues is the development of more uniform and stringent rules to establish new utilities. Greater economies of scale can be gained by encouraging or requiring existing utilities to serve new developments rather than allowing a developer to start a new utility. Several developer-owned utilities have been established even though a municipal utility is nearby. In one example, a municipality provides all of the water and sewage treatment for a developer-owned utility. In these situations, the new utility simply acts as a middleman and creates additional regulatory burdens on state agencies. One of the primary motivations a developer might have to start a utility, even when an existing utility is nearby, is to avoid donating the infrastructure to the existing utility and possibly paying system development charges for each connection. Developers new to the industry do not realize that it is common practice for the developer to provide the infrastructure and provide additional payments for capacity in the system.

Unfortunately, the rules in place today do not prevent such developers from starting a new utility. More stringent rules should be developed to ensure that developers have pursued all reasonable options with existing utilities. Developers must show that an existing utility was

[11] Damon Run Conservancy District, IURC Cause No. 44146, 2013 Ind. PUC LEXIS 184 (Jun. 19, 2013).
[12] Id. at *7-8.
[13] Id. at *8.

unwilling or unable to provide service on reasonable terms. Both the IURC and IDEM are aware of numerous times where small water and wastewater utilities have failed. When these small utilities fail, options for solutions are limited and are almost always very expensive. Numerous state agencies, including the IURC, IDEM, OUCC, and Attorney General's office work together in dealing with these troubled utilities. Improved laws are needed by the IURC and other agencies to prevent the formation of troubled utilities in the first place, because the legal action required to fix them after the fact is time consuming, expensive, and an undue burden for the affected customers.

## State Agencies with Water and Wastewater Responsibilities

Four state agencies have a role in Indiana's regulatory process for the water and wastewater utility sectors: IDEM, IURC, Indiana Department of Natural Resources (IDNR), and Indiana State Department of Health (ISDH).

- IDEM's jurisdiction is the most comprehensive. Its statutes enable it to regulate all of the more than 1,100 water and wastewater utilities providing service in the state, primarily regarding water quality and water management. Some responsibilities, however, extend beyond water quality. IDEM is also responsible for overseeing the establishment of water and wastewater utilities that form as regional water and sewer districts.
- The IURC primarily regulates utility rates and charges for a limited number of utilities. Further, any new water or wastewater utility that forms as investor-owned or not-for-profit or municipal water utility is required to come before the Commission. The Commission also determines whether the formation is in the public interest, if there are the financial, managerial and technical capacities to operate the utility, and how initial rates and charges will be established.
- IDNR's jurisdiction extends to many of the state's water utilities because significant water withdrawal facilities (SWWF) are required to register and report annual surface water and groundwater withdrawals. IDNR has additional permit authority over SWWFs located within the Great Lakes Basin and also has the responsibility to oversee the establishment of water and wastewater utilities that form as conservancy districts.
- The ISDH's responsibility includes wastewater utilities that utilize commercial on-site sewage treatment system. An on-site treatment system is one that is not connected to a centralized wastewater treatment plant and does not discharge effluent into surface water.

As described further in this Report, the roles and responsibilities of state agencies regulating the water sector are separate and distinct. These responsibilities appear to be allocated in a logical manner, and, as a result, these agencies conduct their daily business with limited interaction. When situations arise that require inter-agency communication and action, staff across each agency generally have good working relationships and are able to coordinate work

responsibilities. For your reference, each agency's jurisdiction and role is shown in the chart on the next page, as well as described thereafter.

## Table 1. State Agency Jurisdiction Over Water and Wastewater Utilities

| Type of Utility | IDEM | | | | | IDNR | | | ISDH | IURC | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | NPDES Permitting[1] | Construction Permits | Operator Certification | Monthly Report of Operation | Oversee Entity Start-up | Significant Water Withdraw Reporting | Dam/Levee Permitting (if applicable) | Oversee Entity Start-up | Permitting On-site Sewage Systems (if applicable) | Rates and Charges | Rules and Regulations | Territory Authority (CTA) | Annual Report | Annual Water Resources Report | Ability to Withdraw from Jurisdiction | No Jurisdiction | Oversee Entity Start-up |
| Investor-Owned Water | | ✓ | ✓ | ✓ | | ✓ | ✓ | | | ✓ | ✓ | | ✓ | ✓ | ✓[2] | | ✓ |
| Investor-Owned Wastewater | ✓ | ✓ | ✓ | ✓ | | | | | ✓ | ✓ | ✓ | ✓ | ✓ | | ✓[2] | | ✓ |
| Not-for-Profit Water | | ✓ | ✓ | ✓ | | ✓ | ✓ | | | ✓ | ✓ | | ✓ | ✓ | ✓ | | ✓ |
| Not-for-Profit Wastewater | ✓ | ✓ | ✓ | ✓ | | | | | ✓ | ✓ | ✓ | ✓ | ✓ | | ✓ | | ✓ |
| Water Authority | | ✓ | ✓ | ✓ | | ✓ | ✓ | | | ✓ | ✓ | | ✓ | ✓ | ✓ | | |
| Municipal Water | | ✓ | ✓ | ✓ | | ✓ | ✓ | | | ✓ | | | ✓ | ✓ | ✓ | | ✓ |
| Municipal Wastewater | ✓ | ✓ | ✓ | ✓ | | | | | | | | | | | | ✓ | |
| Regional Water District | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | | | | | | ✓ | | ✓ | |
| Regional Sewer District | ✓ | ✓ | ✓ | ✓ | ✓ | | | | | | | | ✓ | | | ✓[3] | |
| Conservancy Water District | | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | | ✓[4] | | | ✓[4] | ✓ | ✓ | | |
| Conservancy Sewer District | ✓ | ✓ | ✓ | ✓ | | | | ✓ | ✓ | | | | ✓ | | | ✓ | |

[1] A majority of wastewater utilities utilize a treatment system where effluent is discharged into surface water and an NPDES permit is required. A small number of wastewater utilities use an onsite treatment system permitted by ISDH.

[2] Investor-owned utilities with 300 or fewer customers can opt out of the IURC's jurisdiction, per Ind. Code § 8-1-2.7-1.3.

[3] Campgrounds served by regional sewer districts have the ability to appeal to the Commission's Consumer Affairs Division for an informal review of a disputed matter, per Ind. Code § 13-26-11-2.1.

[4] IURC has jurisdiction over water conservancy districts that make an election to provide water service under Ind. Code 14-33-20 in its District Plan. Water conservancy districts with fewer than 2,000 customers can opt out of the IURC's jurisdiction, per Ind. Code § 8-1-2.7-1.3. The IURC has jurisdiction over wastewater conservancy district's rates for customers outside the District's boundaries.

Note: This table provides an overview of state agency jurisdiction over water and wastewater utilities to offer a concise presentation. Thus, limitations exist. For instance, many wastewater utilities send their effluent to another utility for treatment and are not required to obtain an NPDES permit. Similarly, many water utilities purchase their entire water supply and would not be required to report significant water withdraws to IDNR. Also, the table does not identify every aspect of each agency's jurisdiction. Other less common utilities are cooperatives, sanitary districts, and county on-site waste management districts.

## Indiana Department of Environmental Management

Utilities that provide drinking water and treat wastewater are subject to federal regulations under the United States Environmental Protection Agency (U.S. EPA). Water quality regulation falls under the Safe Drinking Water Act (SDWA), passed in 1974 and amended in 1986 and 1996.[14] In addition to protecting drinking water and its sources – rivers, lakes, reservoirs, springs, and ground water wells – the SDWA also gave the U.S. EPA authority to set national health-based standards for drinking water. The SDWA was originally centered on treatment, but grew in scope over the years. In fact, the 1996 amendments greatly enhanced the existing law by recognizing source water protection, operator training, funding for water system improvements, and public information as important components of safe drinking water.

Wastewater regulation falls under the Federal Water Pollution Control Act or Clean Water Act (CWA), most recently amended in 1987.[15] In 1948, Congress passed the Water Pollution Control Act, which later became known as the CWA. It authorized the surgeon general of the Public Health Service to develop programs aimed at eliminating or reducing the pollution of interstate waters and tributaries and improving the sanitary condition of surface and underground waters. Similar to the SDWA, the CWA has been amended multiple times, most notably in 1972, which is when permitting became standard. In order for an entity to discharge any pollutant into a waterway, a permit must first be obtained through the U.S. EPA's National Pollutant Discharge Elimination System (NPDES) permit program.[16]

The U.S. EPA has delegated to IDEM's Office of Water Quality the authority to carry out the requirements of the SDWA and the CWA. The Office of Water Quality is divided into several divisions; three of these divisions are the Drinking Water Branch, the Permits Branch and the Compliance Branch.[17]

**Drinking Water Branch:** The Drinking Water Branch includes two primary program areas: the Public Water Supply Supervision Program and the Ground Water Protection Program. The Public Water Supply Program focuses on ensuring the quality of water provided for drinking purposes through public water supply systems while the Ground Water Protection Program focuses on protecting the resource, that is, groundwater, from which a large percentage of drinking water is derived. The Drinking Water Branch includes a group of inspectors that conduct on-site reviews of water utilities, a compliance section that tracks drinking water quality and requires corrective actions if contaminants are detected, and a permit section that issues construction permits for the construction of water drinking facilities including water mains, wells, pumps, chemical additions, storage facilities, and water treatment plants.

**Permits Branch:** The Permits Branch is dedicated to wastewater and implements both the NPDES permit and combined sewer overflow program. An NPDES permit is required for any

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[14] 42 U.S.C. §§ 300f to 300j-26
[15] 33 U.S.C. §§ 1251-1387
[16] U.S. EPA, Summary of Clean Water Act, *available at* http://www2.epa.gov/laws-regulations/summary-clean-water-act (last accessed July 11, 2014)
[17] IDEM operates primarily under state statutes codified in Titles 13 and 327 of the Indiana Code.

facility that discharges pollutants into surface water. The permit establishes limits on pollutants that can be discharged and defines monitoring and reporting requirements. In addition to the federal NPDES permit program, the Permits Branch operates a state program that issues construction permits for the construction of wastewater treatment facilities including sewer main extensions, lift stations, wastewater treatment plants, and pretreatment plants.

**Compliance Branch:** The Compliance Branch is also dedicated to wastewater and includes inspectors that conduct on-site reviews of wastewater utilities; collect, enter, and evaluate compliance data submitted by permit holders; and manages the state Pre-treatment Program and Sewer Connection Ban Program. The Compliance Branch is also responsible for certifying the water and wastewater operators that operate water and wastewater utility facilities. This responsibility includes testing and continuing education.

Water utilities are required to test their water, operate and maintain their system and, in most cases, to file monthly reports of operations to demonstrate compliance. Sewer utilities have many similar requirements for proper operation and maintenance, periodic sampling of effluent and reporting to IDEM. When compliance issues develop, IDEM typically tries to work with regulated utilities to solve compliance matters, but will use its enforcement authority when necessary to achieve compliance and to protect the public health and the environment.

**Other Agency Functions:** IDEM's role in a Water Shortage Warning is to advise public water supply systems in the affected area, by letter, regarding the declaration of a warning. IDEM routinely surveys water supply systems in the affected area to determine the status of water supply availability and demand. IDEM also advises public water systems to immediately develop and update water shortage contingency plans for their respective systems, where such plans are not already available for implementation.

Another IDEM task is to oversee the establishment of regional water and wastewater districts. Decisions about forming new districts are initiated at the local level. IDEM's role is to ensure these utilities are formed according to the legal and technical requirements specified by statute. The formation process begins when IDEM receives a formal petition which includes the territory to be served. Approximately 18 water, 72 sewer, and 11 combined water/sewer districts have been currently established. Once formed, rates and charges are set by the district's board of directors.

In addition to its oversight of new regional water and wastewater districts, all new water utilities, regardless of type, must submit a Water System Management Plan to IDEM showing the proposed utility will have the technical, managerial, and financial capability to provide clean, safe drinking water before they are given a permit to construct the facility.

With respect to IDEM, it is particularly useful to note that this document only focuses on water and wastewater utilities in the sense that these entities provide utility service to others for a fee. IDEM does not use this definition and does not look at its regulated entities though this filter. IDEM regulates many more drinking water and wastewater treatment facilities than the ones described in this document. These entities include mobile home parks, property owner associations, campgrounds, schools, gas stations, churches, industries, and office buildings.

## Indiana Department of Natural Resources

The IDNR's Division of Water oversees the statewide registration and annual water use reporting for SWWF, including surface water and groundwater.[18] While IDNR does not generally require a permit to install a high-capacity water well (except for new facilities located within the Great Lakes Basin that exceed established withdrawal thresholds), it may be necessary to register the well as a SWWF. A SWWF includes any combination of wells, surface water intakes, and pumping apparatus that supply, or can supply, at least 100,000 gallons of water per day to a common collection or distribution point. A utility (or non-utility) that owns such a combination must register those facilities as a SWWF with the IDNR Division of Water within three months after it is constructed and must report annual water use by March 31st of each following year.

IDNR's Division of Water is responsible for enforcing Indiana's standards for well construction; however, wells constructed by water utilities are primarily subject to IDEM's jurisdiction. In addition to SWWF reporting, IDNR touches on many aspects of water resources that affect drinking water utilities including the following:

- Maintains a water well record database using data required to be provided by well drillers;
- Responsible for licensing and continuing education of well drillers and pump installers;
- Implements the Emergency Groundwater Rights Act which provides assistance to non-SWWFs whose water supply is disrupted by a SWWF;
    - Resolution of these conflicts usually involves the SWWF reimbursing the impacted well owner for expenses associated with restoring the water supply or the impacted well owner connecting to a nearby water system;
- Sale of water from state financed reservoirs;
- Indiana's implementation of the Great Lakes Compact;
- Assists with the coordination and implementation of Indiana's Water Shortage Plan (The Water Shortage Task Force was abolished by the 2011 Legislature under HB 1002);
- Regulates approximately 1,100 dams under State jurisdiction, reviews dam and levee construction plans, and provides safety improvement recommendations to dam owners in order to reduce the risk of dam incidents and dam failure flooding.

Another task IDNR participates in is the establishment of water and wastewater utility conservancy districts. Once a circuit court, in the county with the most land in the proposed district, determines a petition is complete, the court will refer the petition to the Natural Resources

[18] IDNR operates primarily under its rules codified in 14 I.A.C. 132.

Commission (NRC).[19] The NRC conducts a public hearing, gathers input, and prepares a report to the court. When the circuit court receives the fact-finding report from the NRC, the court will schedule a hearing regarding the establishment of the utility. One of the first responsibilities of the utility is to develop a district plan which consists of an engineering report that sets forth the general, comprehensive plan to accomplish the district's purpose. The NRC is required to review and approve the district plan but has delegated this role to the Director of the IDNR, Division of Water. As a special taxing district, a conservancy district can assess taxes on all real property included in the district. A district's boundaries are based upon identification of properties expected to benefit from the district. As of the printing of this report, six water, 26 wastewater, and 18 combined utility conservancy districts have been established.

Rates and charges of wastewater utility conservancy districts are set by the Board of Directors except for customers it may serve outside its designated boundaries. In those instances, the IURC must approve the wastewater rates and charges. Whether the IURC has jurisdiction over a district's water rates depends on whether the district has made an election in its district plan to provide service under Ind. Code § 14-33-20-4. If the district makes such an election, then it is subject to the IURC's jurisdiction for rates and charges. However, a district that makes such election and serving fewer than 2,000 customers can opt out of the IURC's jurisdiction pursuant to Ind. Code § 8-1-2.7-1.3. Currently, there are six water utility conservancy districts under the IURC's jurisdiction and the IURC has set sewer rates outside the designated boundaries of two wastewater utility conservancy districts.

## Indiana State Department of Health

The Environmental Public Health Division of the ISDH oversees sewer utilities that utilize an onsite or decentralized wastewater treatment system.[20] A commercial on-site sewage treatment system is not connected to a centralized wastewater treatment plant and does not discharge effluent into an open stream. On-site treatment systems include individual septic systems, cluster systems, and alternative wastewater treatment technologies like constructed wetlands, recirculating sand filters, and mound systems that dispose of effluent more than 6" below the ground surface. ISDH's on-site sewage program sets minimum state-wide standards for residential and commercial on-site sewage disposal systems. The staff also conducts workshops and seminars on soils analysis and residential sewage disposal, and provides consultation and technical assistance to local health departments on the operation of their sewage disposal programs. The on-site sewage program also reviews and approves plans and specifications for commercial on-site sewage disposal systems.

[19] The Indiana Natural Resources Commission is an autonomous board that addresses issues pertaining to the IDNR.
[20] IDEM is responsible for all permitting of municipal corporations regardless of the treatment system used.

## Indiana Utility Regulatory Commission

The Commission is the economic regulator of utility rates and charges and quality of service.[21] The Commission also regulates the "terms and conditions" of investor-owned and not-for-profit utilities. The "terms and conditions" for water utilities can be found in Title 170 of the Indiana Administrative Code, Article 6. The types of items addressed in "terms and conditions" include meter accuracy and testing, customer service relationships including bill requirements and adjustments, creditworthiness and deposits, disconnection of service, and rules defining the amount customers are required to pay to extend mains. The legal form of a utility determines the existence and extent of the Commission's jurisdiction. Typically, if the Commission does not have jurisdiction, either the utility's board or a local unit of government does. Below are some facts about the Commission's role in water and wastewater issues:

- The rates and "terms and conditions" of investor-owned water and wastewater utilities are regulated by the Commission;
- The rates of municipal water utilities and water authorities are also regulated by the IURC;
- The Commission has jurisdiction over those conservancy districts that make an election to provide water service under Ind. Code 14-33-20 in their District Plan. Water conservancy districts with fewer than 2,000 customers can opt out of the Commission 's jurisdiction;[22]
- Investor-owned water and wastewater utilities with fewer than 300 customers and municipal water utilities, regardless of the number of customers, are able to remove themselves or "opt out" from the Commission's jurisdiction;[23]
- Rates and "terms and conditions" for not-for-profit water and wastewater utilities are regulated by the Commission *unless* they have opted out;
- The Commission does not regulate wastewater conservancy districts except in rare instances where the district serves customers outside its boundaries. In these instances, the IURC has jurisdiction over rates and charges of the outside customers;
- The Commission does <u>not</u> regulate municipal wastewater utilities, nor does it regulate regional water/wastewater districts.[24]

The Commission also has limited territory authority over wastewater utilities. Certificates of Territorial Authority (CTAs) authorize utility service in a defined area; however, only investor-

[21] The IURC operates primarily under state statutes codified in Title 8 and 170 of the Indiana Administrative Code.
[22] *See*, Ind. Code 8-1-2.7 (not-for-profit including water authorities, water conservancy districts with fewer than 2,000 customers, cooperatives, and investor-owned with 300 or fewer customers) and Ind. Code § 8-1.5-3-9 (municipalities).
[23] Id.
[24] In 2005, a law was enacted that provides campgrounds served by regional sewer districts with the ability to appeal to the Commission's Consumer Affairs Division for an informal review of a disputed matter. *See* Ind. Code §13-26-11-2.1.

owned and not-for-profit wastewater utilities are required to obtain CTAs from the Commission. Municipal wastewater utilities, regional wastewater districts, and conservancy districts are not required to obtain CTAs. Likewise, water utilities are not required to obtain CTAs. Consequently, they have no service territory regulation. However, the Commission does have jurisdiction in resolving territorial disputes between water utilities regardless of whether they are regulated by the Commission.[25]

Although the Commission only regulates a fraction of the water utilities in the state, these entities serve approximately 45% of Indiana's water consumers. This is because many of the water systems withdrawn from the Commission's jurisdiction only serve a small number of customers; whereas, the largest regulated water utilities provide service to primarily urban areas that are more densely populated. The majority of wastewater customers are served by non-jurisdictional utilities; the Commission does not regulate municipal wastewater systems.

A new water or wastewater utility that forms as an investor-owned or not-for-profit or municipal water utility is required to come before the Commission. The Commission will determine if its formation is in the public interest, if the entity will have the financial, managerial and technical capabilities to operate the utility, how its initial rates and charges will be established, and issues a CTA for investor-owned and not-for-profit wastewater utilities.

The Office of Utility Consumer Counselor (OUCC) is a separate state agency that represents the interests of all Indiana utility customers in matters before the Commission. The OUCC serves as the consumers' legal and technical representative in those cases. Hence, the OUCC advocates for the consumer while the Commission serves as the impartial fact finder and decision maker in cases that come before it.

[25] Ind. Code § 8-1-2-86.5.

# Section III: Analysis of Indiana Water Utilities Data

As directed by Ind. Code 8-1-30.5, the Commission notified all known water utilities in the state that it was to collect certain data for the year 2013. The Commission received responses from 458 (down from 487 in 2012) water utilities. Consistent with data collected for the 2013 report, several responses contained contradictory or incomplete information, or were never formally submitted. IURC staff worked with the utilities to resolve as many of the issues as possible and ultimately deemed 412 (up from 374 last year) of the responses to be complete. Indiana American Water Company has 20 separate water systems throughout the state that are not interconnected. For purposes of looking at water supply, these water systems resemble stand-alone water utilities, even though they are owned by and do financial reporting as one entity. The Commission considered these 20 systems as one utility in its statistical analysis.

The survey asked the utilities about the amount of water they sold and number of customers they served in 2013, to identify their primary water source, and their options for additional water sources. It also included questions about the utility's operation and maintenance costs, funding sources, needed infrastructure improvements, and water shortage and conservation plans. Each question asked related directly to Ind. Code 8-1-30.5, and the results of the survey are summarized below.

## Water Utilities and Service Territories

The survey asked utilities to provide basic information, such as ownership type. Of those that responded, 73% are municipal utilities, 19% are not-for-profit (including cooperatives)[26], and 4% are investor-owned utilities. Conservancy districts and regional water districts are less common and made up 3% of respondents (Figure 8).

Despite numerous follow-ups, the utility response rate was slightly lower than experienced in 2013, but greatly improved data quality resulted in a higher number of reports being acceptable for use in the report. The initial list of utilities utilized by the Commission in this year's Report was derived from IDEM data and is based on the establishment of a Public Water Supply Identification Number (PWSID). That list was then refined based on the 2013 report data and staff interaction with the utilities. In 2013 the total number of water utilities was 537 based on this year's reporting, further research and a handful of acquisitions. This year, 458 (85%) submitted a report. The Commission established enhanced quality control protocol that evaluated the reported data for completeness and obvious errors. The online report form was modified to include some basic quality checks and many fields were modified to prohibit the use of null entries. Although the data received in the 2014 effort was of a much higher quality, the controls did not rise to the level of an audit and could not in any way verify that the data provided was absolutely valid. Upon successful application of the quality control checks and follow-up with some of the utilities, most applications were formally "accepted" by the Commission.

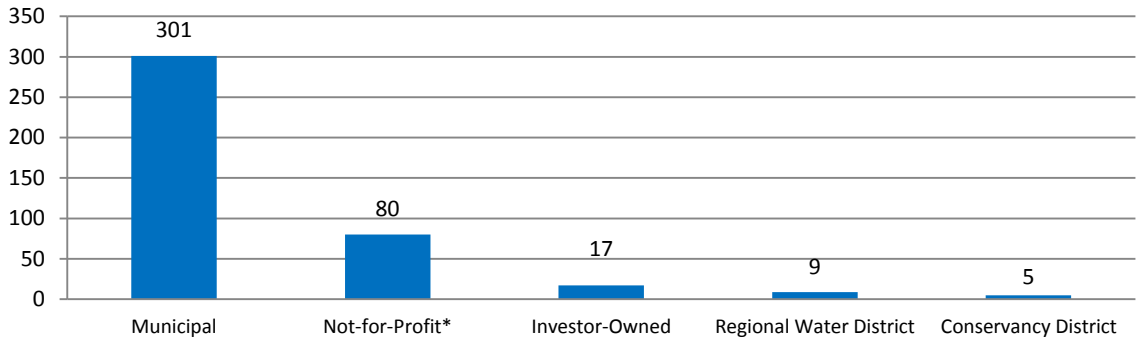
[26] There was considerable confusion regarding the cooperative classification as, by definition; it is a not-for-profit entity. Through independent research, staff believes there are approximately 22 cooperative water utilities in Indiana. In 2012 only two respondents classified themselves in this manner. To avoid further confusion and improve data consistency we have included all cooperatives in the not-for-profit category.

Service territories were utilized for all utilities that submitted but not necessarily were "accepted" through the Commission's quality control process. Territories that were submitted in 2013 but not in 2014 were also utilized and reported. Any service territory that could be obtained was utilized as being the best available data and represents the Commission's best understanding of the territory of the utilities. Staff recognized at the outset that each entity would have different definitions of what service territory means based on their own needs and regulatory situation.

As part of the Report, utilities were asked to provide a copy of their current service territory map. Figure 9 shows the service territories of 474 utilities. Although the map does not include all the utilities in the state, it does provide the Commission's best understanding of the distribution of the state's utilities.

Reported values such as water produced, water sold, and utility plant in service were scrutinized for reasonableness. Those reported values deemed to be unreasonable were specifically removed from the analysis rather than triggering a rejection of the entire Report. Given the fluidity, known errors, and limitations of the datasets, gaps are acknowledged and totals and percentages will not always precisely balance.

**Figure 1. The different utility types of ownership represented by respondents**

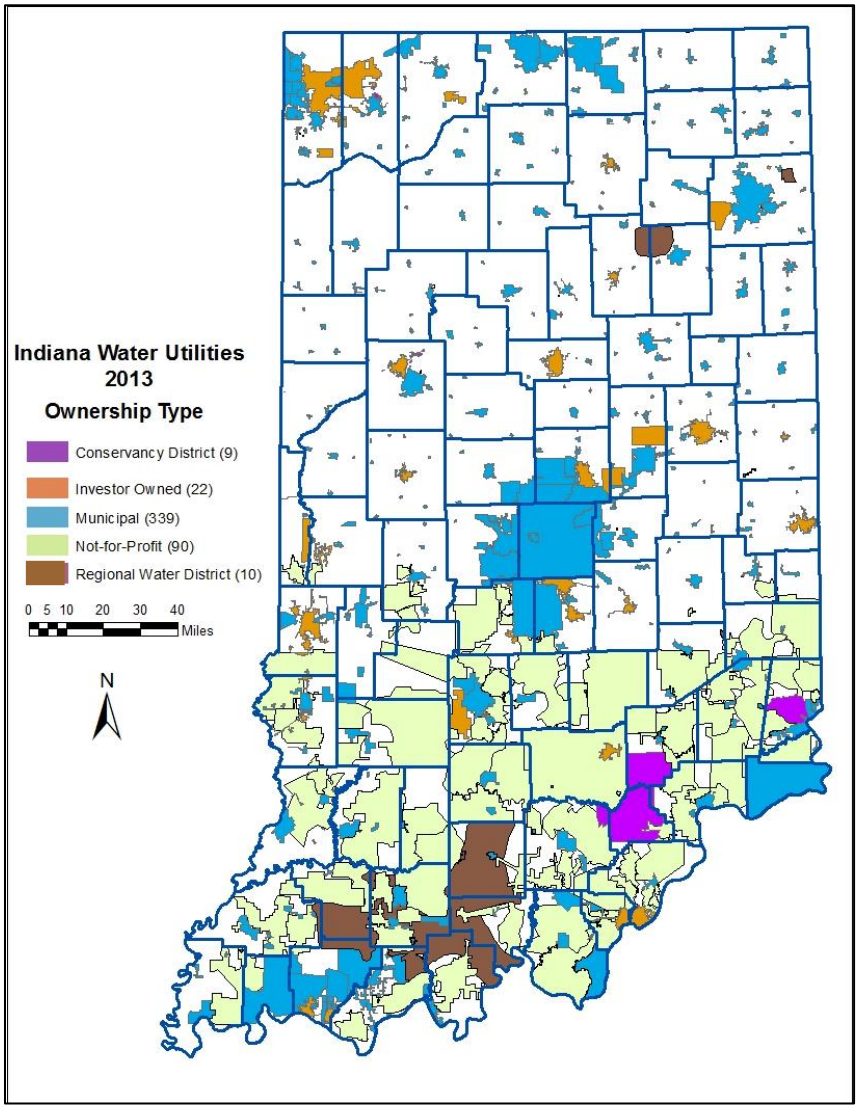



In northern and central Indiana, municipal and investor-owned utilities are the most common ownership types with only a few regional water districts. In southern Indiana, not-for-profit utilities are the most common, but there is also a greater variety of other ownership types than in the upper two thirds of the state.

The service territories in southern Indiana are closer together and larger than in northern and central Indiana. The territories in the north tend to be smaller, with exception of those found in the northwest corner of the state. The difference likely has to do with groundwater availability. The shallow groundwater supplies in northern and central Indiana make it easy for homeowners to use a well rather than purchase water from a utility. Groundwater supplies are not as easily available in southern Indiana, and more people rely on a utility to provide water than on their own well.

**Figure 2. Service territories of responding utilities differentiated by ownership.**

**Note: This reflects service territories of 474 utilities. It is not inclusive of all utilities in Indiana but reflects more than those reporting for 2013. Indiana American's 20 service districts are all shown but are counted as one utility for the purpose of statistical analysis.**




The utilities were asked for the total number of customers they served and the number served within specific customer classes in 2013. The customer classes are: residential, commercial, industrial, resale (which is water sold to another utility), and other (which identifies water that is taken from hydrants to fill tankers, vacuum trucks, hydro-excavators, or spraying equipment). Some of the highlights include:

- One water use not included in this list is agriculture as farmers typically have their own wells for irrigation and do not rely on water utilities.

- Over 1.6 million customers throughout Indiana are served by the utilities highlighted in this report. Ninety-two percent of these customers are residential (Table 1).
- Only 235 utilities serve industrial customers, and this class makes up less than 1% of total customers.
- Seventy four water utilities sell water to other utilities. Of these, 44% sell to just one resale customer. Municipal utilities serve the largest number of resale customers followed by not-for-profit. The largest provider of resale water by volume is a municipal utility that sells to 23 wholesale customers (Patoka Lake).
- Data is not comparable to 2012 due to the different sample set.

**Table 2. Number of customers based on utility ownership and customer class for 2013**

| Ownership Type | Number of Customers | | | | | |
|---|---|---|---|---|---|---|
| | Residential | Commercial | Industrial | Resale | Other | Total |
| Municipal | 1,094,509 | 100,678 | 8,016 | 167 | 9,261 | 1,199,628 |
| Investor Owned | 281,808 | 27,676 | 631 | 24 | 6,025 | 316,164 |
| Not-For-Profit | 149,734 | 2,990 | 317 | 38 | 1,245 | 152,950 |
| Conservancy District | 10,699 | 132 | 5 | 6 | 143 | 10,985 |
| Regional Water District | 7,288 | 373 | 20 | 23 | 176 | 7,880 |
| Total | 1,544,038 | 131,849 | 8,989 | 258 | 16,850 | 1,687,607 |

In addition to number of customers, the utilities provided the volume of finished water sold to each customer class in 2013 (Table 3). Twenty-one water utilities reported they do not meter any customers. Instead of basing a bill on meter readings, these 21 utilities likely charge a flat rate per month and the customer pays the same amount of money per month regardless of the amount of water used. The sum of volume sold by customer class does not include water sold to unmetered customers.

**Table 3. Volume of total finished water sold in 2013**

| Ownership Type | Customer Class (volume shown in thousands of gallons) | | | | | |
|---|---|---|---|---|---|---|
| | Residential | Commercial | Industrial | Resale | Other | Total |
| Municipal | 63,911,338 | 38,894,003 | 28,227,713 | 8,614,291 | 5,996,545 | 145,643,891 |
| Investor Owned | 15,058,595 | 8,626,547 | 4,694,592 | 4,075,850 | 1,936,319 | 34,391,902 |
| Not-For-Profit | 74,235,952 | 1,066,178 | 546,177 | 1,047,841 | 409,778 | 77,305,925 |
| Conservancy District | 271,399 | 55,040 | 3,894 | 311,827 | 929,848 | 1,572,009 |
| Regional Water District | 310,014 | 92,979 | 17,090 | 2,059,390 | 27,510 | 2,506,983 |
| Total | 153,787,297 | 48,734,747 | 33,489,467 | 16,109,199 | 9,300,000 | 261,420,710* |

* This number includes resale and may include water that has been resold by other utilities

## Types of Water Resources Used by Utilities

The Report also asked utilities about their water resources, whether they used groundwater, streams, lakes, reservoirs, or purchased water, and how much they used from each source. The results are summarized below.

### Groundwater

Groundwater is used as a primary or supplemental source by 303 or 66% of the responding utilities. A reliable, total well count is not available as many utilities have individual wells that are manifolded into a single raw water line before it is metered. While 1,242 wells were recorded in the survey, we are well aware that many, if not the majority, of these wells represent entire well fields. This configuration of recording production, which is prevalent across mid to small size utilities in Indiana, should be of some concern as it suggests that individual wells are not being managed for peak efficiency. 39% of utilities reported that peak pumping days occurred in July or August. Total annual production for 303 reporting utilities was 114 billion gallons for 2013.

## Streams and Rivers

Fourteen utilities identify 17 streams and rivers as their water source. Of the rivers identified, several have multiple intakes at different locations. Only one utility reported having intakes on multiple rivers. Peak withdrawals occurred in July (Table 4).

**Table 4. Summary of reported stream and river withdraws in 2013**

| Water Body Name | Peak Day Withdraw (MGD) | Peak Production Date |
|---|---|---|
| Big Eagle Creek | 2.60 | 9/6/2013 |
| East Fork White River | 3.60 | 7/20/2013 |
| Fall Creek | 23.10 | 4/27/2013 |
| Flatrock River | 2.95 | 7/17/2013 |
| Muscatutuck River | 5.75 | 7/16/2013 |
| Ohio River | 37.54 | 7/18/2013 |
| Patoka River | 4.48 | 9/12/2013 |
| Sandcreek | 0.50 | Unknown |
| St Joe River | 44.65 | 8/28/2013 |
| White River | 128.75 | 7/19/2013 |
| Wildcat Creek | 7.67 | 7/19/2013 |

## Lakes

Lakes are natural features created by geologic processes. Only one lake was identified as a water source - Lake Michigan. Five utilities in Indiana use Lake Michigan as a water supply withdrawing a total of 42 billion gallons annually.

## Reservoirs

Reservoirs are man-made lakes used for flood control, water storage and supply. Sixteen utilities withdrew water from one or more reservoirs. Two of the 19 reservoirs identified by the utilities are quarries. Eagle Creek, Hurshtown, and Middle Fork reservoirs and a private quarry are the only sources identified that are not located in southern Indiana.[27] In southern Indiana, five of the reservoirs are in Ripley County and three of those serve a single utility. Peak pumping days in 2013 occurred in August. Peak rates ranged from 0.2 mgd to 23 mgd, with the highest one day pumping occurring in August. The largest annual withdrawals came from Lake Monroe (Table 5).

[27] Reservoirs such as Geist, Morse, and Prairie Creek are located in central Indiana, but are used to regulate flows in the White River. They are not used directly by utilities as a water supply.

**Table 5. Location and 2013 withdrawal volume for reservoirs used as supply**

| Reservoir Name | County | Peak Day Withdraw (MGD) | Peak Production Date |
|---|---|---|---|
| Bischoff Reservoir | Ripley | 1.7 | 8/4/2013 |
| Eagle Creek Reservoir | Marion | 19.0 | 8/26/2013 |
| Hahn Reservoir | Ripley | 0.6 | 9/10/2013 |
| Huntingburg Lake | Dubois | 1.2 | 4/18/2013 |
| Hurshtown Reservoir | Allen | Unknown | Unknown |
| John Hay Reservoir | Washington | 2.6 | 1/28/2013 |
| Lake Salinda | Washington | Unknown | Unknown |
| Lake Santee | Decatur & Franklin | 0.2 | 9/1/2013 |
| Middle Fork Reservoir | Wayne | 4.7 | 7/8/2013 |
| Mollenkramer Reservoir | Ripley | 0.7 | 8/1/2013 |
| Monroe Reservoir | Monroe | 23.0 | 8/30/2013 |
| North Quarry | Ripley | 0.9 | 6/27/2013 |
| Old Lake | Gibson | Unknown | Unknown |
| Oser Reservoir | Ripley | 0.7 | 7/15/2013 |
| Packwood Branch Reservoir | Clark | 0.5 | 5/29/2013 |
| Patoka Lake | Dubois, Crawford, Orange | 8.4 | 11/7/2013 |
| Scottsburg Reservoir | Scott | Unknown | 8/16/2013 |
| Unnamed Quarry | Madison | Unknown | Unknown |
| Upper Lake | Decatur | 0.2 | Unknown |

## Purchases from Other Utilities

One hundred and fifteen utilities purchase water from another utility; 27 of these utilities purchase water from more than one utility. The 115 utilities identified several different utilities (by name or PWSID number) from which they buy water, one of which is located in Illinois. Of the utilities reporting the number of interconnects, 63% have just one interconnect with the utility from which it purchases water; 27% have between two and seven interconnects.

One hundred and eleven utilities reported their total annual volume of purchased water. The total purchased water for these utilities was 37.3 billion gallons. Peak pumping occurred in July (13%) and August (27%) in 2013. During these two months, peak day pumping rates ranged from 0.008 mgd to 33 mgd.

## Additional Water Sources

The water utilities were asked whether they had additional water sources that could be used if necessary, such as during a water shortage, if the primary water source becomes contaminated, or if there is a water emergency. Five questions were asked in regard to additional water supplies (Table 6). Only utilities that answered "yes" to question A were asked questions B through E. Responses from the utilities indicate that the majority have not taken additional steps to secure emergency water supplies.

**Responses from the utilities indicate that the majority have not taken additional steps to secure emergency water supplies.**

**Table 6. Questions regarding additional water resources**

| Questions | Number of Responses | |
|---|---|---|
| | Yes | No |
| A. Do you have additional water resources that could be used if necessary? | 107* | 351 |
| B. In regards to Question A, have you purchased land? | 25 | 82 |
| C. In regards to Question A, have you conducted a feasibility study to bring the source on line? | 32 | 75 |
| D. In regards to Question A, have you obtained any permits? | 17 | 90 |
| E. In regards to Question A, are there any restrictions, such as contracts, that limit the utility's ability to procure additional resources? | 15 | 92 |

*This number includes multiple "yes" responses from 27 utilities that identified more than one source.

Question A was answered by 80 utilities that identified 108 additional water resources (27 utilities identified more than one additional water supply source). They were then asked the source of their additional resources. The majority of additional resources come from water purchased from another utility or from a well. Miscellaneous sources include purchasing water from a disaster relief agency or retailer, using emergency interconnects, or using purchased land to develop a source. Water purchases and surface waters can become unreliable during prolonged drought. Surface waters are affected earlier during a drought than groundwater, and if the source of the purchased water is a stream or reservoir, not only may the availability of water decrease, but there also will be increased demand from customers of the utility providing the water.

**Table 7. The surface water sources listed as additional resources**

| Reservoirs | Streams |
|---|---|
| New Lake | Central Canal |
| Old Lake | Montgomery Creek |
| Expand Ireland Trail Reservoir | -- |
| Hardy Lake | -- |
| Geist Reservoir | -- |

In addition to the name of the resources, the utilities were asked the estimated capacity of the additional resources and the estimated build out capital costs. Eighty two utilities answered with capacities ranging from 0.01 to 18 mgd. Nine utilities were unsure or did not answer the question. The estimated build-out cost for a utility ranges from $1 to $30 million (this total is for multiple sources); average cost is $3.8 million. Very few estimated build out costs were provided for any resource other than purchased water or well.

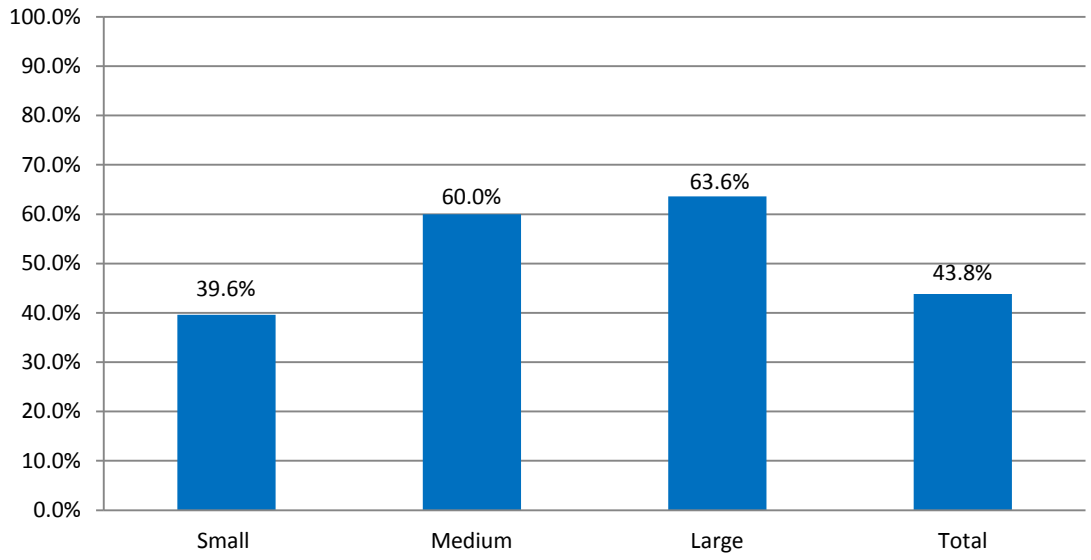
## Conservation, Curtailment Plans, and Water Shortage

The Report asked utilities if they have general conservation plans that promote water conservation among their customers, a curtailment plan in the event of a water shortage, and a plan for additional resources in the event of a water shortage.

**Finding:** A majority of water utilities have not implemented a water conservation plan.

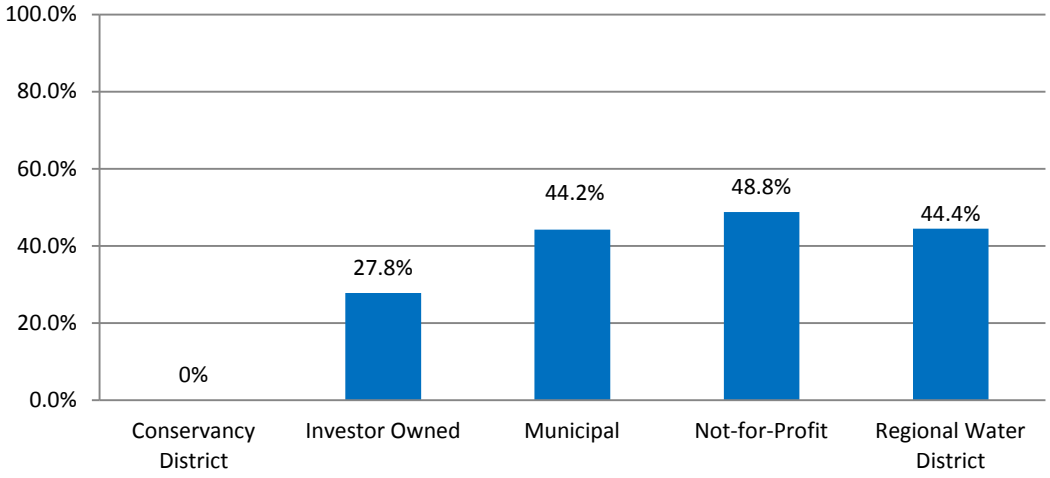
The following figure shows the percentage of utilities that currently have a water conservation plan, based on utility size. Utilities are categorized as small, medium, and large utilities based upon a customer size of 1 to 3,300; 3,301 to 10,000; and greater than 10,000, respectively. Approximately 44% of all utilities that reported have implemented water conservation plans. This indicates that the majority of utilities are not actively promoting a water conservation plan. Of those that have such plans, it appears that large and medium-sized utilities have higher participation rates at 67% and 60%, respectively. Less than half of all small utilities have implemented plans.

**Figure 3. Utilities With a Water Conservation Plan**
Based on Utility Size



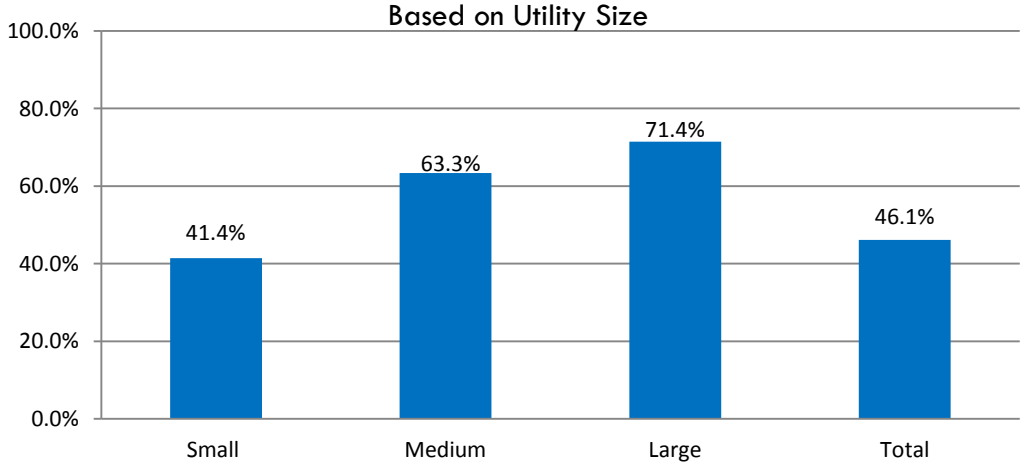
The following figure illustrates the percentage of each utility type that has a water conservation plan. Not-for-profits, municipals, and regional water districts have the highest implementation rates at 49%, 44%, and 44%, respectively. Investor-owned utilities are behind with an approximately 28% participation rate. No affirmative responses were received from conservancy districts.

**Figure 4. Utilities With a Water Conservation Plan**
Based on Utility Type



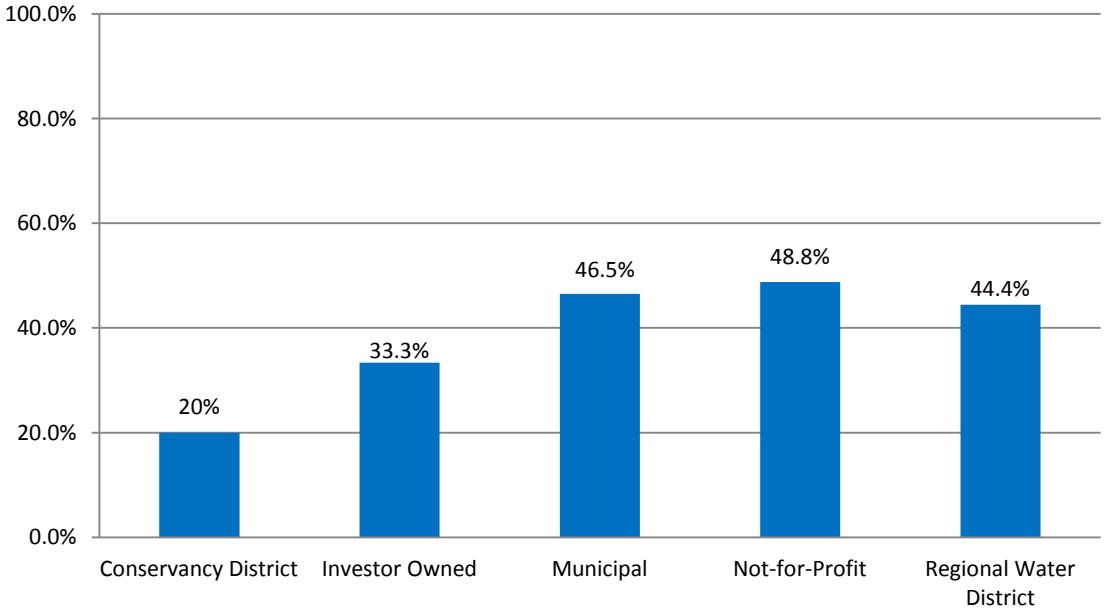

The following figure shows the percentage of utilities, based on size, that have a water shortage plan. 46.1% of all utilities reporting stated that they have a water shortage curtailment plan. Large utilities appear to be the best prepared for a water shortage, with 71% stating they have a plan to address such a crisis. Of medium-sized utilities, 63% stated that they have a water shortage curtailment plan. 41% of all small utilities reporting indicated they have a curtailment plan to implement in the untimely event of a water shortage.

**Figure 5. Utilities With a Curtailment Plan in Event of a Water Shortage**
Based on Utility Size



The results, by type, for those utilities indicating they had a water shortage plan do not show much difference among types other than conservancy districts being somewhat less.

**Figure 6. Utilities With a Curtailment Plan in the Event of a Water Shortage**
Based on Utility Type



At 46%, less than half of all utilities reporting stated that they have plans for acquiring additional water resources if needed. Again, larger utilities appear to be the best prepared, with approximately 71% stating that they have plans in place to obtain additional water resources in the event of a water shortage. Of the medium-sized utilities, 63% reported that they have plans to obtain additional water resources. Small utilities appear to be the least prepared, with only 41% having plans to obtain additional water resources.

**Figure 7. Utilities With a Plan for Additional Resources in the Event of a Water Shortage**
Based on Utility Size

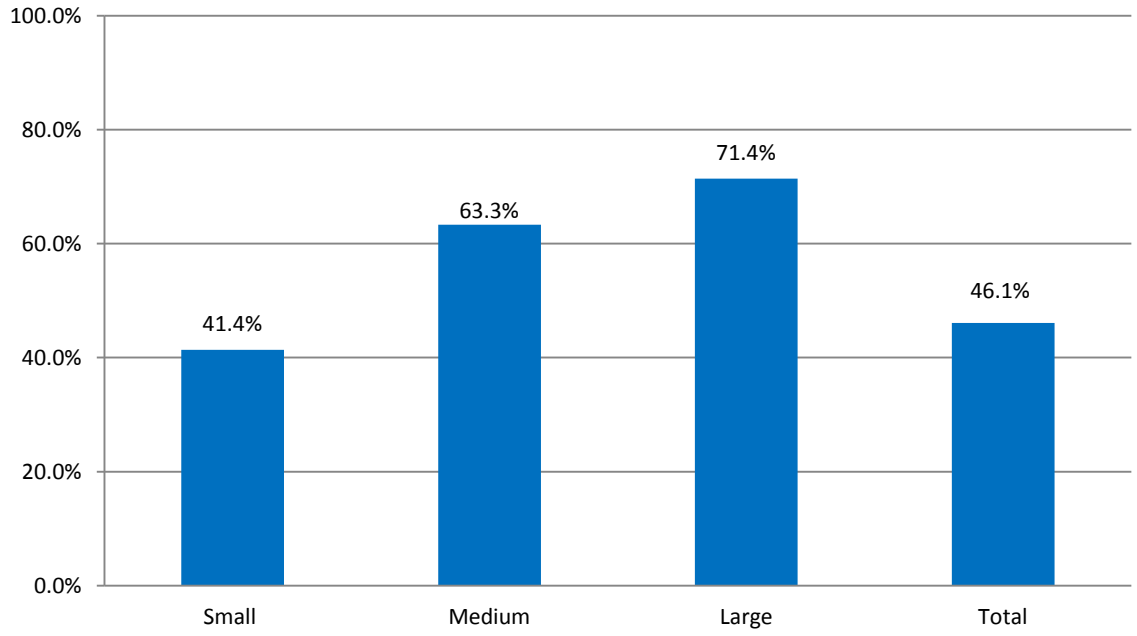
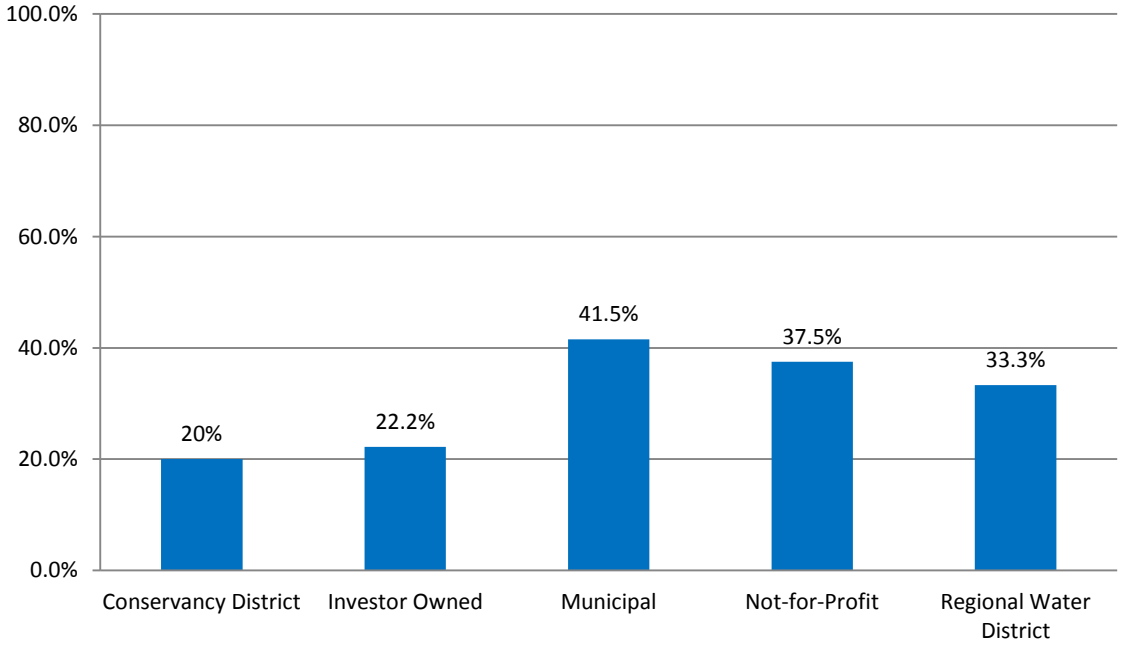


Figure 8 illustrates the percentage of each utility type that has a plan for additional water resources in the event of a water shortage. With 41%, municipalities have the highest percentage of utilities with plans for additional water resources. The remaining utility types have similar percentage levels of having developed plans, ranging from 20% to 37%. It appears that the size of utility has more influence on whether a utility has an actionable plan to secure additional water resources than the specific type of utility. The larger the utility, the more likely they are to have a plan. Smaller utilities are at a greater risk during a water shortage or drought.

Taking this data into consideration, it is apparent that all utilities, especially small utilities, should have a plan in place to address potential water shortages. As cost is a factor, each utility's plan should be comparable to their customer demand and budget; a small municipal utilities' plan should not rival that of the larger investor-owned utilities. Instead, a plan should memorialize and provide a goal for future years if the need arises for additional water supply. The Commission recommends that small utilities share ideas regarding preparing and planning for potential water shortages in order to best leverage institutional knowledge across the industry.

**Figure 8. Utilities With a Plan for Additional Resources in the Event of a Water Shortage**
Based on Utility Type



## Infrastructure Improvements Needed in the Next Five Years

The Commission asked utilities about their infrastructure improvements needed in the next five years. Of the 412 utilities with acceptable submissions, 149 (36%) indicate they have no capital improvements planned over the next five years. This suggests that these utilities do not conduct any sort of capital planning. Of those utilities who have a capital planning program, the total five-year infrastructure improvements equal $1,174,757,808. Based on utility size, total planned infrastructure improvements for small and medium utilities are $210,178,197 and $192,847,194, while large utilities are planning to invest $771,732,417.

**Figure 9. Planned Infrastructure Expenditures**
Based on Utility Size

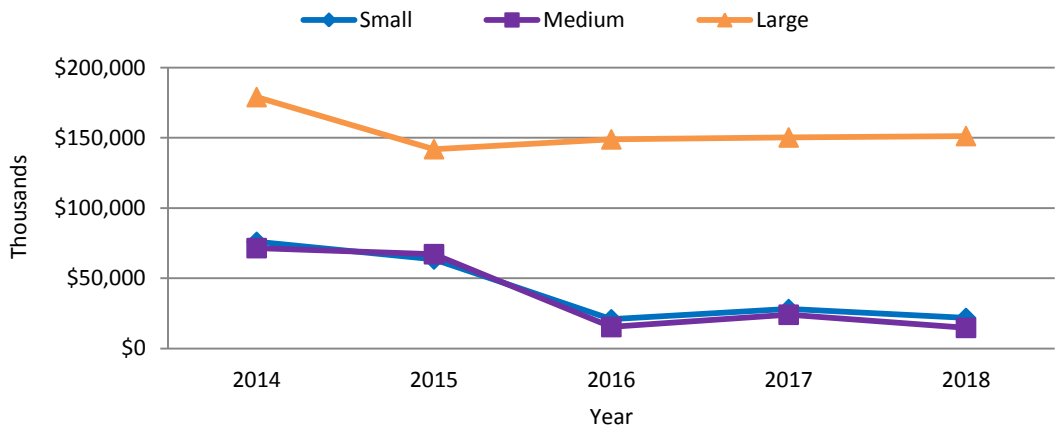



**Figure 10. Percentage of Utilities with Planned Rate Increases**
Based on Utility Size

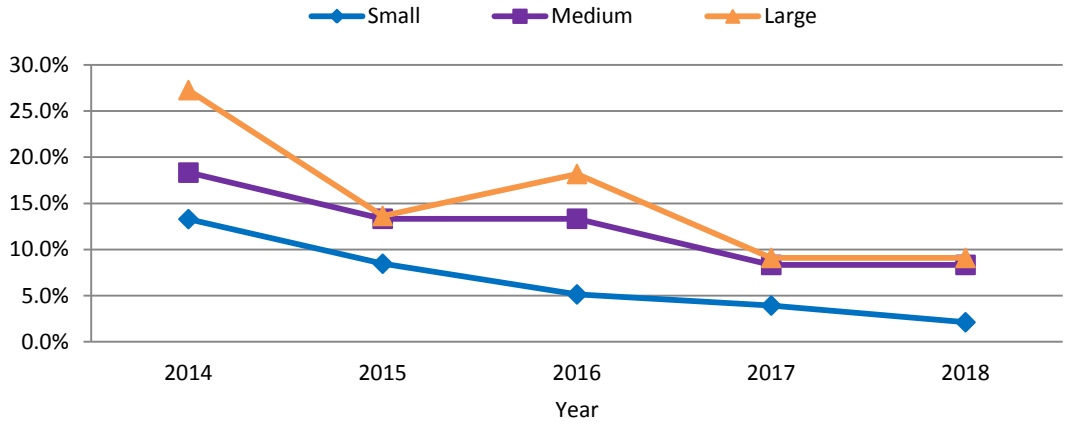
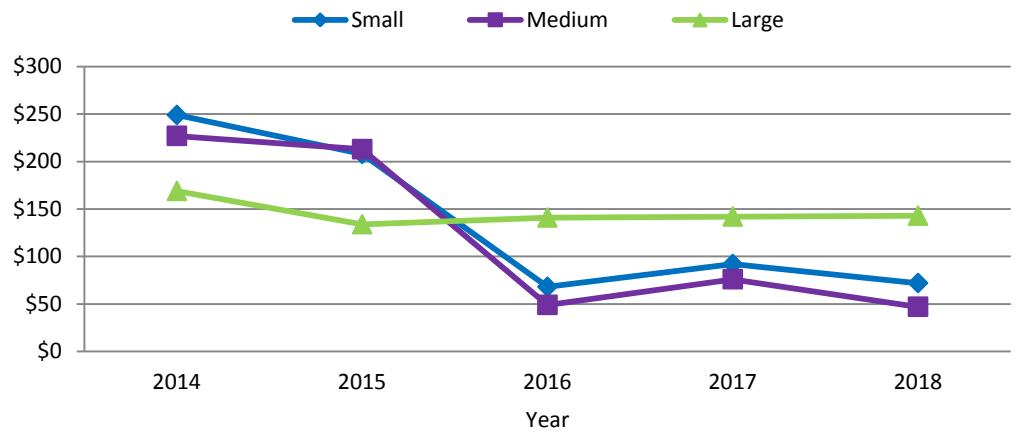


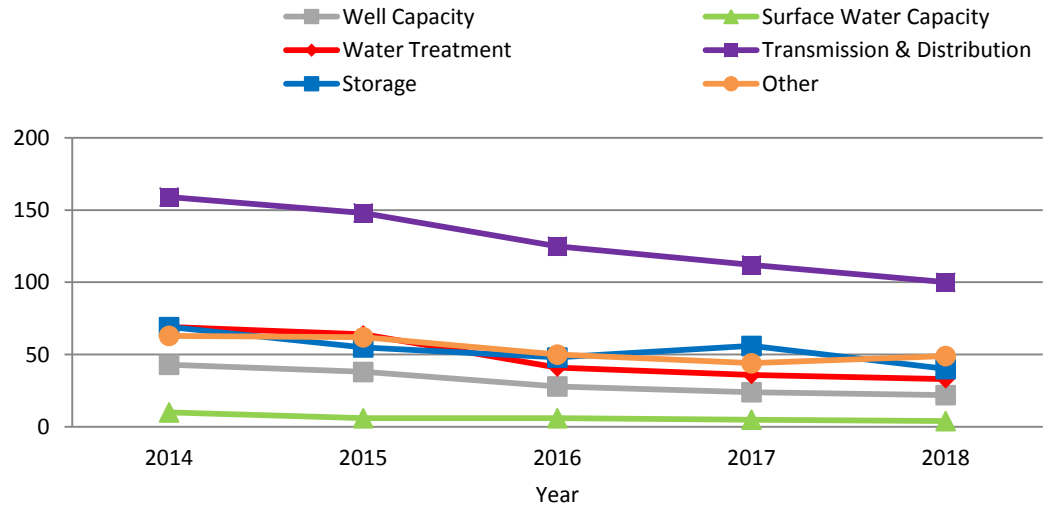
Figure 11 highlights the planned infrastructure expenditures per customer over the next five years, and suggest that small utilities will experience smaller rate increases. The data also suggests that small utilities often do not plan properly for infrastructure improvements and thus, may experience higher rate increases than the figures indicate. Given the responses, all utilities should have a written capital improvement plan in place as part of the utility's strategic planning efforts. It is important to have continuity and an idea of where the utility is headed and when rate increases may be needed, even in the event of leadership changes.

**Figure 11. Planned Infrastructure Expenditures**
Per Customer



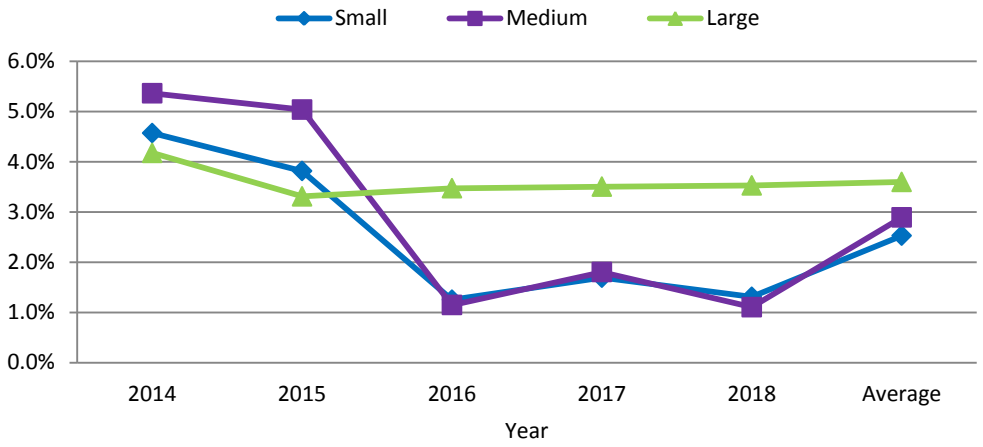

The most frequently cited planned infrastructure projects relate to transmission and distribution, followed by water storage, miscellaneous, well capacity and surface water capacity.

**Figure 12. Number of Planned Infrastructure Projects**
For the Five Years Ending 2018



The Utility Plant in Service (UPIS) replacement rate is the expected capital expenditures divided by UPIS. Large utilities, on average, have a higher UPIS replacement rate, followed by medium-size utilities and small utilities.

**Figure 13. UPIS Capital Replacement Rate**
Based on Utility Size



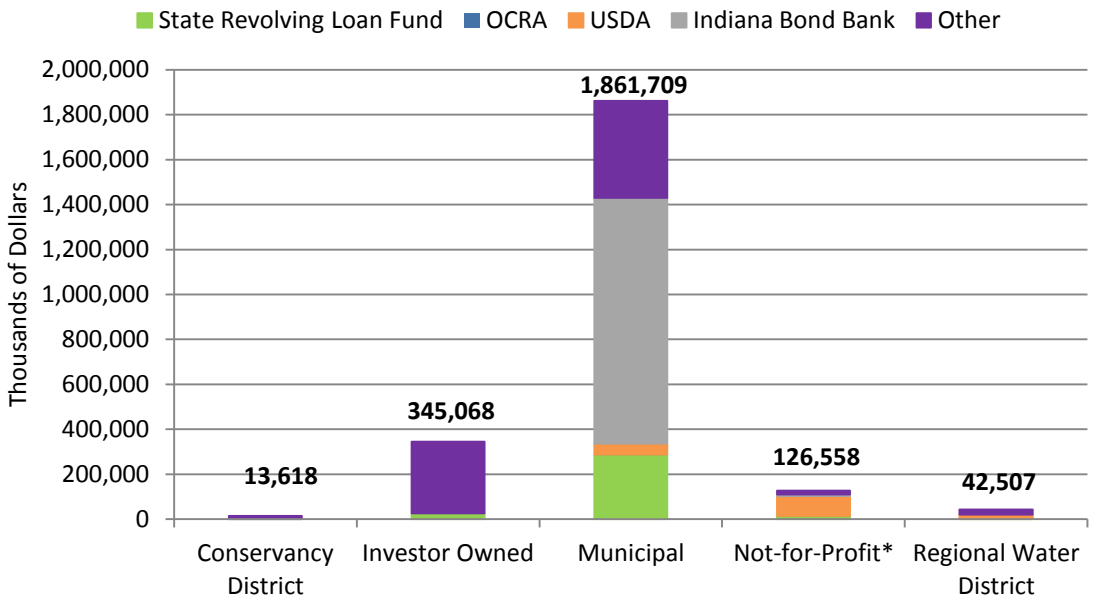
## Indebtedness of Water Utilities

The Report asked utilities about the total amount of debt they have outstanding as of December 31, 2013 and funds received during 2013 from the State Revolving Loan Program, Office of Community and Rural Affairs (OCRA), US Department of Agriculture Rural Development Loans and Grants (USDA), Indiana Bond Bank, and other sources, including private bank loans or bonds.

Of utilities that reported, municipal utilities have $1,861,709,000 of indebtedness. They are followed by investor-owned utilities with $345,068,000, not-for-profit utilities with $126,558,000, and regional water districts with $42,507,000. Conservancy districts have the least amount of debt with $13,618,000. Therefore the total amount of reported debt is $2,389,456,000 (Figure 14).

Long-term debt carried by utilities may seem like a hindrance to the bottom line. However, utilizing debt to make system improvements, comply with state and federal regulations, as well as perform costly maintenance projects can help a utility keep itself in working order while amortizing the costs associated with such long-lived projects over several years.

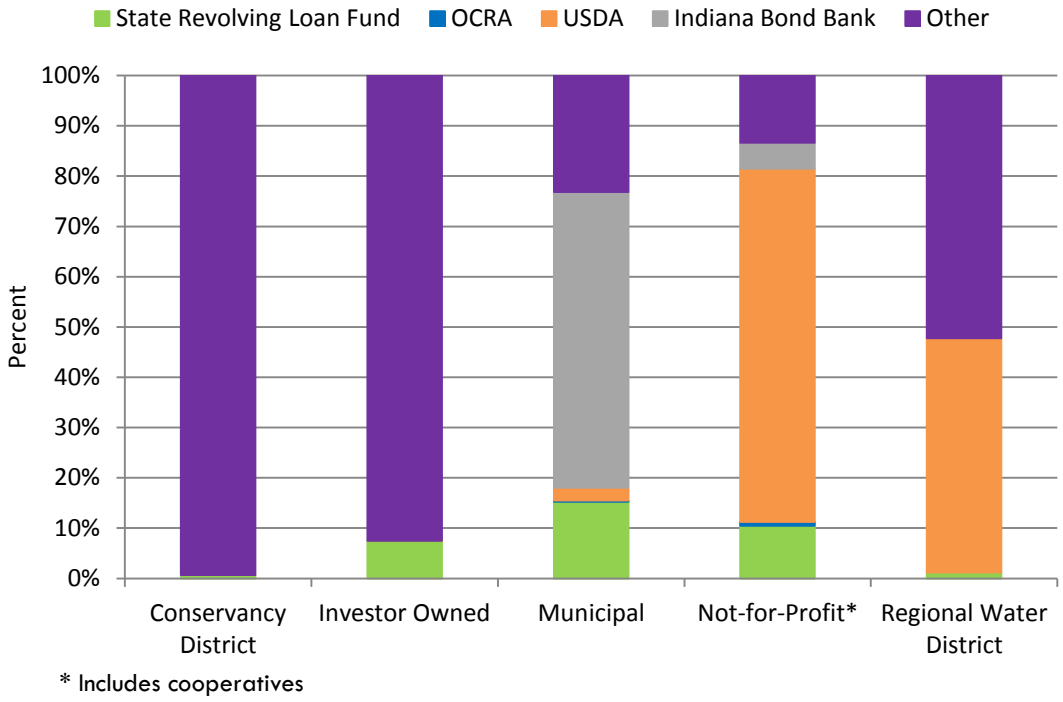
**Figure 14. Amount and sources of debt**
Based on Utility Type




* Includes cooperatives

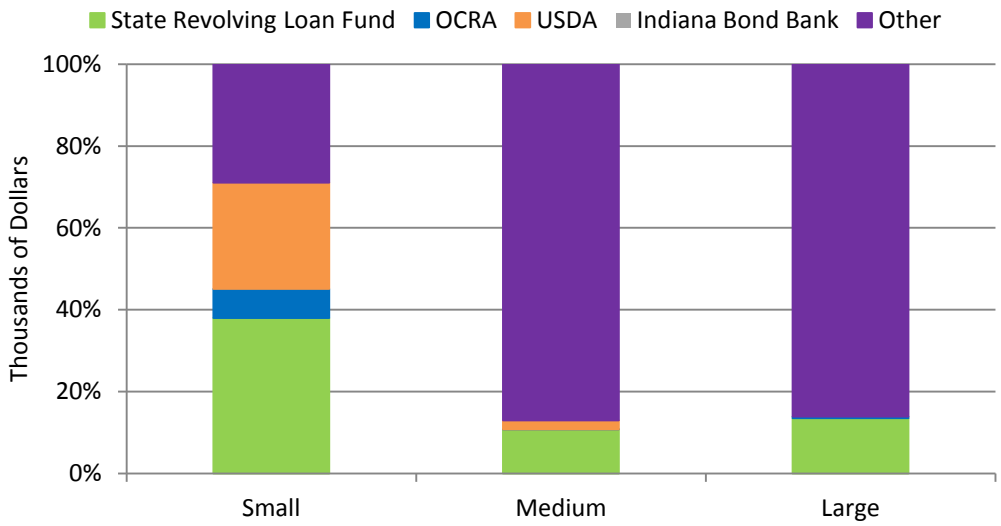
Conservancy districts reported using funding from predominantly other sources. For 2013 they reported using a proportional mix of funds from the USDA (35%), the State Revolving Loan Fund (27%), and private banks or bonds (38%) to fund their water capital projects. The Commission attributes this dramatic change from last years' data to fundamental changes in the data collection process. Investor-owned utilities rely solely on bank loans or bonds for funding. Municipals obtain 59% of their financing from the Indiana Bond Bank, whereas not-for-profit and regional water districts rely heavily on the USDA, using 70% and 46%, respectively. These results are similar to the results reported for 2012 (Figure 15).

**Figure 15. Sources of debt**
Based on Utility Type



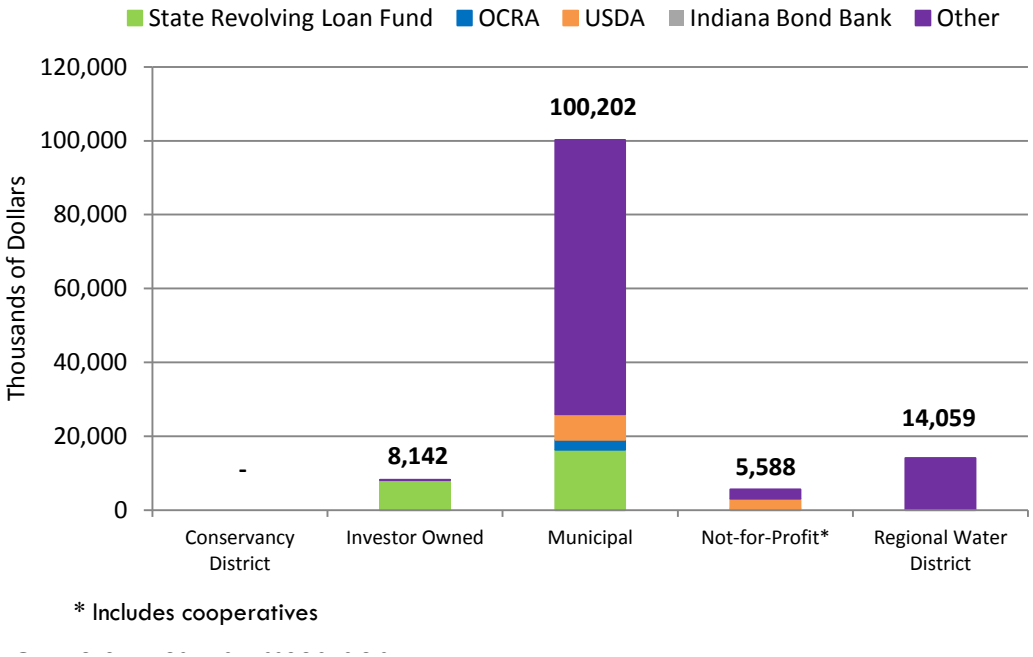
Small utilities receive 33% of their financing from the USDA and 30% from the State Revolving Loan Fund. Medium sized utilities receive 87% of their financing from private bank loans or bonds and 11% from the State Revolving Loan Fund. Large utilities receive 14% of their financing from the State Revolving Loan Fund and 86% from private bank loans or bonds (Figure 16).

**Figure 16. Debt incurred in 2013**
Based on Utility Size



Municipal utilities incurred the most debt among all utility types in 2013, with conservancy districts and cooperatives incurring the least amount of debt. Municipal utilities incurred $100,202,000 of indebtedness. They are followed by regional water districts with $14,059,000, investor owned with $8,142,000, and not-for-profit utilities with $5,588,000. Conservancy districts did not report any debt incurred in 2013 (Figure 17).

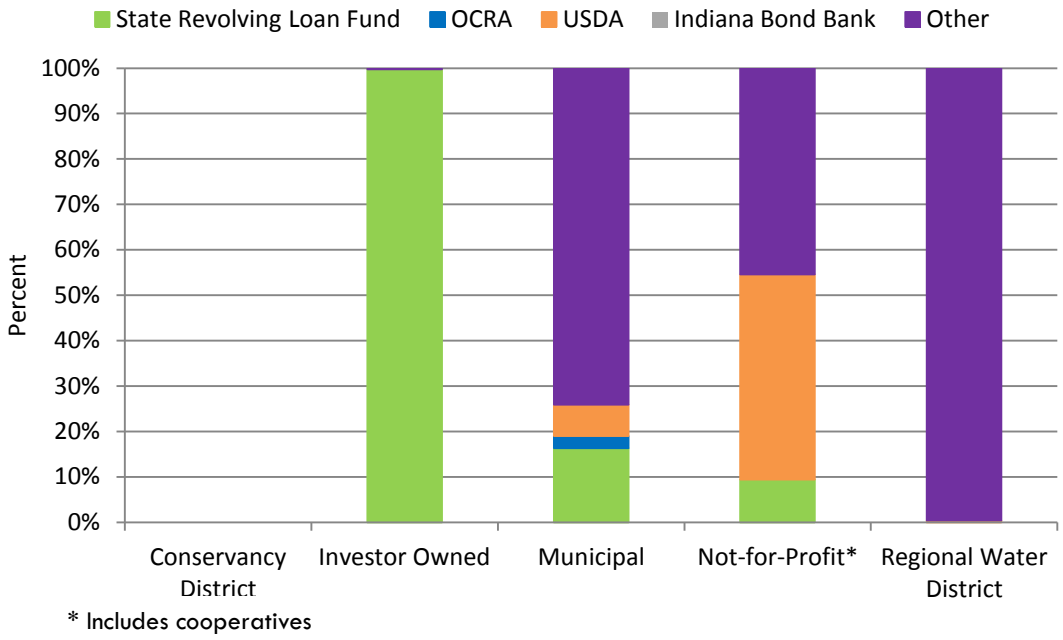
**Figure 17. Debt incurred in 2013**
Based on Utility Type




* Includes cooperatives

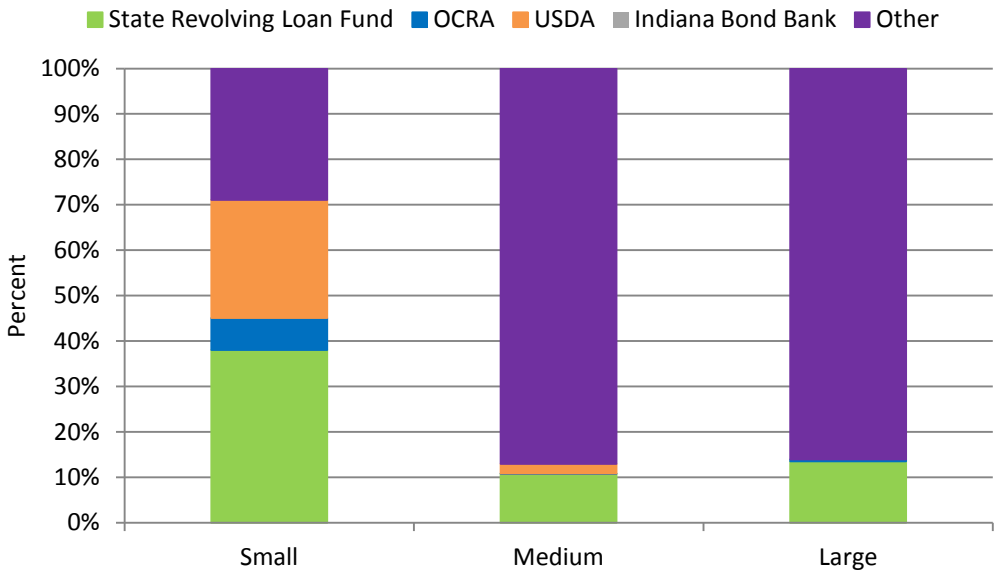
Of the utilities that issued debt in 2013, investor owned utilities relied almost exclusively on the State Revolving Loan Fund. Municipalities maintained a mix of financing sources, primarily obtaining 74% from private bank loans or bonds, 16% from the State Revolving Loan Fund, 7% from the USDA, and 3% from OCRA. Not-for-profits received 45% of their financing from the USDA and 45% from private bank loans or bonds. Regional water districts received almost 100% from private banks or bonds. This data is dramatically different in comparison to the data received for 2012, specifically, that of the investor owned utilities. In 2012, the investor owned utilities reported $49,460,000 of debt. In 2013, investor owned utilities reported just $8,142,000 of debt. Meanwhile, municipal utilities decreased their borrowing by nearly $40,000,000, $100,202,000 in 2013, down from $139,977,000 in 2012. Not-for-profits and regional water districts borrowed slightly more in 2013, approximately $1,300,000 and $5,000,000, respectively.

**Figure 18. Debt incurred in 2013**
Based on Utility Type



Small utilities were able to take advantage of a wide range of funding sources, resulting in 26% from the USDA, 38% from the State Revolving Loan Fund, 30% from private banks or bonds, and 7% from OCRA. Medium sized utilities attributed 11% of their financing from the State Revolving Loan Fund, 87% from private banks or bonds, and 2% from the USDA. Finally, large utilities received 86% of their financing from private bank loans or bonds, and 14% from the State Revolving Loan Fund.

**Figure 19. Debt incurred in 2013**
Based on Utility Size

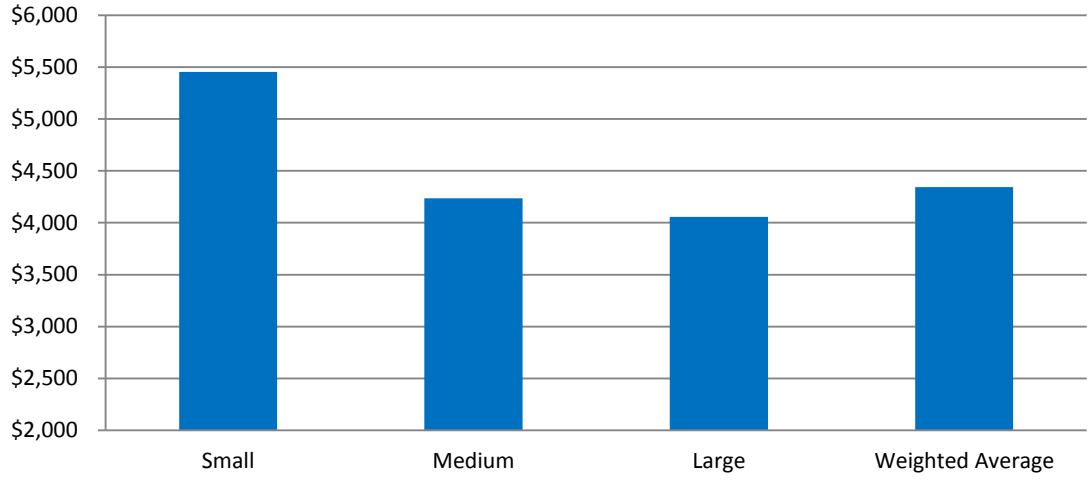



## Total Utility Plant in Service

For purposes of this Report, total utility plant in service (UPIS) represents funds that have been spent on physical assets such as land, pipes, pumps, meters, wells, water treatment plants, water storage facilities, office equipment, and vehicles. It does not include construction work in progress (CWIP), plant held for future use, accumulated depreciation or materials and supplies. Based on the utilities reporting, the total UPIS as of December 31, 2013 is $10.153 billion. Utilities are categorized as small, medium and large utilities based upon a customer size of 1 to 3,300; 3,301 to 10,000; and greater than 10,000.

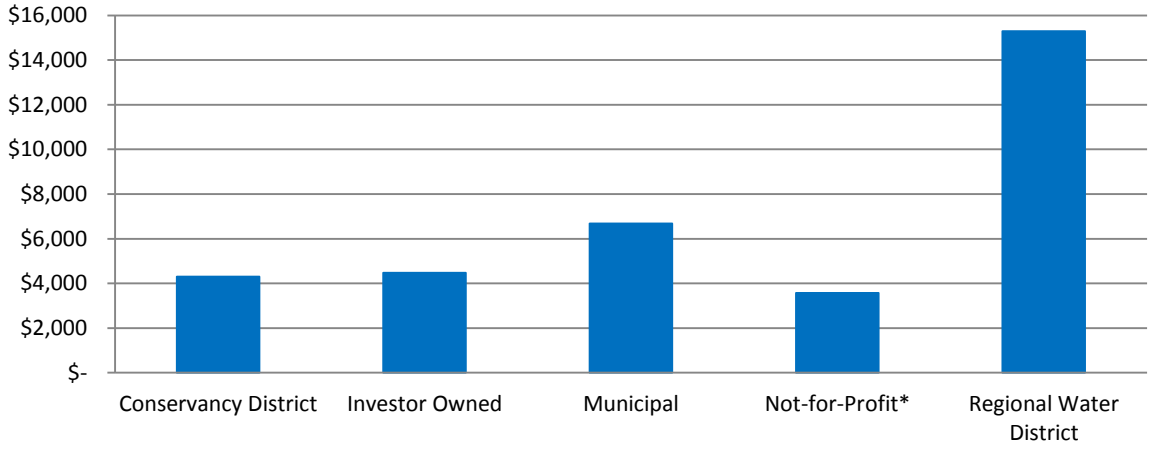
The UPIS per customer for small utilities is $5,454, and $4,056 for large utilities. See figure 20 on the next page. The medium UPIS per customer of $4,236 is less than the large UPIS per customer amount. The 2012 data reflected numbers for small utilities to be nearly double that of large utilities. This shift is attributed to the utilities having a better understanding of UPIS. This concept may not have been well known to non-regulated utilities prior to the introduction of this Report in 2012.

**Figure 20. UPIS per customer**
Based on Utility Size




In 2012, the UPIS per small municipal utility customer was $10,006, the remaining small utility customers UPIS per customer is $3,617- for an average of $8,065. This year's data reflects the per capita UPIS for small utilities has shifted to under $5,500 per customer. This dramatic shift is attributed to the small utilities having a better understanding of what UPIS is, as many may not have encountered the term prior to receiving the Commissions' survey.

**Figure 21. UPIS per customer**
Based on Utility Type




The analysis above shows a distribution of UPIS that is significantly skewed toward the regional water district. The skewing was caused a single utility, Patoka Lake Regional Water District. While the utility reported a UPIS in excess of $96 million dollars, they directly serve less than 5,000 customers. In examining their reported sales, approximately 90% were attributed to the resale class. Patoka Lake Regional Water District sells water to several utilities spanning eleven southern Indiana counties. According their website, they actually serve over 31,000 customers, despite less than 5,000 of those being direct customers within their utility's borders. As

the survey does not collect data regarding specifically who the out-of-district customers are, it is not possible for this single utility's UPIS to be normalized.

Although data quality appears to improving, UPIS data submitted by small utilities is often inconsistent due to their lack of reliable resources. The Commission often has the same concerns when assessing a small utility rate case. The issue in the submitted data may be even more pronounced as many reporting utilities have withdrawn from Commissions' jurisdiction, so maintaining a reliable UPIS record may not be a priority from a management perspective. Much of the data received was in error as operations and maintenance expense (O&M) equaled UPIS, the UPIS amount was missing, or the amount was considerably high or low or indicated as "unknown."

*Def: "Utility Plant In Service"* **represents funds that have been spent on physical assets such as land, pipes, pumps, meters, wells, water treatment plants, water storage facilities, office equipment, and vehicles.**

Often, the individual responsible for record keeping did not correctly maintain the UPIS account. Mistakes often include expensing capital items or capitalizing expense items. The wide variation of amounts received per customer indicates that the UPIS received by the Commission may not be reliable. Even though it is suspected that the less sophisticated and resource challenged small utility group has likely failed to record all of its capital improvements as UPIS, it is interesting that the amount per customer amount is significantly more than the medium and large utilities.

# Section IV: Water Resource Planning at the State, Local, and Utility Level

Anecdotal evidence suggests Indiana is blessed with adequate water supplies and is well positioned to use this resource as an economic advantage over states lacking water. However, studies have not been completed that would measure more precisely the amount of water Indiana has or how long it might last at current rates of consumption. Future rates of consumption are another issue. Economic development, industrial, agricultural, and population growths are all factors that must be considered. While data exists that would permit some demand forecasts, such an exercise would be futile without accurate data regarding water supply.

## Integrated Water Resource Management at the State and Local Level

Supply and demand of water is largely affected by the weather. Accordingly, drought events have a significant impact on water utilities and the consumers they serve. Typically, when supply is outpaced by demand, deficits are filled by tapping into reservoir storage and groundwater. Additionally, water use restrictions are communicated to the public with varying degrees of required compliance. As a result, cooperation amongst regional water providers is essential to continue to meet the ever-growing demand for water.

**Recommendation:**

Begin integrated water resource management

Population growth and shifts, economic development, aging infrastructure, climate change, and land use all impact water resources. Typically, water management only focuses on water-supply development without consideration of water quality, ecosystems, or social impacts. An alternative to this traditional method is integrated water resources management (IWRM). IWRM is "a process that promotes the coordinated development and management of water, land, and related resources in order to maximize economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems and the environment."[28]

The American Water Resources Association[29] (AWRA) identifies and defines the four key concepts of IWRM as:

1) **Manage water sustainably**– Water management must balance the multiple objectives of different interests with consideration for economic development, social equity, and the environment as well as current and future generations.

2) **Coordination is required for integration**– Integrate water management between and within levels of government and other organizations, with recognition of the respective roles of each.

[28] Global Water Partnership. 2012. What is IWRM? http://www.gwp.org/The-Challenge/What-is-IWRM/
[29] American Water Resources Association. 2012. Case Studies in Integrated Water Resources Management: From Local Stewardship to National Vision. http://www.awra.org/committees/AWRA-Case-Studies-IWRM.pdf

3) **Encourage participation**– Involve the public and stakeholders from all water use sectors.

4) **Resources are connected**– Holistic management recognizes the interconnectedness of land and water, surface water and groundwater, water quantity and water quality, freshwater and coastal waters, and rivers and the broader watershed.

Managing Indiana's resources requires assessing the state's supplies and determining current and future needs both locally and regionally. To do this, groundwater and surface water supplies must be monitored for water level, flow, and water quality changes. Monitoring does occur in Indiana, but the data is not analyzed on a holistic basis. Analyzing the data in relation to areas of population growth and future economic development can give insight into where demand is greatest, and identify the long-term water use and supply trends for that area. Additionally, water demand data for all users must be analyzed. One use, such as public supply, cannot be analyzed without regard to other uses like agriculture or industrial uses, because all of the water withdrawn is from the same interconnected sources. Continued investment in hydrologic data collection and analysis is critical for determining when and how to respond to changes in water use and supply.

**Several states and communities in the United States already use integrated water resources management, including Oregon, Washington, California, New Mexico, Minnesota, Florida, and New York.**

IWRM expands water utilities' options for securing adequate supplies. Instead of simply installing a well or surface water intake to meet new demands, IWRM can be used to determine whether water conservation, an aggressive leak detection program, or water reuse is cost effective and can supply the additional needed water. Unlike traditional groundwater and surface water supplies, these alternative options are not affected by climate variability and have minimal environmental impact.

Having the regulatory framework in place that facilitates these alternative sources is critical. It requires coordination among different state agencies and partnerships between utility departments. State and local policies, legislation, and financial structures must support IWRM in order to initiate planning and authorize funding. Several states and communities in the United States have begun IWRM. The AWRA published case studies on seven IWRM programs that highlight the different ways in which IWRM can be implemented.[30] These seven states (Oregon, Washington, California, New Mexico, Minnesota, Florida, and New York), as well as many other states which to some degree use IWRM, started on the path to using IWRM many years ago.

In several of those seven states, there was a definite impetus to begin IWRM, such as an interstate water issue on the Rio Grande or a region where a drought occurs on average every five years. Indiana is not in quite the same situation. However, Indiana should not wait to start. While Indiana droughts are not as periodic as the example above, there is a risk that Indiana could experience a drought that is similar to or worse than in 1988, or have back-to-back droughts. Even absent a drought threat, Indiana's economic development would be best served by

[30]American Water Resources Association. 2012. Case Studies in Integrated Water Resources Management: From Local Stewardship to National Vision. http://www.awra.org/committees/AWRA-Case-Studies-IWRM.pdf

acquiring solid data regarding supply and demand, and implementing IWRM. As mentioned above, monitoring does occur in Indiana, but the data is not analyzed on a holistic basis. Based on the Commission's review of available information and data, Indiana still has much work to do towards assessing even the current supply and demand for water in totality.

There are already various resources available in Indiana that could provide assistance with IWRM. One such resource is expanding the scope of work of the State Utility Forecasting Group (SUFG). By law, the SUFG must be based at a state supported university, and it has been analyzing and forecasting the supply, demand, and price of electricity for 25 years. In addition, the SUFG conducts special studies related to energy. The SUFG is based at Purdue University, but the actual forecast is a collaborative effort between Indiana University and Purdue University.

Other water related groups already based at state-supported universities include the Indiana Geological Survey at Indiana University and the Purdue Water Community. Such Indiana state university academic resources would prove useful tools that can be utilized for effective IWRM, and the development of a model comparable to that developed by the SUFG for the comprehensive analysis of both current production and projected water needs could be utilized by the IURC and other state agencies. Any model developed for such purposes should also be capable of producing outputs based on various scenarios.

For many years, staff members from IURC, the OUCC, and IDEM have met from time to time to discuss small, troubled water and wastewater utility issues. This informal group is called the Water Wastewater Task Force (WWTF).

In 1994, IDNR created Indiana's Water Shortage Plan. A Water Shortage Task Force (WSTF) was created by law in 2006 to refine the IDNR Water Shortage Plan. The WSTF met for several years, completed its mission, and is no longer active. During its existence the WSTF addressed many of the issues that directly relate to the IWRM initiative. The task force was composed of members representing: public water supply utilities, agriculture, steam electric generating utilities, industry, municipalities, environmentalists, consumer advocates, economic development advocates, academia, and the public. One way to address Indiana's water supply concerns is to reactivate the WSTF and give the group new direction and purpose as well as possibly including additional state agencies. By more effectively utilizing the existing WSTF, the state could leverage the large amount of work already accomplished and better position Indiana for IWRM in the future.

## Use of IWRM Planning by Indiana Utilities

In the second year of the Commissions' Report, one thing is certain: planning is paramount. In an effort to provide the context for utilities to best plan for their resources, the Commission has analyzed the data provided by the state's utilities to present opportunities and options for utilities to develop water resource planning. Indiana's water supplies are not evenly distributed throughout the state; droughts and areas of concentrated demand can stress water supplies. There are both infrastructure improvements and management improvement that utilities can make in order to extend supplies. By better managing water supplies, planning for the future, looking realistically at where water is now and where demand will be in the future, and acknowledging

the continued variability of Indiana's climate, Indiana's water utilities will be in a better position to manage unforeseen events.

Major utilities in Indiana are starting to use IWRM and are engaging stakeholders. Because of the difficult issues like projected growth rates and forecasting peak demand periods, some of the IWRM plans utilize a mix of the following strategies:

- Water conservation, by utilizing conservation rate structures, public awareness and education, and customer efficiency;
- System optimization, through leak detection and repair, well field optimization, infrastructure upgrades, and treatment plant inlets;
- Water reuse, by treatment plant re-use and aquifer recharge;
- New surface and groundwater to the local water supply;
- New storage provided by dredging existing reservoirs, expanding existing reservoirs, and using a balance/share reservoir storage approach;
- Purchase water from new and existing suppliers;
- Utilizing a combination of voluntary and mandatory water use restrictions;
- And the development and use of regional resources, to include pipelines and reservoirs.

Other water utilities have found that participating in various economic development organizations has proved beneficial for identifying growth trends in communities, thus being prepared for new development projects. The general planning periods for the utilities that attempt to forecast their growth are 20 to 25 years in the future, with some also using a shorter 5 to 6 year focus for more immediate capital planning efforts. Additionally, utilities have found it useful to engage regional water planning councils in their territories, as they have proven to be a useful vehicle upon which to encourage interconnected, regional approaches to water supply planning. Another major utility has also utilized the IWRM concept in an effort to better meet its consumers' needs. In addition to utilizing a comprehensive drought management plan (discussed on page 55), this utility has also sought to promote "wise water use" through a customer conservation education program. This has proved significant, as the utility has been able to reliably use this decline in demand when projecting its customers' future demands and when planning its sources of supply.

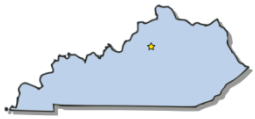
## Water Resource Management in Other States

Indiana is not alone in its vigilance of the state's water resources. Many other states in the U.S. have made managing water a priority. A short description of water resource management for surrounding states, as well as three other non-western states that have more developed state-wide water resource management plans, are provided below. Each state's overall governance, structure, and terminology varies considerably in relation to how that state manages water resources. Consequently, each state's approach is unique and tailored to fit the needs of that

state. As this Report is written by the Commission and not those heavily involved with these states' plans, a general overview of each state's plan and links to more information has been provided.

### Kentucky

**http://water.ky.gov/wa/**



Within Kentucky's Division of Water, a water quantity management section provides oversight of water withdrawal permitting, water supply planning, and drought management. The intent of Kentucky's policy in this area is "to maximize the conservation and beneficial use of water, prevent flooding, maintain the normal flow of all streams, regulate reasonably the amount of withdrawal of public waters and provide planning of regionalization, consolidation and partnerships among governmental agencies and private parties." In regard to water supply planning, it is done on a county basis mostly through area development districts. Water supply plans are submitted to the state for approval. Although all 120 counties are engaged in water supply planning, it should be noted that water supply planning is voluntary. However, the lack of an approved plan can result in project funding availability consequences. Kentucky's goal, which is quite proactive, is to see that water service is provided to all areas unserved or underserved by 2020.

### Illinois

**http://www.isws.illinois.edu/wsp/**

Illinois started water supply planning through an executive order (2006-01) of the Governor in 2006, although much preliminary work had been done in years prior. This Executive Order directed the Illinois DNR and the Illinois State Water Survey (a Division of the Prairie Research Institute of the University of Illinois at Urbana-Champaign) to engage in regional water supply planning. Three regions were determined to have priority: East Central, Kaskaskia, and Northeastern. Each region is composed of numerous counties and roughly corresponds to a major watershed/aquifer system. Numerous studies have been completed including a supply and demand study through 2050 for each of the three priority regions.

### Ohio

**http://soilandwater.ohiodnr.gov/water-use-planning/water-planning**

Ohio has been divided into five regions for water supply planning purposes conforming to watersheds and these watersheds were studied and reports issued between 1967 -1978 by the Ohio DNR and include studies on community systems. Two of these regions had updated studies completed in 1986 and 1988. These studies are then supplemented by community and sub region updated studies on an as needed/funded basis. Ohio assists community water systems (including water utilities) in water supply planning.

### Will the Lake Erie algae woes that plagued Toledo have a similar impact on Indiana's water supply?

Unlike the shores of Lake Michigan that border Indiana's northwest corner, Lake Erie is susceptible to agricultural and fertilizer runoff, as it is the shallowest of the five Great Lakes. As a result, Indiana's susceptibility to the algae problem that caused a city-wide usage ban in Toledo during the month of August 2014 is unlikely to occur in Indiana. However, the Toledo event may bolster attempts in neighboring states and at the federal level to pass legislation intended to help curb phosphorous seepage, which researchers say factored heavily in increasing massive, toxic algae growths in Lake Erie.

**Michigan**

**http://www.michigan.gov/deq/**

No comparable water supply planning method could be found for Michigan. Michigan's Department of Environmental Quality (DEQ) is responsible for water quality for public water supply systems and regulates private drinking water well drilling. It is noted that Michigan has more households (1.12 million) served by private wells than any other state. There is also a Water Use Advisory Council and the DEQ, which administers the significant water withdrawal registration process, prepares a Water Conservation and Efficiency Annual Program Review report as part of the Great Lakes Compact.

**Georgia**

**http://www.georgiawaterplanning.org/**

In 2004, the State-wide Water Management Act mandated the Georgia Environmental Protection Division (EPD), with oversight from Georgia Water Council, to develop the first comprehensive Statewide Water Management Plan. The plan was completed and adopted by the General assembly in 2008. The plan contains sections on resource assessments, forecasting, and regional water planning. The resource assessment section evaluates the capacity of water resources (surface and groundwater availability as well as surface water quality for assimilative capacity) to meet current and future needs. The plan's forecasting section analyzes water demand through 2050 for the municipal, industrial, agriculture, and energy sectors. For regional analysis, the state has been divided into 10 regions administered by a council, with each region roughly conforming to a watershed, plus a special Metro district around Atlanta. The Councils must submit their regional water plans to Georgia EPD for approval.

### Minnesota

http://www.bwsr.state.mn.us/planning/CLWM/index.html
http://www.wrc.umn.edu/watersustainabilityframework/index.htm

Water supply planning in Minnesota is complex due to its evolutionary nature. Historically, much of the planning took place at the county level under the supervision of the Minnesota Board of Water and Soil Resources (BWSR). However, watershed districts were enabled to be formed in 1955. There are now 46 watershed districts in Minnesota; however, they only cover about half of the state. In addition, there is a special seven county metro Minneapolis area which accounts for surface water supply planning only. BWSR has oversight responsibilities to ensure that local water plans are prepared and coordinated with existing local and state efforts and that plans are implemented effectively. In 2008, legislation provided that a portion of state sales tax be dedicated to clean water. All parts of Minnesota have state-approved and locally adopted plans in place. In 2012, BWSR was given the authority to develop and implement a comprehensive watershed management plan approach as a means to transform the current system of water plans, largely organized on political boundaries, to one where plans are coordinated and consolidated on a watershed basis. The legislation has come to be known as One Watershed, One Plan. Under this approach, the number of water plans should be consolidated from about 200 to around 100. Further changes could happen based upon legislative recommendations contained in a 150 page report entitled "Minnesota Water Sustainability Framework" prepared by Water Resources Center of University of Minnesota. Some of the recommendations in the report relate to determining the state's water balance, improving the water appropriations permitting, planning for water re-use, and factoring in the water-energy nexus.

### North Carolina

http://www.ncwater.org/Reports_and_Publications/swsp/swsp_jan2001/swsp_j01.php
http://www.ncwater.org/Water_Supply_Planning/Local_Water_Supply_Plan/
http://portal.ncdenr.org/web/wq

In North Carolina, the Division of Water resources is responsible for reviewing and approving local water plans, which must be submitted by all local governments which operate a public water supply system as well as some community systems. These plans span a 20 year time period and must be updated every five years. The plans assess availability of water supply, projected future needs for water, and sources needed to meet any projected deficit. These local water plans, of which there are around 500, are utilized in a bottom-up approach and look at water supply and demand on a regional basis and, ultimately, to identify problems facing the state as a whole.

# Section VII: Drought Planning

Indiana experienced droughts lasting multiple years in the 1930s, 1950s, 1960s, 1980s, with the most recent drought occurring in 2012. The 1988 drought served as the catalyst for addressing the impact of water shortages on the health, safety, and economic well-being of Indiana. Even in the water rich Kankakee River Basin, record low groundwater levels were measured in 19 out of 23 bedrock and unconsolidated observation wells.[31]

It is critical that water utilities and government agencies identify water systems vulnerable to short-term (lasting a season) and long-term (lasting more than one season) droughts and require water utilities to do drought planning. State agencies should also prepare and coordinate on messaging to ensure consistency and a unified approach to response efforts.

Water utilities most vulnerable to drought are:

- Systems that rely on a single surface water source for supply;
- Smaller systems unable to develop alternative water supplies capable of meeting demand;
- Smaller systems unable to update infrastructure because of financial constraints;
- Systems unable to interconnect with nearby larger systems;
- Systems unable to monitor water level changes and anticipate flow changes because its surface water source is not monitored.

Any community that obtains its water from surface water sources, such as rivers, streams, lakes, and reservoirs, is more vulnerable to drought than a community using groundwater because low precipitation and high temperatures for extended periods of time reduces stream flows. Areas in southern Indiana without access to the sand and gravel deposits along major rivers are vulnerable to drought. The state's reservoirs in the southern region (Patoka, Monroe, and Brookville) provide a reliable supply source during short-term droughts but could be affected by long-term droughts.

**Recommendation:**

Conduct a water symposium

In order to better determine if the state's water utilities are prepared to meet expected summer demand (including preparing for a drought), in the 2013 WURR, the IURC recommended that state agencies partner with water utilities and trade associations to host a public water symposium to address issues related to summer preparedness as well as utility finances, master planning and rate structures.

[31] IDNR, Division of Water. 1990. Water Resource Availability in the Kankakee River Basin, Indiana – Executive Summary.

## Historic Drought of 2012

In 2012, Indiana experienced the worst drought since 1988. All 92 Indiana counties were in some level of drought during this period, and at the drought's peak, most of the state was categorized as being in extreme or exceptional drought – the two highest levels. By July 2012, IDNR and the IDHS issued a water shortage warning for all counties in Indiana.

In response to the unprecedented drought conditions, many cities and towns throughout the state also issued water restrictions in July 2012. The restrictions specifically targeted outdoor water use, which is a nonessential use. Some cities issued voluntary conservation measures; whereas, restrictions were mandatory in other cities. Measures included no lawn watering or lawn watering restrictions; no car washing except at commercial car washes; no cleaning sidewalks, paved areas, or structures with water; and no operating non-recycling decorative water fountains. Mandatory conservation measures are typically outlined in water conservation ordinances.

Additionally, IDEM conducted a survey of all public water suppliers during the drought. Through this survey, it was found that despite southwestern Indiana having the most severe drought conditions, central Indiana reported the most water shortages. This highlights that both water supplies and demands must be understood in order to properly prepare for and respond to drought.

## Planning for and Mitigating Future Droughts in Indiana

The most important Indiana water conservation measures are those that affect "peak flow," meaning times of highest demand. This is particularly true when preparing an effective drought response. When planning for future consumers, water utilities must also take peak flow into consideration. In Indiana, peak flow historically results from daily residential lawn irrigation. Notably, the peak months for lawn irrigation typically come during the months where water supply shortages are most significant: July through September. In the 2013 report, the Commission recommended requiring drought planning be done by water utilities.

To demonstrate action that can be taken at the utility and local levels, Citizens provided a detailed overview of their response to the 2012 drought. In their presentation, Citizens showed how below normal precipitation combined with above average temperatures resulted in the following consumer and environmental impacts:

- Increased system demand for irrigation;
- Decreased stream flows; and
- Increased reliance on storage and ground water for the supply deficit.

Citizens Water's drought management plan's inclusion of water use restrictions was a key component. The use restrictions were of a tiered nature and provided exemptions for certain businesses. The tiered restrictions are as follows:

- Tier 1 – Water Shortage Watch (voluntary conservation)
- Tier 2 – Water Shortage Alert (irrigation restricted to 2 days per week and alternating between odd-even address numbers)

- Tier 3 – Water Shortage Warning (irrigation ban)
- Tier 4 – Water Shortage Emergency (irrigation ban and outdoor water use restrictions)

Exemptions from these restrictions included gardens, construction, parks, athletic fields, golf courses, and car washes, as these entities had a financial stake in maintaining normal water use. For your reference, the Indianapolis-Marion County Water Conservation Ordinance[32] is attached as Appendix A.

Comments from other water utilities also showed great strides being made in the area of drought management. For example, Indiana American Water utilized comprehensive drought management planning which encompasses planning, design, and construction of sources of supply. These sources of supply include reservoirs and groundwater wells, sufficient to meet maximum day demands over the planning period with a 95% confidence level. The sources used are designed so that the probability of maximum day demands exceeding the source of supply capacity is 5% over the planning period. In the event that maximum day demands exceed designed source of supply capacities, Indiana American Water correspondingly implements demand management actions through its drought response plans.

## Water Ban Implementation

**Finding:** Model ordinances should be in place for municipalities and utilities to use when a drought occurs. See Appendix A.

One of the reasons why the water ban ordinance was effective in Indianapolis and Marion County was enforcement by the Department of Code Enforcement. For example, during the 2012 drought, 36 citations were issued. In the future, it is Citizens' position that the ordinance could be improved by: (1) clarifying exemptions, (2) providing interim steps, (3) providing an exception for new landscaping, and (4) limiting fire hydrant access.[33]

Initially, Citizens found the benefits of voluntary lawn watering restrictions to be minimal, but later mandatory bans proved to be especially effective. Additionally, the unprecedented communication of such water use restrictions to the public proved to be key. Citizens also found that the daily operations and reservoir summaries maintained media interest in the situation, and believes that proactively reaching out to the media earlier in the summer would only increase such success. In the future, Citizens plans to expand its use of social media, neighborhood outreach, and business and intuitional outreach. Specifically, Citizens will look to educate the public regarding smart watering practices and the benefits of such practices. Further, Citizens plans to partner with landscapers to promote smart watering.

**Recommendation:**

Require drought planning

Although each situation is different, this example shows

[32] Indianapolis-Marion County, Indiana, Municipal Code §007-001, *Water Conservation Ordinance* (2013)
[33] Citizens Energy Group, 2012 Drought Communications, presented at May 14, 2014 Citizens Water Technical Advisory Group

how localities worked together to inform the public about their respective water bans through customer communication and coordination with local media outlets. The Commission believes that this open dialogue was crucial to successfully managing the drought of 2012 and Indiana's respective water bans. This strategy could also serve as a model for other communities in the future, should drought or emergency conditions arise.

## Municipal Water Ban Implementation

Bloomington also implemented a watering ban during the 2012 drought.[34] The ban was imposed by the City of Bloomington Utilities Department and was effective through October 11th of that year.[35] The ban restricted most outdoor watering activities, with the exception of commercial enterprises reliant upon water use.[36] Violators of the ordinance were issued fines ranging from $100 to $500, depending upon whether it was a repeat violation. During the drought, the Monroe Water Treatment Plant was operating at or beyond capacity.[37]

### Lawn Irrigation Increases Peak Usage

Lawn irrigation is the largest drain on water systems during the summer months.

[34] Indiana Daily Student, *Bloomington implements city-wide water restrictions, available at* ***http://www.idsnews.com/article/2012/08/bloomington-implements-city-wide-water-restrictions*** (last accessed August 1, 2014)
[35] Id.
[36] Id.
[37] Id.

# Section VIII: Financial & Managerial Planning

A utility's ability to plan effectively for their financial needs and manage their operations adequately can make or break the organization. Indiana's water utilities generally are one of two extremes: a large, investor-owned utility or a small, municipal or non-jurisdictional entity. Each has its strengths and weaknesses and the IURC has identified several areas for utilities to consider when planning for their organizational needs.

**Recommendation:**

Promote efficiency, sound management, and best practices for water utilities

The discussion that follows is based upon the data collected by Ind. Code 8-1-30.5, observations made as the data was being collected and analyzed, and the institutional experience of the Commission. The water industry tends to be regional or local in nature; a large number of small systems serve a small percentage of the population, while a small number of large systems serve a majority of the population. Therefore, many small systems may find it difficult to obtain the financial benefits that economies of scale can provide. Of the 412 utilities submitting customer data, the 25 largest water utilities in the state serve 965,361 customers while the remaining 387 utilities serve 710,564 customers. The general availability of water in the state, high cost to construct water mains, and the expense to pump water have likely contributed to the local nature of the industry. However, there are opportunities for small utilities to achieve the financial benefits provided by economies of scale. The opportunities for financial savings revolve around two categories: economies of scale and management.

## Economies of Scale and Cost Savings

Economies of scale should be considered a component of any plan to encourage the efficient use of financial resources. Economies of scale should not be limited to acquisition and consolidation of utilities, but should be expanded to include wholesale water purchase arrangements, shared ownership in water source and production facilities, limiting new utility startups, and purchasing cooperatives.

One solution to create economies of scale for the fragmented water industry is to encourage the use of water purchase agreements. In many parts of the state, water utilities have reached a point where their distribution systems have become interconnected or overlapping. Often, utilities are already using existing interconnections to purchase water from a neighboring utility. Yet, in many instances, these interconnections exist solely for emergency purposes. It is useful that these interconnections exist to maintain system reliability; however, it can be very costly for each utility to construct and maintain separate source of supply and treatment facilities.

When water utilities need additional treated water supplies or are in a position where existing facilities require replacement, they should be encouraged to consider the financial benefits that may exist by purchasing water from a neighboring utility. In order to encourage wholesale water purchase arrangements, existing barriers must be addressed. One barrier may

be the belief that every water utility must be an island unto itself. Some localities may view outside ownership or control of water resources as unreliable. Others may resist exporting their supply for the benefit of neighboring communities. Many may be concerned that if they commit to sharing resources their future economic development will be limited. Case studies of successful regional solutions should be identified with the benefits summarized and presented to utilities in order to provide guidance on best practices. One example of a successful regional approach is the Patoka Lake Regional Water District. In addition to its own retail customers, the Patoka Lake District sells water to 23 water utilities that expand over 11 southern Indiana counties.

Another problem with the use of water purchase agreements for wholesale water service is when the purchase agreement does not account for an equitable transition when the purchase agreement terminates. As purchase agreements expire, some water providers may take advantage of their monopoly position in providing water to wholesale customers and attempt to protect their own ratepayers from cost increases by passing along an inordinate portion of the increase to wholesale customers. Likewise, wholesale customers do not always want to pay their fair share of price increases that inevitably occur over the course of time. Unfortunately, the parties to the former purchase agreement often feel their only recourse is to litigate the dispute.

In order to reduce the likelihood of costly litigation upon the expiration of wholesale water agreements, basic elements for establishing the parties' rights upon termination should be developed and incorporated into all water purchase agreements.

Economies of scale = efficient use of resources

The more unique solution to generate economies of scale would be shared ownership and or governance of water treatment and production facilities. There are situations where two or more utilities are adjacent to each other and are also both near raw water sources. When these situations exist, and the utilities need to add or replace existing facilities, joint ownership of newly constructed treatment and production assets should be considered as a way to gain economies of scale. This practice is relatively common in the electric industry and should be readily adapted to the water industry. Shared ownership may also address many of the concerns over loss of control and litigation over purchase water agreements because ownership is maintained while providing economies of scale.

One of the most apparent methods to achieve economies of scale is acquisition. The best opportunities for acquisition exist for small systems serving fewer than 1,200 customers. Based on the utilities that submitted customer data, 297 serve fewer than 1,200 customers. A trend appears to be developing where the acquisition of small utilities is already occurring and should continue without additional facilitation. As regulations and cost increase, many smaller systems realize that it is difficult to meet ongoing challenges as stand-alone entities.

Another area where the opportunity for consolidation may exist lies with the number of not-for-profit and regional water utilities providing service across the state. Some counties in the state have a number of these water utilities serving the local area, often times with interconnections for reliability and for wholesale water arrangements. Opportunities may exist to

merge a number of these entities to eliminate duplication of costs such as board of director fees, utility managers, office staff, and legal and accounting fees. Consolidation could also lead to greater purchasing power resulting in lower prices for meters, chemicals and other utility purchases.

There are instances where municipal systems provide wholesale service to utilities that serve only one or two subdivisions just outside the municipality's corporate boundaries. These municipalities could be encouraged to take ownership of these smaller systems. At this time, it is not clear what catalyst might be used to take advantage of these consolidation opportunities. One approach may be to perform a study to identify specific consolidation opportunities across the state and develop tools to facilitate municipalities' ownership of the satellite utilities.

A final possible alternative to obtain economies of scale is the purchasing cooperative. One of the greatest advantages large utilities have is their ability to achieve price reductions by purchasing in large volumes. In many instances across the state, consolidation opportunities will not be achieved for various reasons but a purchasing cooperative may provide a large number of small utilities with large utility benefits by consolidating their purchasing needs to provide the ability to purchase chemicals, meters, pipe and other materials at substantial discounts. It may even be possible to obtain discounts on large capital items such as pumps, motors and water storage tanks. If an entity were to consolidate the components of multiple projects and then request discounted bids on those components on behalf of its members, substantial economies of scale will be achieved. As an example, one large utility, which operates multiple utilities in the state, has been able to obtain better prices for components of each plant when it has constructed more than one treatment plant at a time.

### Added Benefit: Energy Efficiency = Lower Costs

As electric costs are projected to rise in Indiana, water utilities should continue to evaluate their operations and identify ways to save energy. For many communities, the cost of energy needed for water treatment and delivery is significant. Issues such as a high volume of lost water and aging or outdated infrastructure can often result in higher energy costs.

Ultimately, investments in these areas can save money for the utilities and their ratepayers.

## Management and Training

Most of the water systems in the state are owned by municipal or not-for-profit entities. These entities are managed by a board of directors or town or city councils. Individuals in these positions may be volunteers or receive minimal compensation and have other jobs that consume most of their time and energy. Individuals in these positions are also subject to turnover. One

solution to enhance the management of ratepayer owned utilities is to provide training for the decision makers. Once armed with knowledge, the board and council members would be better equipped to manage the utility and its consultants. In at least two states, Mississippi and West Virginia, state law requires board members to obtain training. Training should be provided in the areas of financial, managerial and technical aspects of utility operations. All small utilities would benefit from this type of training.

*Capital Improvement Plan –* **A short-range planning document used by a utility to identify capital improvements, replacements and equipment purchases. These plans typically define a schedule, detail cost estimates and lays out a plan for financing implementation.**

In order to make good decisions, decision makers require good information. Two areas exist where this information can be improved. The financial management and bookkeeping responsibilities for many of the small municipal utilities lies with the clerk-treasurer. This is an elected position, and there are no requirements regarding education or experience. Many utilities lack plant accounting records and, often times, are unable to produce a balance sheet that balances. A complete set of accurate financial statements should be produced on a monthly basis for all but the smallest utilities to facilitate utility management. Anyone desiring to be a clerk-treasurer should possess the accounting knowledge or experience necessary to fulfill the financial roles and obligations of the position.

Another area where management information can be improved relates to adequate analysis of alternatives for capital projects. Utilities frequently rely on engineering consultants to perform this analysis. However, utility management may not understand how to evaluate the cost differential that exists between the recommended solution and other alternatives. Capital projects should be developed with a true and complete evaluation of alternatives including operation and maintenance costs for the anticipated life of the improvement and decision makers should be trained to properly request a valid evaluation and identify which option is most appropriate for the utility and customers.

*Utility Master Plan –* **A planning document used by a utility to project growth, land use and the infrastructure improvements required to serve future customers within their planning territory. Master plans are typically tied to some sort of defined service territory, planning area or boundary and are regularly updated to reflect projected versus actual growth and land use changes.**

Small utilities can be better managed through planning. Based on data received in preparation of this report, most small utilities have not undertaken adequate master planning for capital projects. Master plans provide a road map that utilities can follow and update as the utility grows. All but the smallest utilities should be required to develop master plans that also consider regional solutions. If all utilities are required to plan for capital needs in advance and to share that information with neighboring utilities, regional opportunities will be more easily identified and realized. Master plans that are well-construed should also act as a control mechanism so that only projects that are needed and properly sized are constructed.

While water may be adequate in some areas of the state, the infrastructure costs to develop new sources of supply and to treat and store the water are high. For those utilities with high peak to average demands and those in areas facing supply constraints, water efficiency

programs will reduce the cost to provide water utility service by reducing the amount of infrastructure that is needed to meet consumer demand. If consumers can reduce their total consumption and reduce utilities' peak demands, utilities will be able to reduce their investments. Customer education and pricing are also areas to consider for a water efficiency program. Finally, utilities with high water losses should take steps to reduce the loss before large investments are made to meet system demands.

As previously described, a large number of small utilities provide water utility service. These entities are often managed by part-time boards or councils and possess limited resources. In addition to facilitating opportunities for small utilities to generate economies of scale, additional resources should be provided to enhance the financial, managerial, and technical abilities of these small utilities. This can be done by identifying existing resources and compiling them in one place on the internet; then perhaps, incentives can be developed to encourage utilities to utilize these resources. The Commission recently completed a similar project for small utilities under its jurisdiction.

## Resources for Improving Financial, Managerial, and Technical Abilities

The types of information that can be compiled include:

- Board member training materials with templates for job descriptions and utility policies
- Financial policies, procedures, and budget information and templates
- Identify utility accounting materials available for purchase
- Strategic plan information and handbook
- Project management information
- Asset management plan information and template
- Water system self evaluation information and questionnaire
- Security vulnerability assessment and emergency response plan information and template
- Water conservation information

## Action Steps Utilities Can Take

- Provide an asset management plan that has been prepared or updated within the last three years
- Develop or provide existing standard operating procedures
- Complete a water system self evaluation questionnaire
- Complete a security vulnerability assessment and emergency response plan
- Complete and document routine maintenance across all program areas as applicable to the utility
- Develop or provide an existing map of utility system assets

- Provide a system master plan that has been prepared or updated within the last five years
- Join Indiana's Water/Wastewater Agency Response Network (InWARN) as a utility member
- Provide to the utility's consumers, at least annually, educational material concerning the wise use of water via a billing insert and provide the same or similar information on the utility's website, should they have one
- Develop or provide existing information that supports the existence of written financial policies and procedures and the use of financial budgets
- Develop or provide an existing business plan or strategic plan
- A member of the clerk-treasurer's office of a municipal utility system or primary bookkeeper for private utilities holds a minimum of a two year accounting degree
- Two currently serving board members or city/town council members attend Alliance of Indiana Rural Water's Management Conference during the most recent 12 month period.

## Conclusion

In the second year of the Commission's report, much of the information requested by the General Assembly has remained the same, and the need for improved water utility planning continues to be at the forefront. As the General Assembly considers this Report, it may also wish to review the scope of the data request under Ind. Code 8-1-30.5 to determine whether the information gathered is adequate enough to address Indiana's water utility resources and resource planning issues. The General Assembly may also want to consider how to encourage reporting compliance with Ind. Code 8-1-30.5 as approximately 15% of water utilities in the state did not provide information for this report.

**Recommendation:**

Evaluate the scope of existing law

# Appendices

## Appendix A: Indianapolis-Marion County Water Conservation Ordinance

### Revised 2013

**Sec. 007-001. Application.**

This chapter applies to the use of water from the water system.

**Sec. 007-002. Definitions.**

As used in this chapter, the following terms shall have the meanings ascribed to them in this section.

*Advisory conditions* means conditions under which voluntary conservation measures are appropriate due to decreased supplies in the reservoirs, or other circumstances have reduced the amount of treated water available to customers, as determined by CITIZENS ENERGY GROUP.

*Customer* means an individual, firm, corporation, government agency or other entity being supplied with Citizens Energy Group service by CITIZENS ENERGY GROUP at a location within the county.
*Flower garden* means a garden where substantially all of the plants are suitable and maintained primarily for decorative purposes or are ornamental shrubbery regardless of the age of the plant, tree, bush, or shrub.

*Mandatory conservation* means compliance with CITIZENS ENERGY GROUP's imposition of requirements that are designed to reduce certain kinds and types of water use.
*Normal conditions* means conditions under which water supply and treatment capacity are adequate to meet all demands.

*Reservoirs* means a usually artificial lake that is used to store a large supply of water for use in people's homes, in businesses, etc.

*Treated water* means water treated in a manner that it is suitable for human consumption or for another designated use.

*Vegetable garden* means a garden where substantially all of the plants are suitable and grown primarily for human consumption.

*Voluntary conservation* means compliance with CITIZENS ENERGY GROUP's request to

reduce water use.

*Water alert* means an occurrence wherein mandatory conservation measures are appropriate due to actual or projected levels in either of the reservoirs being reduced to less than their designed drawdown curves, groundwater wells not functioning properly due to reduced groundwater levels, or the existence of other circumstances that have reduced the amount of treated water available to customers, as determined by CITIZENS ENERGY GROUP.

*Water emergency* means an occurrence wherein mandatory conservation measures are appropriate due to the levels in either of the reservoirs having been reduced to less than their designed drawdown curves or less than an estimated twenty-five (25) percent of their annual drawdown design capacities, groundwater wells not functioning properly due to reduced groundwater levels, or the existence of other circumstances that have reduced the amount of treated water available to customers, as determined by CITIZENS ENERGY GROUP.

*Water system* means the water system in the county owned and operated by CITIZENS ENERGY GROUP.

*Water user* means a customer or other individual, firm, corporation, government agency, or other entity using water within the county from the water system .

*Water warning* means an occurrence wherein mandatory conservation measures are appropriate due to the levels in either of the reservoirs having been reduced to less than their designed drawdown curves or less than an estimated fifty (50) percent of their annual drawdown design capacities, groundwater wells not functioning properly due to reduced groundwater levels, or the existence of other circumstances that have reduced the amount of treated water available to customers, as determined by CITIZENS ENERGY GROUP.

**Sec. 007-003. Voluntary conservation.**

During normal conditions and advisory conditions, water users should follow the voluntary conservation measures as found in the water conservation policy adopted by CITIZENS ENERGY GROUP.

**Sec. 007-004. Declaration of need; notice.**

(a)

Without disclosing trade secrets or information vital to the security of its water system, CITIZENS ENERGY GROUP shall certify to the department of code enforcement and the mayor a detailed description of the findings, conditions, and other circumstances that support CITIZENS ENERGY GROUP's determination that a water alert, water warning, or water emergency should be declared and the estimated impact of a failure to declare a water alert, water warning, or water emergency and that the certification be posted on CITIZENS ENERGY GROUP/Code Enforcement websites.

(b)

Upon being notified by CITIZENS ENERGY GROUP that the water system is in a condition of water shortage, the mayor may declare the existence of a water alert, water warning or water emergency, whereupon the respective water conservation measures described in section 007-005 of this chapter shall apply until the water alert, warning or emergency is terminated. Whenever the mayor finds that some or all of the conditions that gave rise to the declaration of a water alert, water warning or water emergency no longer exist, the mayor may declare the water alert, water warning or water emergency terminated.

(c)

Notice of the declaration or termination of a water alert, water warning or water emergency shall be made by publication in a newspaper of general circulation. Notice shall be deemed effective upon publication.

**Sec. 007-005. Mandatory water conservation; exemptions.**

(a)

During a water alert it shall be unlawful for a water user to cause, permit, allow, or engage in the sprinkling, watering, or irrigating of grass more than two (2) days per week. Water users with odd number property addresses may sprinkle, water, or irrigate grass on Monday and Thursday. Water users with even number property addresses may sprinkle, water, or irrigate grass on Tuesday and Friday. No sprinkling, water, or irrigating of grass shall be permitted by any water user on Sunday, Wednesday or Saturday.

(b)

During a water warning, it shall be unlawful for a water user to cause, permit, allow, or engage in the sprinkling, watering, or irrigating of grass; provided, however, that vegetable gardens, flower gardens, and trees less than three (3) years old may be watered every other day by container, hand held hose equipped with a shut-off nozzle, or drip irrigation system.

(c)

During a water emergency, it shall be unlawful for a water user to cause, permit, allow, or engage in any of the following actions:

(1)

Outdoor watering, including but not limited to the sprinkling, watering, or irrigating of grass; provided, however, that vegetable gardens, flower gardens, and trees less than three (3) years old may be watered every other day by container, hand held hose equipped with a shut off nozzle, or drip irrigation system;

(2)

Washing cars, trucks, trailers, mobile homes, railroad cars or any other type of mobile equipment, except as required by applicable local, state, or federal law for health or safety reasons;

(3)

Using water to clean sidewalks, driveways, paved areas, structures,

buildings, or other outdoor surfaces;

(4)

Filling empty swimming pools with water from CITIZENS ENERGY GROUP;

(5)

Using hydrants except for fire suppression or as otherwise directed by CITIZENS ENERGY GROUP; and

(6)

Operating water fountains that are non-recycling.

(d)

The following water users and water uses shall be exempt from the prohibitions contained in subsections (a), (b), and (c) of this section:

(1)

Nurseries, provided water use is limited to the amount essential to preserve inventories; and

(2)

Any activity associated with the installation, repair, testing, or maintenance of an irrigation system.

(e)

The following water users and water uses may be exempted by the mayor from the prohibitions contained in subsections (a), (b), and (c) of this section:

(1)

Automatic commercial car washes, including but not limited to automatic car washes operating within car dealerships, provided a majority of the water used is recycled;

(2)

Manual commercial car washes, including but not limited to manual car washes operating within car dealerships, provided only a handheld hose equipped with a shut-off nozzle is utilized;

(3)

Golf courses, provided that documented measures are taken to preserve the use of water, only watering tee boxes, greens, and fairways in the manner most efficient for the course;

(4)

Any watering of property owned or controlled by the department of parks and recreation, the department of public works, the capital improvement board, or the City of Indianapolis (pursuant to the city's heat relief plan) as directed by the mayor where such watering is necessary or appropriate for asset preservation;

(5)

Limited watering of in-season athletic fields for public safety, health, or welfare purposes;

(6)

Limited watering of new lawns or landscaping for construction projects with building permits issued by the department of code enforcement prior to the declaration of such water alert, warning, or emergency; and

(7)

Limited use of splash pad recreational watering systems or small temporary pools that have been filled by hand.

(f)

The department of code enforcement shall have the authority to promulgate regulations related to the operation of the exceptions listed above.

**Sec. 007-006. Violations.**

(a)

Each customer shall be responsible for compliance with section 007-005 of this chapter with respect to the premises where the customer receives water service. If the identity of the water user cannot be ascertained, the customer shall be prima facie liable for violations that occur on such premises.

(b)

A person's first and second violations of section 007-005 in any twelve-month period shall be subject to an admission of violation and payment of the designated civil penalty through the ordinance violations bureau in accordance with chapter 003, article III, of the Code.

(c)

With respect to violations not resolved under chapter 003, article III, of the Code, including a person's third and subsequent violations of section 007-005 in a twelve-month period, the department of code enforcement may refer the matter to the city prosecutor to file an enforcement action in court, or issue a notice of administrative hearing as provided in chapter 003, article V of the Code. Violations under this subsection are subject to the general penalties provided in section 007-003 of the Code; however, the penalty for each such violation shall not be less than five hundred dollars ($500.00).

(d)

All monies collected from violation of this chapter shall be deposited in the county general fund.

**Sec. 007-107. Enforcement.**

This chapter shall be enforced by the department of code enforcement.

**Sec. 007-108. Nonexclusive.**

This chapter is not intended to be, and shall not be, exclusive with respect to any further water conservation measures or the enforcement thereof, as may be adopted by CITIZENS ENERGY GROUP.

# Appendix B: Water Law in Indiana

> *Def: Riparian (ri·par·i·an) adjective- Act of being located on the banks or shore of a natural water course.*
>
> *-Black's Law Dictonary 2nd. Ed.*

The rules governing surface water and groundwater use in Indiana originate in common-law property doctrine, generally referred to as riparian rights, which means that a landowner with property adjacent to a waterway may use as much water as needed as long as they do not harm their neighbors. However, Indiana's water rules are considered "regulated" domestic beneficial riparianism, because state law has categorized water into specific uses, which affects ownership and use.[38]

In Indiana, water law gives priority to domestic uses. Surface water withdrawn for domestic purposes may be withdrawn without regard to the effects on other riparian landowners.[39] Domestic use is defined as water used for household purposes and drinking water for livestock, poultry, and domestic animals. Non-domestic uses fall within the definition of reasonable beneficial use, which is considered necessary for economic and efficient utilization and must be reasonable and consistent with the public interest.[40] Beneficial uses other than domestic use are not prioritized, but are as follows: agricultural, commercial, domestic, energy conversion, fish, industrial, irrigation, navigation, power generation, public water supply, recreational, waste assimilation, and wildlife.

Although a landowner may use as much surface water as needed, no person or facility may withdraw water from a navigable waterway[41] without a permit, unless it is a public or municipal water utility.[42] These permits are evaluated for the withdrawals' impact on navigability, the environment, and safety to life or property. However, there are no criteria for evaluating the impact of withdrawals on stream flows, in-stream uses or other withdrawers. In-stream uses include swimming, fishing, and aesthetics. There is no permit or evaluation process for new withdrawals from streams that are not labeled as navigable.

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[38] For an in-depth discussion of Indiana's water rights, see Lucas, Stephen, Indiana, Water and Water Rights. Ref. 4-3/2013 Pub.60748.
[39] Ind. Code §14-25-1-3.
[40] Ind. Code §14-25-7-6.
[41] A navigable waterway is defined in 312 I.A.C. 1-1-24 as a waterway that has been declared to be navigable or a public highway by one or more of the following: a court, the Indiana general assembly, the United States Army Corps of Engineers, the Federal Energy Regulatory Commission, a board of county commissioners under Ind. Code §14-29-1-2, or the commission following a completed proceeding under Ind. Code § 4-21.5. Navigable waterways by county: **http://www.in.gov/nrc/2393.htm**
[42] Ind. Code §14-29-1-8.

## Water Use Conflicts

**Finding:** In Indiana, there is no defined procedure in place to assess the impact a new well or surface water intake will have on the supply source or other users.

In Indiana, there is no defined procedure in place to assess the impact a new well or surface water intake will have on the supply source or other users. However, a new well or surface water intake that is able to withdraw more than 100,000 gallons of groundwater, surface water, or a combination of both in one day, must register with IDNR as a SWWF. Also, a water user wanting to remove water from a navigable waterway, regardless of whether that water will be used for domestic or non-domestic purposes, must obtain a permit from IDNR, unless it is a public or municipal water supplier. Without a procedure in place to assess the impacts of withdrawals on stream flows and groundwater levels, water resources cannot be sustainably managed nor can the occurrence of water-use conflicts be minimized, especially during droughts. As recommended in the 2013 Report, rules or laws should be developed to establish procedures for significant withdrawals from aquifers, surface waters, or interbasin transfers.

**Recommendation:**

Develop rules or laws to establish procedures for additional significant withdrawals from aquifers, surface waters, or interbasin transfers

During the 1988 drought, IDNR recorded several conflicts regarding stream withdrawals. Conflicts occurred throughout the state, but a significant number were in central Indiana. Indiana's existing stream program does not address potential withdrawal conflicts. Although a permit is required to withdraw from a navigable waterway, the impact of that withdrawal on other withdrawers and in-stream uses is not evaluated.

# Appendix C: Physical Groundwater and Surface Water Supply

In Indiana, water is supplied by groundwater and by surface water from streams, rivers, lakes, and reservoirs. Its availability is affected by both short and long-term seasonal patterns. The amount of groundwater and surface water available is a combination of natural and man-made influences. This section focuses on the natural influence of geology and climate.

Groundwater is the water between pore spaces and fractures in the subsurface soils and rocks that form aquifers. Some characteristics of groundwater include:

- Availability in a given area depends on the extent and thickness of the aquifer, the aquifer material's porosity and permeability, and the aquifer's recharge rate;[43]
- Sand and gravel deposits overlaid by a low-permeable material like clay will receive less recharge than deposits close to the surface with no overlying clay;
- Levels are at their highest during the spring wet season and decline in the summer and fall because of reduced recharge, increased evaporation from soil and plants, and increased withdrawals;[44]
- During droughts, groundwater levels drop even more because of decreased recharge and increased pumping to meet greater demands. The most productive aquifers in Indiana are the sand and gravel deposits adjacent to and under major streams.

Groundwater and surface water are hydraulically connected and interact in two primary ways: streams gain water from groundwater that enters through the streambed (referred to as base flow[45]), and groundwater is recharged by streams when the aquifer water level is below the water level in the stream. Groundwater discharges from aquifers into streams and lakes, sustaining a stream's base flow or a lake's water level. Rivers underlain by extensive outwash deposits have a high degree of base flow that sustains stream flow. However, rivers and streams that are not directly underlain by sand and gravel but rather clay, silt, or bedrock have a poor groundwater connection. During dry periods, flow in these streams is reduced substantially or stops. In central and southern Indiana, many of the small and medium streams are underlain by clay or bedrock and have a poor groundwater connection. Streams in northern Indiana have good connections with groundwater which is an indication of higher, more dependable sustained flows than streams in groundwater-poor areas.

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[43] Recharge is the downward movement of water through pores in the soil and fractures in rocks into the subsurface. The rate at which an aquifer recharges depends on the surficial geology, climate, land use, depth to water table, and vegetation.

[44] IDNR. 2002. Ground-water resources in the White and West Fork White River Basin, Indiana. Division of Water. Water Resource Assessment 2002-6.

[45] Base flow is the water flow in a stream during low-flow conditions and is present on a more or less continual basis.

## What is an aquifer?

An aquifer is a body of permeable rock that contains and transmits water. The amount of water that can be stored and transmitted depends on the following:

**1) Porosity:** amount of pore space between soil particles or within fractured rock. The more porous the material, the more water can be stored.

**2) Permeability:** the connectedness of the pores. The higher the permeability, the more liquid can pass through.

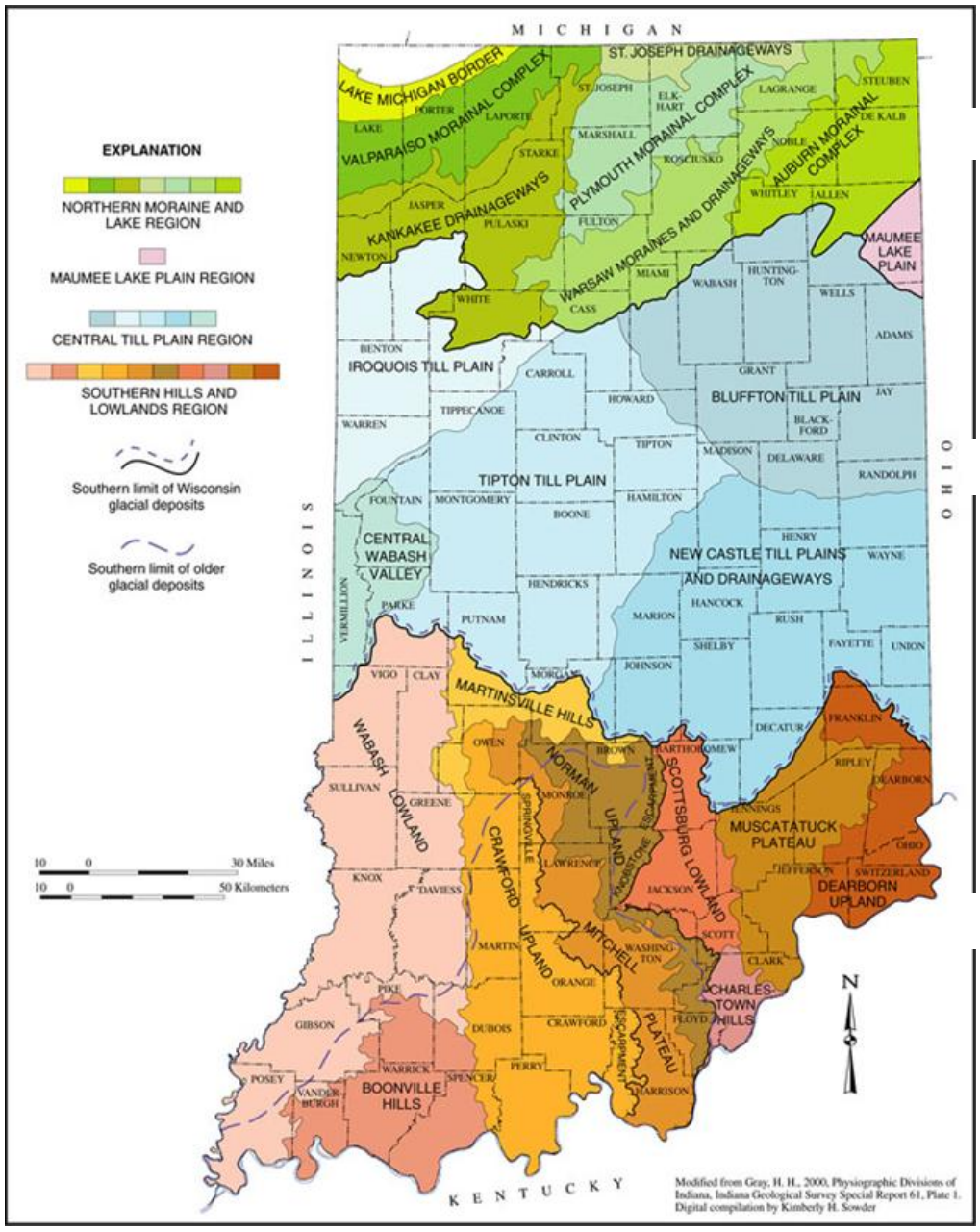
## Regional Availability and Characteristics

To describe Indiana's water resources, this report divides the state into its three primary physiographic regions: north, central, and south, as shown on the following page. These three broad-scale regions are distinguished on the basis of terrain, rock type, and geologic structure and history. These three regions also align with the state's groundwater resources.

The single largest influence on Indiana's topography and geology has been glaciation. Four glaciers advanced into Indiana, with the most recent glacier event, the Wisconsin glacial episode, occurring 70,000 years ago and covering two thirds of the state. This glacier scoured the state's landscape shaping the geology, forming the soil, and cutting drainage courses which, in return, influenced the location and quantity of groundwater and surface water seen today.

As the glacier advanced south from Canada, it accumulated debris and sediment that were then deposited during its melt and subsequent retreat. The Wisconsin glacier's retreat left the southern third of the state unglaciated. Consequently, the geology and water resources of the northern and central regions are quite different from the southern region.

**Figure C-1. Indiana's three physiographic regions. Note: For this Report, the Maumee Lake Plain Region is grouped with the Northern Moraine and Lake Region.**




Northern

Central

Southern

## Northern Region

Northern Indiana's groundwater resources are considered good to excellent.[46] Thick sand and gravel deposits are found primarily along major rivers such as the St. Joseph, Elkhart, Pigeon, Fawn, Eel, Kankakee, and Tippecanoe rivers. There is only one bedrock aquifer in northern Indiana used for water supply: the Silurian Devonian system. This aquifer system is used primarily in the Kankakee River Basin, Lake Michigan Basin, and Maumee River Basin. The bedrock aquifers yield less water than sand and gravel aquifers and are generally used for irrigation, not public water supply.

Northwest Indiana relies more heavily on surface water than groundwater because its proximity to Lake Michigan and because the rivers have more reliable flows. Surface water resources include Lake Michigan; the Little and Grand Calumet, Kankakee, Yellow, Iroquois, St. Joseph, Pigeon, Fawn, Little Elkhart, Galena, and Maumee rivers; Trail, Turkey and Solomon creeks; an extensive tributary network; and natural and man-made lakes, ditches, and wetlands.[47]

Lakes and wetlands are present throughout the northern region and are used for a wide range of recreational activities. However, most are not considered significant supply sources because of their limited storage capacity and regulatory, economic, and environmental constraints.[48]

## Central Region

The Central region is the transition zone between groundwater-rich northern Indiana and groundwater-poor southern Indiana.[49] The groundwater resources of this region are rated as fair to good with the most productive aquifers adjacent to and under major streams. These sand and gravel aquifers are limited to a narrow band along the White, Whitewater, and Tippecanoe rivers and Wildcat and Sugar creeks. Bedrock aquifers in central Indiana yield less water than sand and gravel aquifers and low yields limit their use for public supply. However, they are used for other purposes, such as irrigation and domestic use. Many rivers and creeks run through central Indiana: Wabash, Eel, Mississinewa, Salamonie, Big Blue, White, and Tippecanoe rivers and Sugar, Wildcat, Big Raccoon, Fall, and Eagle creeks. However, many of the streams are not reliable water sources because adequate flows for withdrawals are not sustained throughout the year. The West Fork of the White River and the Wabash River support the largest number of high-capacity withdrawals in central Indiana. In Marion County, during low flows, Fall and Cicero creeks, which eventually flow into the White River, can be regulated by Geist and Morse Reservoirs, respectively, and Eagle Creek can be regulated by the Eagle Creek Reservoir. There are many reservoirs in central Indiana, but only the four largest (Geist, Eagle Creek, Morse, and

[46] Clark, D. E. (Ed.). 1980. The Indiana Water Resource: Availability, Uses, and Needs. Governor's Water Resource Study Commission, State of Indiana.
[47] IDNR. 1994. Water Resource Availability in the Lake Michigan Region, Indiana – Executive Summary.
[48] IDNR, Division of Water. 1987. Water Resource Availability in the St. Joseph River Basin, Indiana – Executive Summary.
[49] Governor's Water Resource Study Commission. 1980. The Indiana Water Resource: Recommendations for the Future. Indiana Department of Natural Resources, Indianapolis.

Prairie Creek) are used for water supply and recreation. Others, such as Mississinewa and Salamonie reservoirs, were built mainly for flood control.

## Southern Region

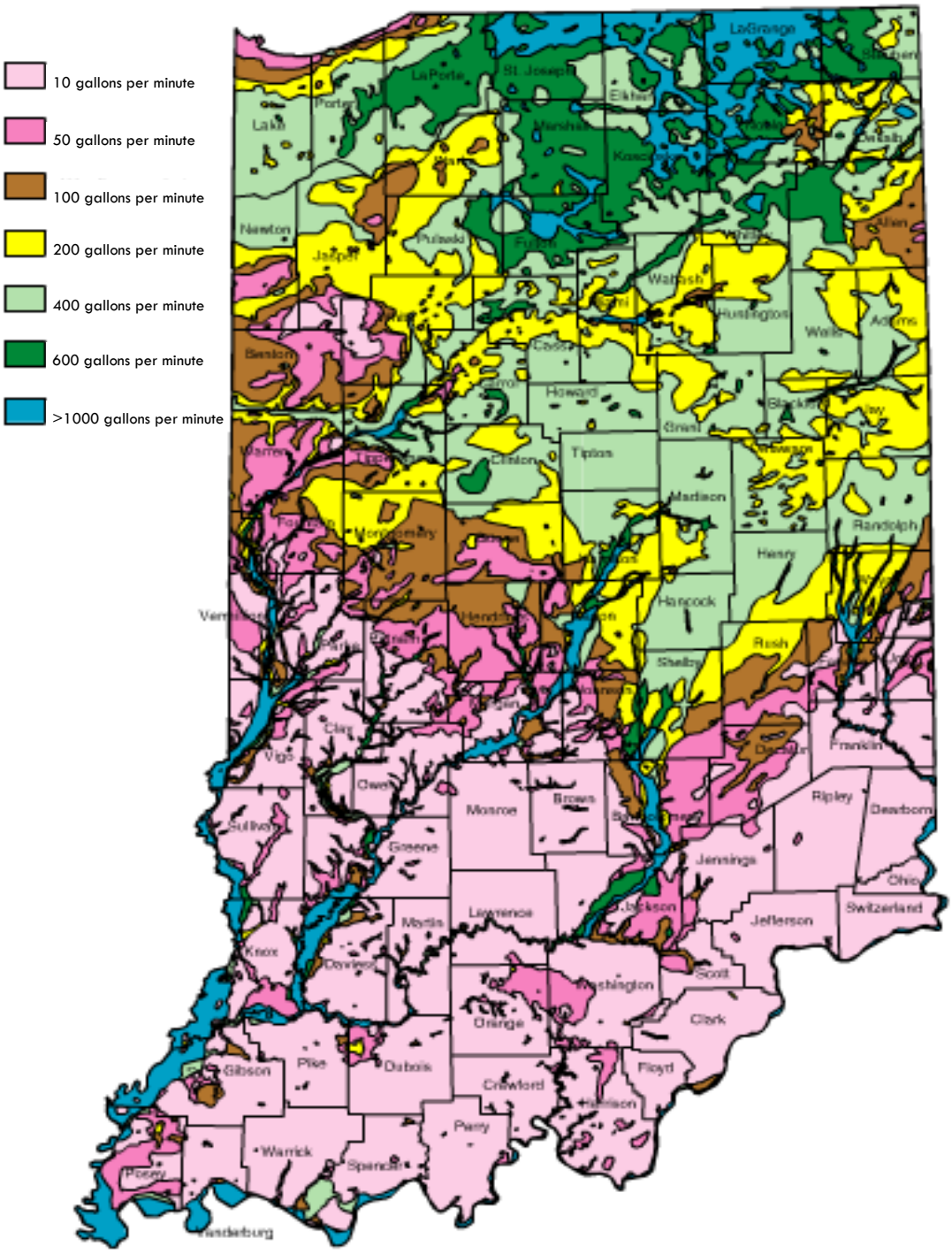
Many areas in southern Indiana have either no or a limited supply of groundwater. The thickest sand and gravel deposits, and consequently highest-yielding aquifers, are found in the stream valleys of the Ohio, Eel, Wabash, and Whitewater rivers, the East and West forks of the White River, and the main stem of the White River. Outside the stream valleys, water supply is limited and sufficient for domestic use only. The poorest water-bearing bedrock formations in the state are in southern Indiana.[50] Most bedrock formations are only suitable for domestic purposes because of poor yield and poor water quality with depth.

The Ohio, Wabash, and Whitewater rivers and the East and West forks of the White River have reliable year-round stream flow. Although numerous streams flow through southern Indiana, most small and medium-sized streams do not have a hydraulic connection to groundwater. As a result, flow is either variable or non-existent during dry periods.

The state of Indiana owns three water-supply reservoirs in central and southern Indiana: Patoka, Monroe, and Brookville reservoirs. Currently, the drinking water supplies from these reservoirs are not fully allocated. At this time they are primarily used for flood control and recreation.

[50] Clark, D. E. (Ed.). 1980. The Indiana Water Resource: Availability, Uses, and Needs. Governor's Water Resource Study Commission, State of Indiana.

**Figure C-2. Generalized groundwater availability in Indiana. Blue and green areas in central and southern Indiana delineate stream channels.**



# Appendix D: Demand for Water

Demand for water is an important part of water resources conversation. The amount of water withdrawn in Indiana varies over time by use and source. General drivers of this use are economic factors (e.g. population), conservation, and weather.

1. Economic factors drive total withdrawals for industry; as industrial output increases or decreases so do total annual withdrawals. The health of the economy will also influence withdrawals by public suppliers and energy producers. As population increases or decreases, water use generally follows the same trend. However, population's influence on water use is most clearly seen in public supply withdrawals.
2. Conservation practices also play a role in these long-term trends by decreasing per capita use or decreasing the amount of water needed for industrial processes, and thus allowing population and economic growth while maintaining or only slowly increasing overall water demands. This conservation trend is generally seen most clearly in the public supply sector.
3. Weather is the biggest factor in year-to-year variations in water withdrawals. While water withdrawals can vary throughout the year, for most users, except industrial, water use changes monthly due to precipitation patterns and temperature with summer withdrawals the highest. For public water suppliers, increases in withdrawals are typically due to landscape and irrigation use. Energy production withdrawals are highest in the summer because of increased demands for electricity used for cooling.

## Water Use Classification

While the Report aims to understand the amount and type of water withdrawn for public supply, these withdrawals must be understood within the context of water withdrawals by all users in Indiana. The IDNR gathers monthly withdrawals on an annual basis from all SWWFs. Each SWWF withdrawal is assigned to one of six categories:

- Energy Production– Power generation, cooling water, coal mining, geothermal, oil recovery
- Industry– Process water, cooling water, mineral extraction (except coal), quarry dewatering, waste assimilation
- Irrigation/Agriculture– Crop and golf course irrigation, farm field drainage, agricultural services except livestock and fisheries
- Miscellaneous– Fire protection, amusement

**Recommendation:**

Conduct a cost-benefit analysis to determine if the benefits of obtaining more precise water supply data exceed the cost

parks, construction dewatering, dust control, pollution abatement, hydrostatic testing, recreational field drainage

- Public Supply– Public water supply, drinking water/sanitary facilities
- Rural Use– Livestock, fisheries

IDNR also classifies each SWWF according to the source of water withdrawn as either surface water (intake) or groundwater (well). It further delineates the aquifer type (limestone, sand and gravel, shale, etc.) and the water body name for surface water sources. In this section of the report, use was also divided by geographic region.

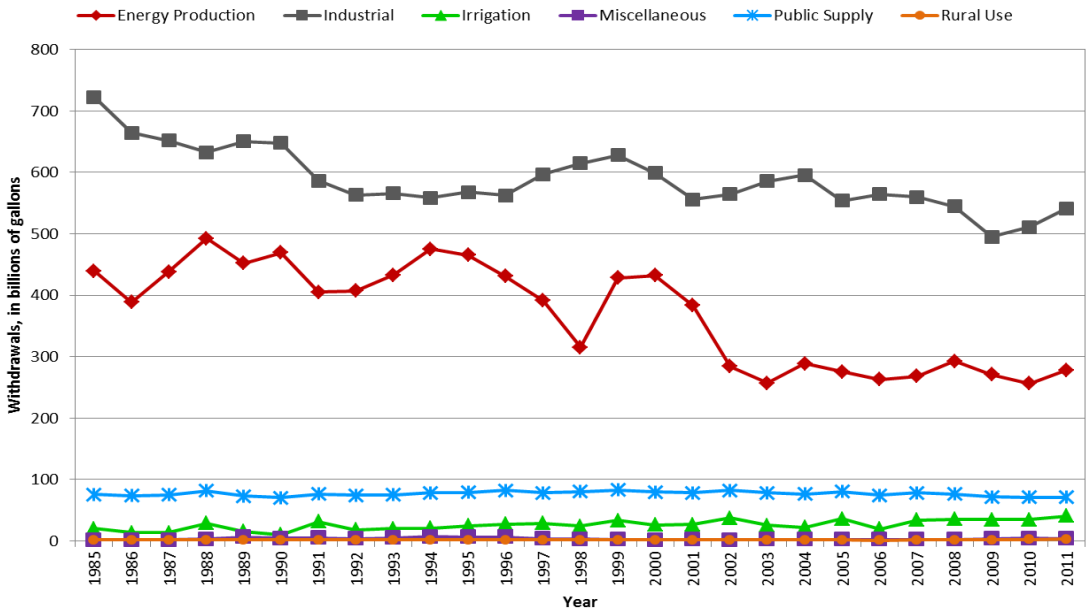
### Did you know?

Generally, there are three types of users within the "Energy Production" category: open-loop cooling systems for thermoelectric generation, closed-loop cooling systems for thermoelectric generation, and coal extraction. Open-loop cooling systems for thermoelectric generation were generally built before 1970. These plants withdraw large amounts of water but return about 99% of water withdrawn to the surface water source. Closed-loop cooling systems, usually installed after the mid-1970s, withdraw less than 5% of the water withdrawn by the open-loop systems, but almost all of the water withdrawn is consumed because it is lost to evaporation. For coal extraction, water is used for coal cutting and dust suppression and all water withdrawn is consumed.

## Northern Region

Northern Indiana shows a decreasing trend in total water withdrawn from 1985 to 2011, going from 1,261 billion gallons (3,454 mgd) to 937 billion gallons (2,568 mgd). These two uses have made up approximately 90% of the water withdrawals in this region in recent years. In 2011, industrial users withdrew 541 billion gallons (1,482 mgd) and energy production withdrew 278 billion gallons (762 mgd). Public water supply withdrawals generally remained steady throughout 1985 to 2011. In 2011, these withdrawals made up 8% of the total use, and the users withdrew 71 billion gallons (195 mgd). In addition to type of use, the source of the water withdrawn is important. In this region, surface water withdrawals make up more than 90% of the water withdrawn but have decreased over time.

**Figure D-1. Water withdrawn by different user categories from 1985 to 2011 in northern Indiana. Source: Indiana Department of Natural Resources**



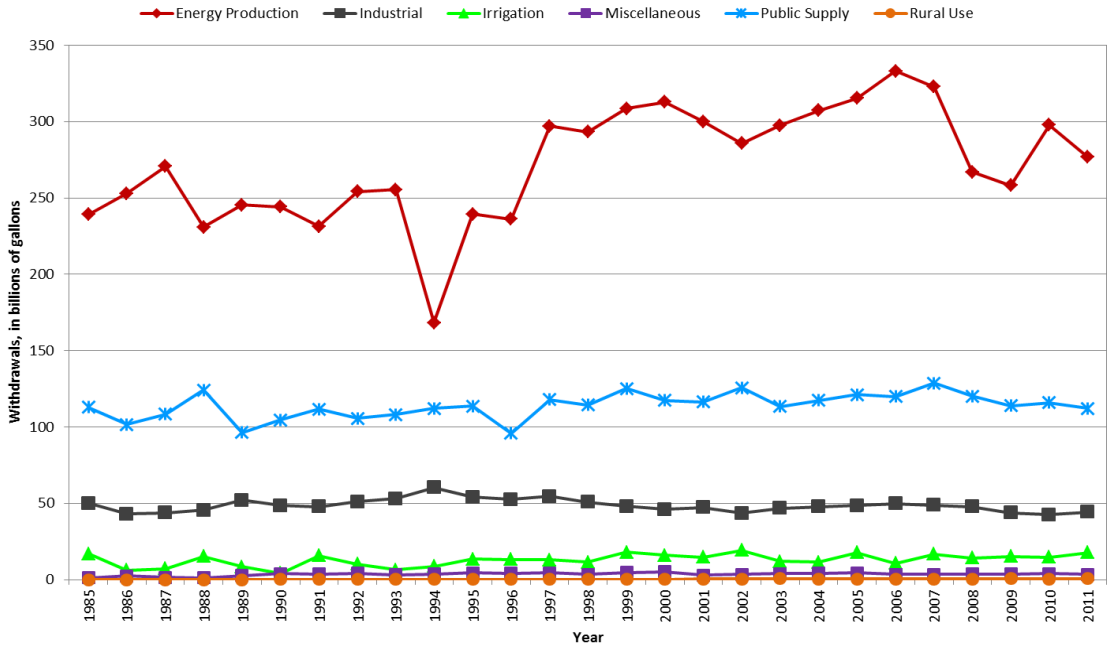

## Central Region

From 1985 to 2011, central Indiana withdrawals have ranged from a low of 354 billion gallons (969 mgd) in 1994 to a high of 521 billion gallons (1,427 mgd) in 2007. In central Indiana, energy production accounts for approximately 60% of the total withdrawals. For example, in 2011 277 billion gallons (758 mgd) were withdrawn for energy production. Public supply, the second largest withdrawal use, accounts for approximately 25% of withdrawals and, in 2011, this equaled 112 billion gallons (307 mgd). The vast majority of withdrawals are from surface water sources. These withdrawals generally increased through 2007 and have since decreased to 361 billion gallons (990 mgd) in 2011. Groundwater withdrawals were 94 billion gallons (256 mgd) in 2011. The percent of withdrawals from the two sources has little variance from 1985 to 2011. When evaluating specific use categories, 99% of energy production withdrawals, 65% of industrial withdrawals, and 60% of irrigation withdrawals for 1985 to 2011 came from surface water. Public suppliers withdrew more than 55% of their water from groundwater sources.

Central Indiana has groundwater systems that are currently used by industry, energy, irrigation, and municipal suppliers. On the north side of Indianapolis, Citizens Water of Westfield, LLC, Citizens Water, the City of Carmel, Martin Marietta (sand and gravel), and Indiana American all use and pump water from the alluvial (water stored in sand and gravel deposits) aquifers. Water in area streams and reservoirs and in the adjacent aquifers is being withdrawn at an ever-increasing rate as the cities in Hamilton County grow. Because the alluvial aquifer does not extend over a large area in Hamilton County and the hydraulic connection to the White River is interrupted by clay layers, groundwater resources are limited. The same is true south of Indianapolis in Johnson County. Multiple public utilities and some industrial users extract water

from a limited aquifer system. Without coordinated and active management, communities that rely on groundwater for their supply will face increasing competition for water resources.

**Figure D-2. Water withdrawn by different user categories from 1985 to 2011 in central Indiana. Source: Indiana Department of Natural Resources**




In the growing metropolitan area of central Indiana, existing surface water supplies are approximately equal to demand during peak use. As long as supplies have exceeded demand, there have been few reasons to consider efficiency. It is clear that additional supplies and resources are limited but while there are many users with very different needs and capabilities, there is no "water management plan" for the regional water resources. The fact that water utility services are independently managed makes it difficult to properly monitor usage of the area's limited groundwater resources, especially during drought. This area should receive highest priority for evaluation.

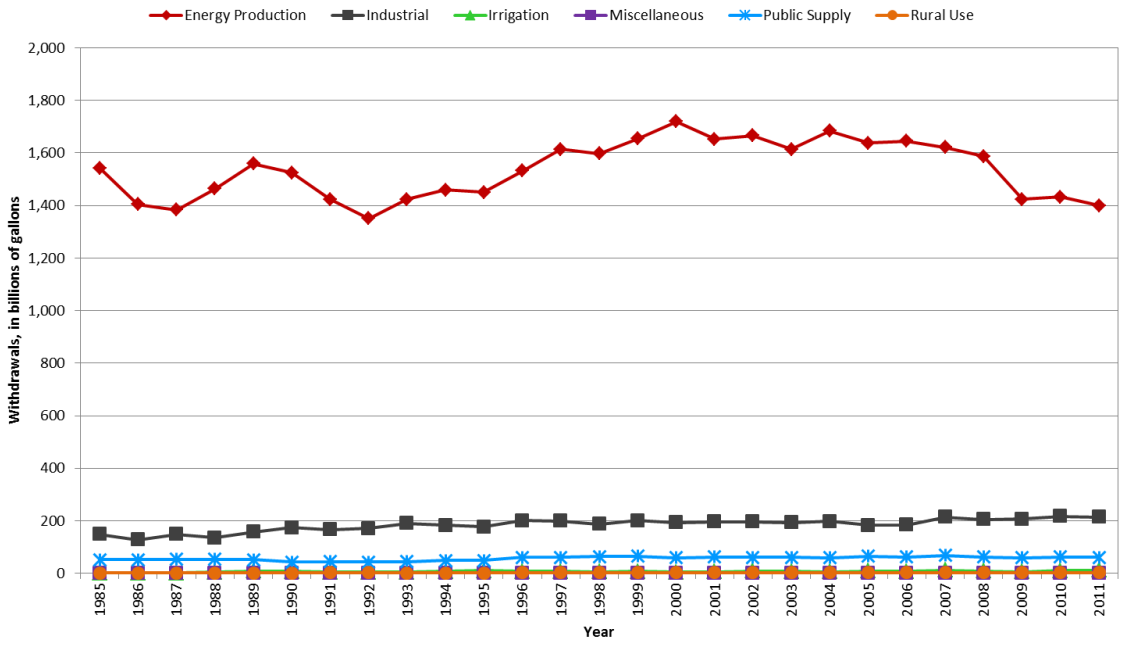
**It is clear that additional supplies and resources are limited but while there are many users with very different needs and capabilities, there is no "water management plan" for the regional water resources.**

## Southern Region

Southern Indiana withdrawal amounts have remained relatively steady from 1985 to 2011, ranging from 1,570 billion gallons (4,303 mgd) in 1992 to 1,979 billion gallons (5,421 mgd) in 2000. Energy production users withdrew the largest amounts of water and accounted for approximately 85% of the total withdrawals from 1985 to 2011. In 2011 energy production users withdrew 1,399 billion gallons (3,833 mgd).

Surface water is the dominant withdrawal source, which is mostly due to lower groundwater yields in this part of the state. In 2011 surface water withdrawals were 1,623 billion gallons (4,446 mgd) and groundwater withdrawals were 64 billion gallons (177 mgd).

**Figure D-3. Water withdrawn by different user categories from 1985 to 2011 in southern Indiana. Note: Rural use, miscellaneous, and irrigation withdrawal quantities are so similar they lie on top of one another in this graph.**




## Southern Indiana and Opportunities for Economic Development

The main concerns about water availability in southern Indiana include the general lack of groundwater across the entire region and whether water will be available to support economic development resulting from the I-69 extension. In order to evaluate these concerns, a map was created (Figure 6) that displays a twenty-mile buffer from surface water supplies, which includes rivers and state-owned water storage in Patoka, Monroe, Hardy and Brookville Lakes. Areas within twenty miles of a river are shaded blue; areas within twenty miles of a reservoir are yellow; and the green areas represent areas within twenty miles of both. The hatched areas represent service territories of existing water utilities.

**Our analysis indicates that utilities already exist and are providing service to areas along the route of the I-69 extension. Although gaps are present, it appears that the existing utilities should be able to expand their service areas to fill these voids.**

This analysis shows that water is generally accessible to most of the southern Indiana region. While an area in southeastern Indiana that encompasses portions of Decatur, Ripley, and Jennings counties appears to lack water, the map shows that utility service is being provided to this area. However, the possibility exists that these utilities may face challenges in obtaining sufficient water supplies as the economy grows. Therefore, additional research may be warranted.

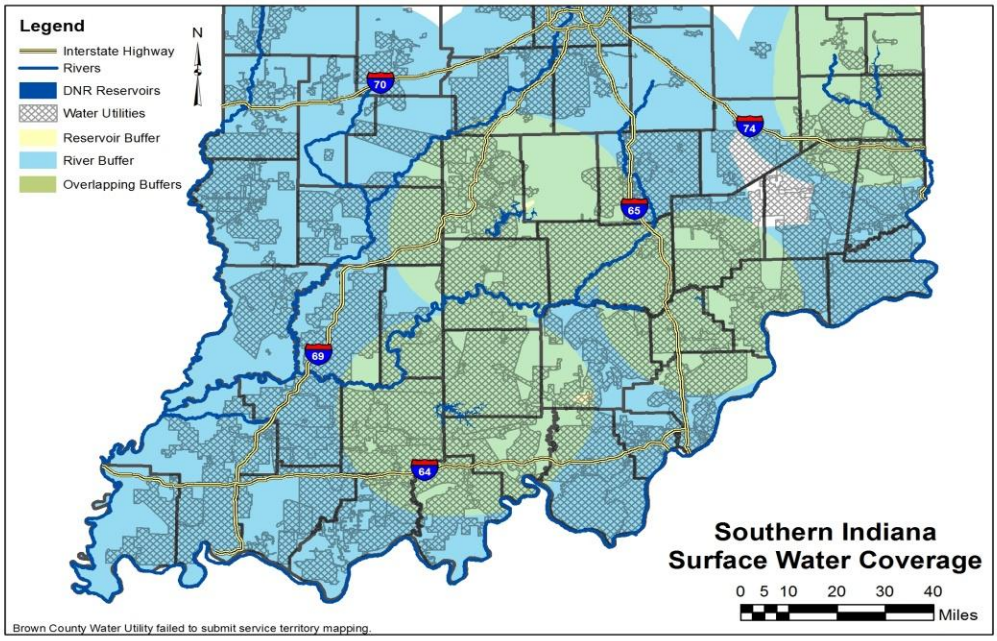
**Recommendation:**

Use existing and underutilized water resources in southern Indiana.

The most obvious utility service void is along the county line between Greene and Daviess Counties. The map also shows that utilities serving along this route should have access to surface water supplies, and although not shown, groundwater along the White River.

While this analysis should alleviate some of the concerns about water availability in southern Indiana, it should be noted that groundwater is generally preferred over surface water. This is because stricter regulations and treatment of surface water often results in higher costs. This analysis also recognizes that in some areas water may need to be transported up to twenty miles. While this distance is manageable and performed on a routine basis, it can be costly to install the infrastructure to do so.

**Figure D-4. Southern Indiana surface water coverage**




This analysis excludes groundwater, which may be available in substantial amounts, although this availability is limited to locations along the Ohio, Wabash, and White Rivers and in Bartholomew and Jackson counties. Finally, an observation of the water utility service territory map (Figure 9) shows that where water supplies are needed, utilities have developed and grown to meet those needs. A large portion of southern Indiana is served by water utilities, while utility service in the northern half is primarily limited to densely populated areas. This utility development is most likely the result of need. Where groundwater supplies are more readily available in the northern half of the state, property owners in rural areas simply drill their own wells. Thus, there has been less need for utility service in the north. It is likely that water utilities will continue to meet water supply needs as they develop, though the costs to obtain incremental supplies will likely be higher.

# Appendix E: Water Basin Analysis

While understanding supply and demand on a regional level is useful, a more detailed analysis of individual basins can provide additional insight. The 1983 Water Resources Management Act (Ind. Code § 13-2-6.1) mandated that the NRC conduct a continuing assessment of water resource availability, conduct and maintain an inventory of significant groundwater and surface water withdrawals, and plan for the development and conservation of water resources for beneficial uses.

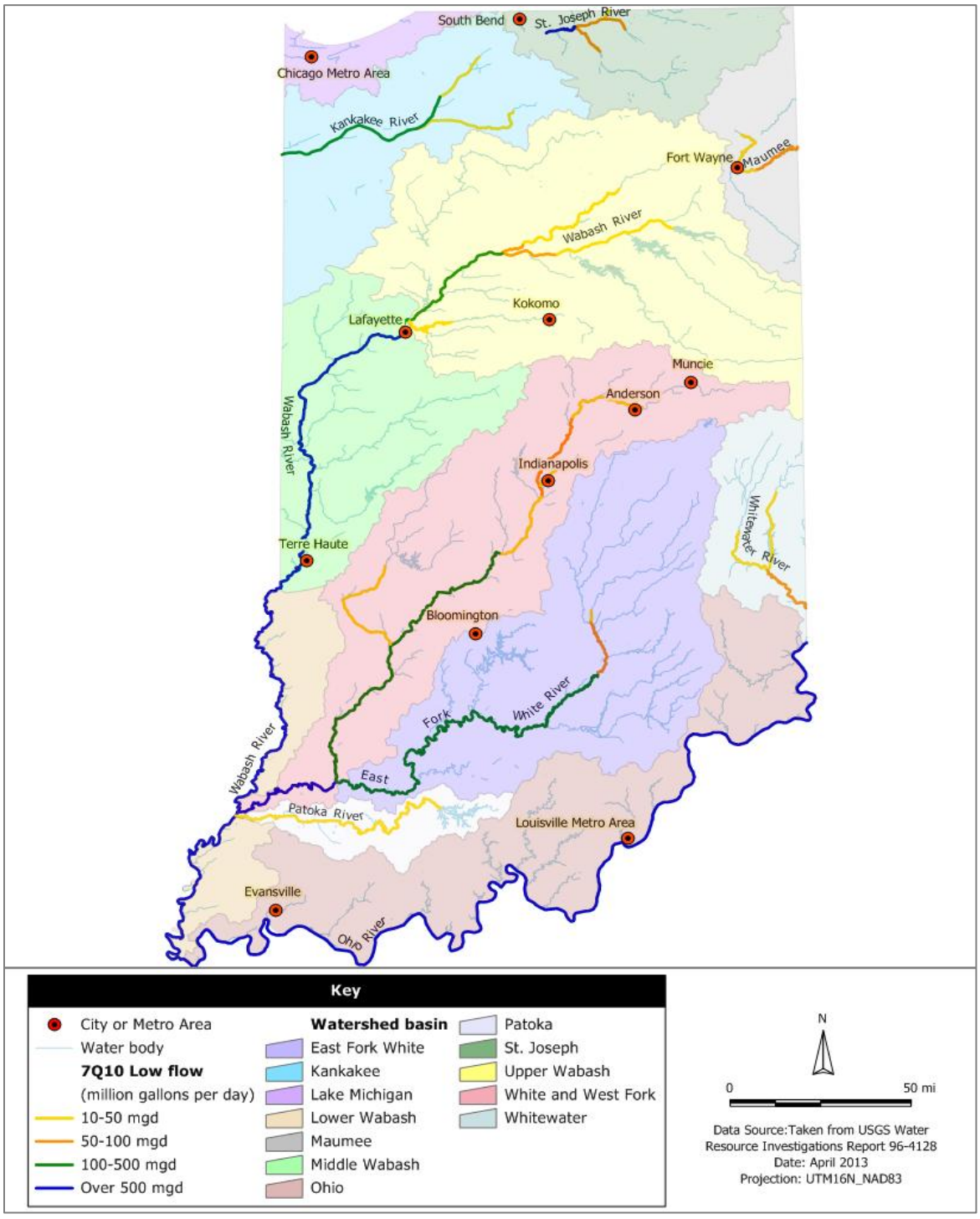
The NRC designated 12 water management basins within the state, and between 1987 and 2002, IDNR's Division of Water completed comprehensive reports on seven of the 12 basins (as shown in Figure 7): Lake Michigan, St. Joseph, Kankakee, Maumee, White, West Fork White, and Whitewater. The purpose of these investigations was to provide socioeconomic, physical environment, and hydrologic information for managing and developing each basin's water resources.[51] They examine various aspects of water resource development, such as supply and demand.

These reports contain information on relevant topics such as:

- Socioeconomic setting;
- Geologic framework;
- Climatic features;
- Surface-water hydrology and quality flow duration curves and frequency analyses;
- Ground-water hydrology and quality potentiometric, transmissivity, and recharge maps;
- Current and projected water use;
- Potential for water-use conflicts;
- Charts, graphs, and maps text, tables, figures, and color plates.

[51] The complete reports are available at **http://www.in.gov/dnr/water/4083.htm**.

**Figure E-1. The 12 major basins as defined by IDNR and the low-flow estimates of select rivers in Indiana. Source: USGS and IDNR**



## Interbasin Transfer

An interbasin transfer moves water from one basin into a second basin. The water is routed through tunnels, channels, or other engineered systems and discharged into a different receiving watershed. There are many examples of interbasin transfers in the United States. New York City transfers water from the Catskill Mountains, and Los Angeles diverts water from eastern California. Although transfers to major metropolitan areas is quite common, so are transfers to smaller communities, such as the diversion of water from the Catawba River Basin in North Carolina to Charlotte, Concord, and Kannapolis.

**Finding:** Currently Indiana does not have any laws prohibiting interbasin transfers except in the Great Lakes Basin. In the future, should any entity in Indiana desire to withdraw water from another basin, rules should require the entity to show that other users will not be adversely affected.

Diverted water is used to meet growing public supply, irrigation, and power generation demands in the receiving basin. However, these transfers are not without controversies. Issues include equitable share of water for communities downstream of the diversion, especially during low flow and drought conditions. Also, large transfers could result in the dewatering of the supply source or flooding of upper reaches of watersheds, not naturally developed to handle large discharges. Any pollutants in the supply source could be transferred to the receiving watershed. Transfers from surface waters lower streams flows in donor watersheds and raises streamflow in receiving watersheds, which affects aquatic ecosystems.

As discussed previously, transfers out of the Great Lakes Basin are regulated by the Great Lakes Compact. Only communities outside the basin, but located within a county that straddles the basin, may apply for an exception. In 2009, Waukesha, Wisconsin, was the first community in the U.S. to submit an application for a diversion. The application, which was submitted to the Wisconsin DNR, is still pending. The decision will likely set a precedent for future applications. Currently Indiana does not have any laws prohibiting interbasin transfers except in the Great Lakes Basin. In the future, should any entity in Indiana desire to withdraw water from another basin, rules should require the entity to show that other users will not be adversely affected.

# Appendix F: Options for Future Supplies

When utilities consider developing new supplies or expanding their back-up supplies, they typically think about where to install a new well or intake. However, there are other very effective ways in which current supplies can be extended. These include improving infrastructure, using water more efficiently, reusing water, and using existing but underused supplies.

## Reducing Water System Leaks

One of the most cost effective and accessible sources of additional water supply can be water saved by stopping or minimizing water lost in a utility's distribution system. Old and poorly constructed pipelines contribute to water leaks. This lost water can be expensive; money was spent withdrawing it from the source, chemically treating it, and moving it through the system before it was lost. Leaks inflate production and raise energy costs, and severe, undetected leaks can expedite infrastructure expansion. Leakage control involves efficient identification of leaks and timely, lasting repairs especially of small leaks at joints and fittings.[52]

## Water Reuse

Water reuse is utilizing partially treated wastewater for non-potable water uses. Advantages of water reuse is that it is not climate dependent, it relieves demand from ground and surface water supplies, and it reduces the amount of nutrients entering surface water supplies from wastewater discharges. In contrast, a disadvantage of water use is that re-used water tends to be seasonal. Additionally, re-used water still requires treatment and disposal capacity.

Two common types of reuses are using treated wastewater as an alternative supply, either for irrigation or drinking water. Regardless of its end use, the reused water receives extensive treatment and disinfection. However, the extent of treatment does depend on its end use. For example, using wastewater for drinking water supply requires more treatment and disinfection than using wastewater for watering golf courses. The application of wastewater in Indiana is regulated by Rule 7 of Article 6.1 Land Application of Biosolids, Industrial Waste Product, and Pollutant-Bearing Water[53]. This rule specifies the requirements for applying pollutant-bearing water, such as wastewater, on land with low and high public exposure. A permit is required for treatment and disinfection depending on the type of wastewater. The rule also specifies water-quality criteria and monitoring requirements. Indiana does not promote or regulate water reuse for drinking water supply. In 2012, the EPA created "Guidelines for Water Reuse" for those states with no regulations.[54]

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[52] AWWA Water Loss Control Committee. 2003. Applying Worldwide BMPs in Water Loss Control. Journal AWWA, 95(8):65-79. B. Bateman and R. Rancier (Eds.). http://www.awra.org/committees/AWRA-Case-Studies-IWRM.pdf

[53] 327 IAC 6.1-7-1

[54] http://nepis.epa.gov/Adobe/PDF/P100FS7K.pdf[54] U.S. EPA, 2012 Guidelines for Water Reuse, *available at* **http://nepis.epa.gov/Adobe/PDF/P100FS7K.pdf** (last accessed July 14, 2014)

## Water Conservation

Water conservation is about using water more efficiently in order to extend existing supplies. Conservation programs are used by water utilities to reduce customers' indoor and outdoor water use. Several water utilities in Indiana have conservation plans and some SWWF facilities operating in the Great Lakes Basin that meet certain thresholds are required to implement conservation programs.

Indoor water use has been decreasing since the passage of the 1992 Energy Policy Act, which set uniform water efficiency standards for showerheads, faucets, urinals, and toilets manufactured after January 1994.[55] Outdoor water use contributes to peak demands for water utilities and can double or triple average day demands; these peaks drive infrastructure expansions and development of new supply sources. During the hot, dry summer months when farmers increase pumping to sustain crops and power plants step up production to meet energy demands, homeowners and businesses are also watering their lawns. These simultaneous demands strain not only the water supplies, but also a water utility's ability to meet peak demands. It can be more cost effective to teach people to use water more efficiently than to build a treatment plant, develop new sources, and lay bigger pipes.

***The Great Lakes Compact***

**A formal agreement binds the states to manage the water in the Great Lakes watershed collectively. The agreements also ban Great Lakes water from being "diverted," or piped out of the basin with a few limited and strictly regulated exceptions.**

**The Great Lakes Compact became effective on December 8, 2008 after final. This date began the ban on diversions of water out of the basin.**

There is no one-size-fits-all conservation plan. Communities have different water supplies and demands. For example, in some communities, residential water use is highest during summer months because of lawn watering, so irrigation meters may be necessary to track outdoor water use. In another community, industrial water use is high year round, so increasing industrial efficiencies by working with each individual business would be more appropriate. Consequently, water use, future demands, climate, and culture are important factors when a water utility and community set long term goals and establish appropriate conservation plans.

## Lake Michigan

One large water resource that is unavailable to the majority of Indiana is Lake Michigan. Only the communities within the Great Lakes Basin (Figure 29), and pending legal decisions, those communities in counties that straddle the basin, have access to that water. Using water from Lake Michigan or any of the abundant groundwater supplies in the Great Lakes Basin to meet outside needs is unrealistic.

[55] EPA. 2012 Green Building: Conserving Water http://www.epa.gov/greenhomes/ConserveWater.htm, *available at* **http://www.epa.gov/greenhomes/ConserveWater.htm** (last accessed July 14, 2014)

**Figure F-1. Extent of the Great Lakes Basin in northern Indiana (shown in blue)**


## Existing Reservoirs

Existing water supply reservoirs and quarries represent two possible future sources of supply. A reservoir is a man-made lake. The primary water supply reservoirs are Cedarville and Hurshtown in Fort Wayne; Geist, Morse, and Eagle Creek around Indianapolis; Prairie Creek in Muncie; Kokomo Reservoir in Kokomo; and Middle Fork in Richmond.[56] Brookville Lake, Lake Monroe, and Patoka Lake are located in southern Indiana and are owned by the U.S. Army Corps of Engineers. The state of Indiana purchased the water supply storage of Brookville, Monroe, and Patoka lakes and IDNR oversees water sales from these reservoirs.

**Table F-2. Available water from the state-owned water supplies. Source: IDNR.**

| Reservoir | Water Supply Storage (mg) | Committed Supply (mg) | Percent Committed |
|---|---|---|---|
| Brookville Lake | 29,098 | 243 | 0.84% |
| Lake Monroe | 52,136 | 9,200 | 18% |
| Patoka Lake | 34,949 | 7,300 | 21% |

[56] Clark, D.E. (Ed.). 1980. The Indiana Water Resource: Availability, Uses, and Needs. Governor's Water Resource Study Commission, State of Indiana.

Water supply information is available for the three reservoirs from which IDNR sells water: Brookville Lake, Lake Monroe, and Patoka Lake have available water supplies. In fact, only 0.84% of Brookville Lake's available water supply is used (Table 8). Patoka Lake has the largest percentage of committed supply at 21%; however, there is still 27,649 mg available for purchase.

Quarries can also be used to supplement water supplies. Two quarries are currently being utilized for water supply and two more have been identified as a potential water supply source that could be utilized in the event of a water shortage. The ability to use quarries as a water supply source will be case specific. Some factors to take into consideration when considering adding a quarry as a source are:

- Is the quarry inactive or abandoned?
- Can the quarry's supply provide enough water?
- How far is the quarry from the water distribution system?
- Are there any water quality concerns?

## Groundwater Resources

Groundwater is abundant in several areas of the state, and, in some areas, groundwater is an underutilized resource. Treatment of groundwater tends to cost significantly less and has less regulation. Therefore, the feasibility of obtaining groundwater in a particular area and the amount that can be withdrawn would require local analysis. However, the State of Indiana does own and has studied the groundwater resources in Charlestown State Park. The estimated supply from this aquifer, if it were to be fully developed within the boundaries of the state park, is 75 mgd. Currently, with the existing infrastructure, the pumping capacity is 3 mgd. In addition, the state may own other facilities such as prisons and state hospitals which may have significant production facilities that could be explored for their potential.

In many cases, industrial facilities build to their own needs, but in an emergency, large-scale industrial facilities could be used to provide at least temporary sources of water. Relatively high capacity wells, perhaps unused at this time, may be within usable distance of a water utility. It might be appropriate to set a threshold for such facilities and inventory them. Likewise, power plants use large amounts of water and may represent another potential source of water. Some, like the abandoned Marble Hill nuclear plant, had large wells installed and, at least in part, is currently being used for water supply. It may be appropriate to set a threshold for such facilities and inventory these as well.

# Appendix G: Monitoring Indiana's Resources

Only by monitoring groundwater and surface water levels and water quality can Indiana determine when a source is being over pumped or polluted, both of which affect a water supply's long-term availability. Effective monitoring must be regular and ongoing in order to identify trends indicating water-level decline or increasing contaminant concentrations.

Groundwater levels naturally fluctuate with changes in precipitation and river stage. However, water-level declines caused by over pumping a well can stress an aquifer when the amount of water removed from the aquifer is greater than recharge into the aquifer. Recharge is reduced and runoff is increased when impervious surface area increases and topsoil is lost. To determine if an aquifer is stressed because of over pumping, drought, or reduced recharge, it is first necessary to know how groundwater levels and recharge rates change annually and seasonally.

In Indiana, several different agencies study and collect data that can be used to understand the conditions of our groundwater resources. IDNR and USGS operate and monitor a network of 36 continuous record monitoring wells in Indiana. The data collected from the network is available at the USGS Groundwater Watch website[57] and the Indiana Water Science Center website.[58] Currently, the USGS is assessing whether the size of the network is an adequate representation of all the aquifers, watersheds, ecosystems, and climatic regions in the state, because over time the network has been reduced from 90 wells to its current size of 36 wells.[59]

**Recommendation:**

Evaluate the adequacy of existing monitoring

Additionally, the USGS Groundwater Resources Program is conducting regional groundwater availability studies of major aquifers in the United States. One of these aquifers is the Glacial Aquifer System, which underlies 25 states and includes two thirds of Indiana. The principal glacial sand and gravel aquifer in this system is the largest water source for public supply, industry, and irrigation. This study will give insight into the current condition and availability of the aquifer's supply in Indiana.[60] Agencies of the state should further refine monitoring efforts for water supply, water demand, and water-quality, prioritizing the most heavily-used aquifers and streams.

Stream flow reflects the amount of water running off the watershed into a stream channel. It is necessary to know how much water is flowing in a stream and how much water is needed to maintain stream flow in order to make water distribution decisions. There should be sufficient stream flow to maintain the integrity of the aquatic ecosystem, to assimilate waste and protect

[57]http://groundwaterwatch.usgs.gov/IDN/StateMaps/IDN.html [57] US Geoglogical Survey, IDNR Groundwater Network, **http://groundwaterwatch.usgs.gov/IDN/StateMaps/IDN.html** (last accessed July 14, 2014)
[58] http://in.water.usgs.gov[58] US Geological Survey, Indiana Water Science Center, **http://in.water.usgs.gov** (last accessed July 14, 2014)
[59] Personal communication with the United States Geological Survey, 2013
[60] Personal communication with the United States Geological Survey, 2013

water quality, and to support new water uses. Stream flows fluctuate during floods and droughts and during the growing season when shoreline vegetation takes up water.

Knowing a stream's low flow is important because it is the water available during dry weather. In Indiana, low flow is determined by calculating the 7Q10, the lowest seven day average flow that occurs on average every 10 years. This criterion is used to set limits on discharges into streams in order to maintain water-quality standards during low flows. Maintaining flows above the 7Q10 is important for protecting water quality; however, higher stream flows may be necessary to protect aquatic life and ecology. The 7Q10 criterion does not account for longer or more extreme droughts nor does it take into account the historical flows under which the aquatic ecosystems evolved.

The USGS collects daily stream flow data throughout the state from 232 stream gauges. It uses the data to create flow-duration, low-flow, and high-flow tables, and to calculate mean discharges. Also, IDNR produces monthly water resource reports that summarize the previous month's precipitation, stream flows, and water levels in Lake Michigan, the state's eight reservoirs and the four water supply reservoirs used by Citizens Water, groundwater levels, and the state's current classification by the U.S. Drought Monitor.[61]

Poor water quality may also limit the usability of a groundwater or surface water source. The USGS's National Water-Quality Assessment program examines the water chemistry of groundwater from the Glacial Aquifer System and has identified the extent of impairments that might limit groundwater use in Indiana.[62] The IDEM monitors water-quality conditions throughout the state. It has a network of 153 public water supply wells and 160 residential wells from which it collects untreated groundwater samples. It submits a water-quality assessment report every two years and a list of impaired water to the EPA. The IDEM collects water samples from rivers and streams to assess the aquatic life, recreational, and fishable uses of the river. It also collects samples from rivers that serve as a public water supply. Currently, water-quality threats to Indiana's water include:

- Nitrate;
- Livestock and poultry confined feeding operations;
- Failing septic systems;
- Landfills;
- Underground storage tanks;
- Class V injection wells (non-hazardous fluid disposal);
- Industrial facilities;
- Storage and use of salt during winter.

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[61] IDNR, Monthly Water Resource Summary, http://www.in.gov/dnr/water/4858.htm (last accessed July 14, 2014)
[62] US Geological Survey, Regional Assessment of Groundwater Quality in the Glacial Aquifer System, http://water.usgs.gov/nawqa/studies/praq/glacaq/ (last accessed July 14, 2014)

When groundwater and surface water becomes contaminated, additional treatment is necessary to use the water for drinking purposes, which is expensive. In some cases, the water source can no longer be used for some purposes such as for irrigation water or for drinking. Typically, when a well's water becomes contaminated, the well must be abandoned and another water source must be found. Remediating a contaminated aquifer or treating contaminated groundwater can be very expensive. Sometimes it is impossible to treat the water so that it is safe for human consumption or other uses.

# Acronyms

## A

**AFUDC –** Allowance for Funds Used During Construction

**AOS –** Alternative Operator Service

**AWWA –** American Water Works Association

## C

**CalWaRN –** California Water/Wastewater Agency Response Network

**CIAC –** Contributions In Aid of Construction

**CPCN –** Certificate of Public Convenience and Necessity

**CPI –** Consumer Price Index

**CSO –** Combined Sewer Overflow

**CWA –** Clean Water Act

## D

**DIMP –** Distribution Integrity Management Program

**DOE –** Department of Energy (Federal)

**DWSRF –** Drinking Water State Revolving Loan Fund

## E

**EIA –** Energy Information Administration

**EPA –** U.S. Environmental Protection Agency

## H

**HDPE –** High Density Polyethylene

**HEA –** House Enrolled Act

## I

**IDEM –** Indiana Department of Environmental Management

**IDNR –** Indiana Department of Natural Resources

**IEDC –** Indiana Economic Development Corporation

**IFA –** Indiana Finance Authority

**INWARN –** Indiana Water/Wastewater Agency Response Network

**IOU –** Investor-owned utility, financed by the sale of securities

**ISDH –** Indiana State Department of Health

**IURC –** Indiana Utility Regulatory Commission

## L

**LCM –** Life Cycle Management

## M

**MS4 –** Municipal Separate Storm Sewer System

**MSW –** Municipal Solid Waste

## N

**NARUC –** National Association of Regulatory Utility Commissioners

**NOPR –** Notice of Proposed Rulemaking

**NPDES –** National Pollutant Discharge Elimination System

## O

**OCRA –** Office of Community and Rural Affairs

**OECD –** Organization for Economic Cooperation and Development

**OIG –** Office of Inspector General (federal)

**OMS –** Organization of Midwest ISO States

**OSS –** Opportunity Sales Sharing

**OQ –** Operator Qualification

**OUCC –** Office of Utility Consumer Counselor

## P

**PAB –** Private Activity Bond

**PE –** Polyethylene

**PHMSA -** Pipeline Hazardous Materials Safety Administration

**PVC –** Polyvinyl Chloride

## R

**RFP –** Request for proposals

**RSD –** Regional Sewer District

## S

**SRF –** State Revolving Loan Fund

## U

**U.S. EPA –** United States Environmental Protection Agency

## W

**WIFA –** Water Infrastructure Finance and Innovation Act

**WRRA –** Water Resources Reform and Development Act