2008 Report

DuPage Water Commission

Water Conservation & Protection Program

January 2009

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MWH

BUILDING A BETTER WORLD

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Executive Summary

The DuPage Water Commission was created in 1985 to make treated Lake Michigan water available to water users throughout the County. With a 2007 average daily water pumpage of more than 87 mgd, the DWC is currently the largest single water customer of the City of Chicago Water System. Moreover, water use by DWC customers alone accounts for roughly 8% of Illinois' total annual pumpage from Lake Michigan.

As part of its ongoing commitment to providing "reliable, quality, responsive, and cost-efficient Lake Michigan water service", the DWC began efforts in 2008 to develop and implement a Water Conservation and Protection Plan (WCAPP). The purpose of the WCAPP is to provide all water users in DuPage County with a consistent message as to the importance of water conservation, while providing DWC member utilities with the tools needed to promote good stewardship of the region's finite water supply. The Plan's overall goal is to achieve a 10% reduction in overall per capita water use by DWC water users within 10 years.

It is important to note that the DWC's conservation effort is being driven by a commitment to stewardship and prudent long-term planning rather than any near-term projection of water shortage. All DWC member utilities currently have Lake Michigan allocations that were recently revised to reflect projections of water needs through the year 2030. As such, sufficient supply should be available to meet projected DWC demands for at least the next 20 years. However, demand projections recently published for the period extending to 2050 do anticipate continued increases in water use within DuPage County and the rest of the Lake Michigan water service area in Illinois. Consideration of conservation options is an appropriate approach to planning for a sustainable, long-term supply of water for the region, and is consistent with the resource management philosophy of the 2008 Great Lakes Compact.

The DWC's approach to conservation planning reflects its desire to be a leader and catalyst for implementation of water conservation practices by its member utilities. During the second half of 2008, DWC management worked with MWH and a Working Group including utility, government, and environmental representatives to review information on conservation strategies and create a program tailored to the specific needs of its customers.

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Key elements of the resulting Water Conservation and Protection Plan shown on the roadmap on the following page include:

Leadership Commitment: Early presentations of the WCAPP to the DWC Board and municipal and county officials will be critical to establishing a high level commitment to plan implementation.

Resource Development: The DWC will develop and distribute printed, electronic, and video resources for use by member utilities in educating end users on conservation principles and practices.

Utility Inclusion: Representatives of DWC member utilities will be introduced to and trained in the use of resources available for developing, implementing, and promoting customized conservation measures.

Conservation Education Programs: Focused effort will be invested in the implementation of specific programs intended to create an initial surge in interest and practices related to water conservation.

Water Pledge: Utility and Customer pledges of commitment to specific conservation efforts

Toilet Leak Detection Program: Leak detection kits to promote reduced leakage from toilets

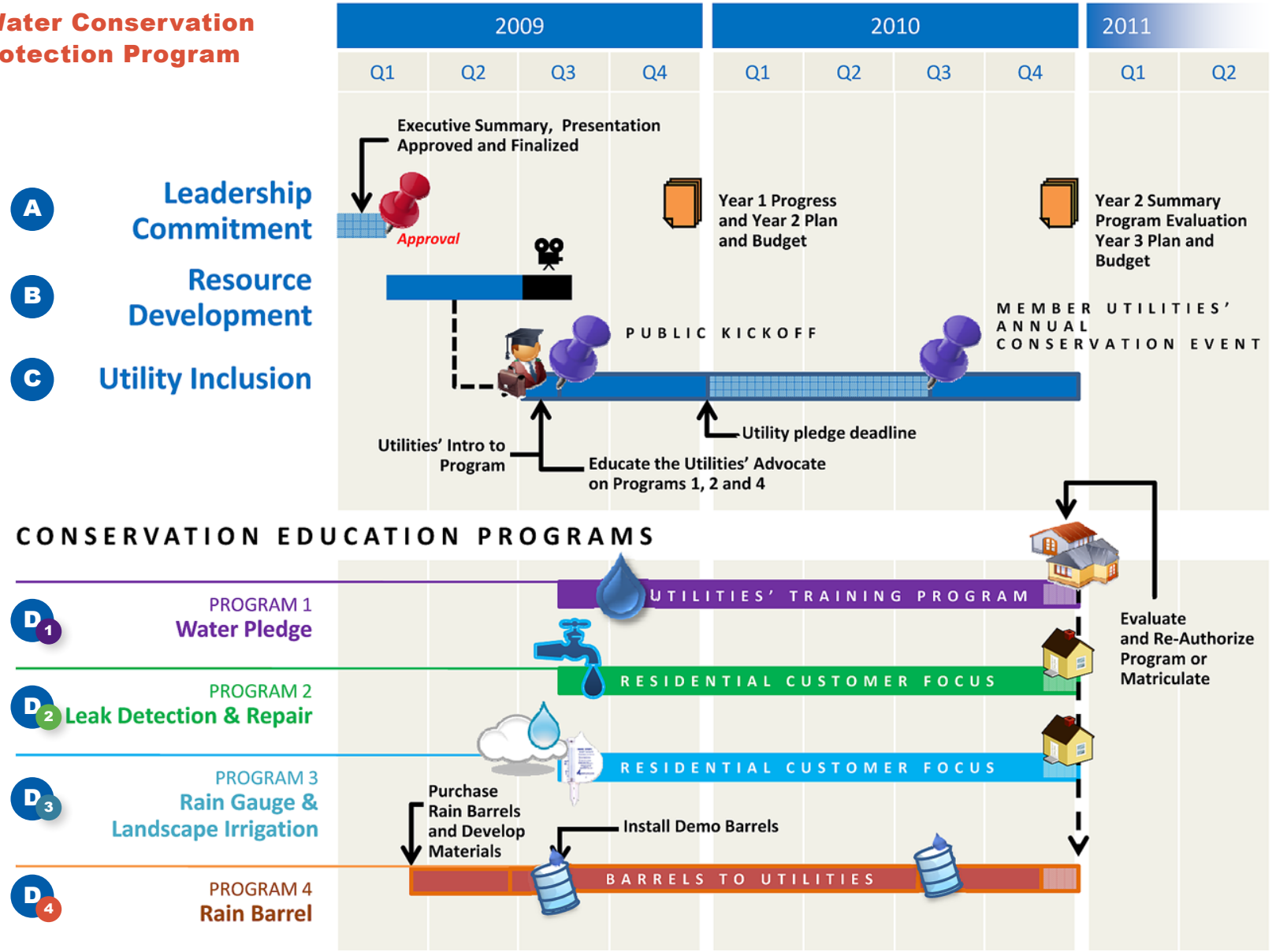
Rain Gauge/Landscape Irrigation Program: Educational kits to promote appropriate and efficient landscape irrigation practices

Rain Barrel Education Program: Demonstration projects to promote purchase, proper installation, and effective use of rain barrels for rainwater harvesting

Progress Monitoring and Evaluation: The progress of the WCAPP toward DWC's conservation goals will be evaluated against baseline metrics so that modifications can be made to the program as appropriate.

As indicated in the schedule on the following page, implementation of the DWC's Water Conservation and Protection Program is planned to begin quickly and proceed toward a formal public launch of resources and programs by the third quarter of 2009. Full scale implementation of the program will continue into 2010 and 2011, with regular reviews and annual reporting. Funds allocated for program activities during 2009 include approximately $77,500 for resource development and plan implementation efforts by the consultant team plus $90,000 budgeted by DWC for purchase and development of conservation education resources and support of conservation education events.

DWC Water Conservation and Protection Program



Section 1: Introduction

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Program Genesis

The DuPage Water Commission (DWC) is a unit of local government existing and operating under the State of Illinois Water Commission Act of 1985. The mission of the DWC is to provide reliable, quality, responsive, and cost-efficient Lake Michigan water service for existing and future customers in DuPage County, Illinois. The Commission is also committed to using techniques, technologies and practices that improve the efficiency of water use and bring water conservation to the forefront of day-to-day utility management.

In keeping with this commitment, DWC has embarked upon an effort to develop and implement a water conservation and protection program (WCAPP) for its service area in DuPage County, Illinois. The WCAPP, as described in this report, includes a conservation strategy, implementation plan, and public outreach activities. The WCAPP has been developed with the input of a small Working Group, consisting of individuals representing local communities and water utilities, and environmental and public education groups. Implementation of the plan is expected to begin in early 2009.

Water Conservation

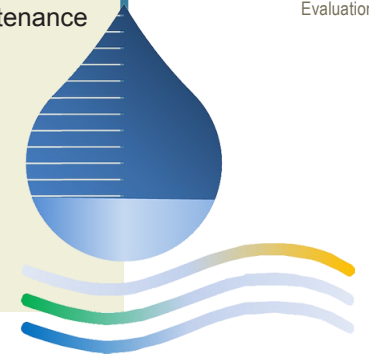
The definition of water conservation has evolved over the years as engineers, scientists and industry professionals have increased their understanding of the competing demands on water supplies and the importance of minimizing water waste and increasing water efficiency. The American Water Works Association (AWWA) has defined water conservation "as practices, techniques, and technologies that improve the efficiency of water use"[1]. AWWA further states that increased efficiency expands the use of the water resource, freeing up water supplies to support population growth, new industry, and environmental conservation.

1 AWWA Water Conservation White Paper, Approved June 28, 1995. (www.awwa.org/advocacy/govtaff)

Water conservation used throughout this document will follow the AWWA definition and focus on short- and long-term improvements in water efficiency that are implementable and sustainable.

Typically, water conservation strategies are implemented by a water utility to accomplish one or more of the following goals:

- To maximize the service population that can be served from a limited source of supply;
- To defer the need for, or reduce the scope and cost of, capital improvements required to increase water supply capacity;
- To reduce operating and maintenance costs associated with the supply of water; and/or
- To demonstrate a commitment to stewardship of water resources the utility uses as its source of supply.



Arid regions of the United States have been working to implement water conservation strategies for many years as they have experienced water shortage due to drought, rapid population increase and depletion of water supplies. In California, for example, water conservation has been used as part of a portfolio of solutions to address water supply issues. In Illinois and other Great Lakes states, however, conservation has not historically been a significant focus due to the abundant source of fresh water available from surface and groundwater sources.

Figure 1: Representative trend of deep well aquifer levels in Cook County, 1940-1995

Source: Adrian P. Visocky, Water-Level Trends and Pumpage in Deep Bedrock Aquifers in the Chicago Region 1991-1995. Illinois State Water Survey, 1997.

DuPage County and Lake Michigan

The Chicagoland Region experienced dramatic growth between 1950 and 2000. As the population of the region grew, demands on infrastructure, including the groundwater systems used to supply most of DuPage County's potable water, increased rapidly. One result of this growth was significant overpumping of the regional groundwater aquifer. Between 1950 and 1980, the normal water level in the deep aquifer decreased by more than 200 feet as shown in Figure 1.

In response to this issue, and to resident calls for improved water quality, a number of utilities in DuPage County joined together to create and put into operation the DuPage Water Commission. The Commission's regional water transmission system was designed to convey treated Lake Michigan water purchased from the City of Chicago to customers throughout DuPage County, thereby eliminating the area's dependence upon the regional deep aquifer system. The DWC system began delivering Lake Michigan water to its utility members in 1992, resulting in rapid recovery of deep aquifer levels.

However, like other parts of the Chicagoland area, DuPage County is not located within the surface water watershed of Lake Michigan. Nor is treated wastewater from the County directed back to the lake. Rather, Lake Michigan water used in DuPage County is discharged to area waterways that are tributary to the Illinois River, and eventually to the Mississippi River system as part of what has become known as the Chicago Diversion. The Chicago Diversion is the single largest diversion of water from the Great Lakes system, and has been the subject of significant debate, litigation, and regulation since its original inception in 1900.

Figure 2: Delineation of the Great Lakes Watershed

Source: Great Lakes Information Network; Bulletins E-1866-70, Sea Grant College Program, 1985.

Figure 3: Chicagoland regional waterway map highlighting the Chicago Diversion

Source: U.S. Army Corps of Engineers

The delineation of the Great Lakes Watershed is shown in Figure 2 and the location of the Great Lakes drainage basin boundary in the Chicagoland area can be seen in Figure 3.

Over time, a variety of organizations and agreements have been put into place to manage the Chicago Diversion and other water transfers into and out of the Great Lakes. Several prominent milestones in this timeline include:

- U.S. Supreme Court Rulings (1906, 1930, 1967)
- Formation of the Great Lakes Commission (1955)
- Great Lakes Basin Compact (1968)
- Great Lakes Charter (1985)
- Water Resources Development Act (1986)

Despite the existence of these legal structures, a number of high-profile issues have, over time, highlighted the challenges associated with managing use of the Great Lakes water resource. One of the most infamous incidents involved a 1998 plan to use huge tankers to ship 156 million gallons of Lake Superior water (one tanker at a time) to arid regions in Asia. The entrepreneur behind the scheme, John Febbraro, was able to apply for and receive a permit from the Ontario Ministry of the Environment. However, due to public outcry over the issue the government cancelled the permit.

In response to these challenges, efforts to develop an improved management system for the Great Lakes were renewed. These recent efforts resulted in a series of meetings and negotiations leading up to the publication in December 2005 of the Great Lakes – St. Lawrence River Basin Sustainable Water Resources Agreement and the Great Lakes – St. Lawrence River Basin Water Resources Compact, the subsequent approval of the Compact by all eight Great Lakes states, and in 2008, the ratification of the Compact by the U.S. Congress. President George W. Bush signed the Compact into law on October 3, 2008. The Compact now serves as the legal standard by which Great Lakes water management proposals are evaluated in the United States. Under this compact water from the Great Lakes cannot be diverted to other regions in the United States, Canada, and abroad without member state approval. The accompanying Agreement is a non-binding international document that mirrors the compact and provides the mechanism by which the Canadian provinces of Ontario and Quebec participate in Great Lakes water management issues.

The Compact defines the legal status for the existing four diversions from the Great Lakes listed in the following Table 1.

Table 1: Existing Diversions from the Great Lakes Basin *Source: Annin, 2006.*

Existing Diversion Location	*Diversion Limit*
Chicago, Illinois	3200 cfs
Forestport, New York	50 cfs
Akron, Ohio	7.4 cfs
Pleasant Prairie, Wisconsin	5.0 cfs

In addition, the Compact establishes significant additional protections for the Great Lakes water resource. These include:

- A ban on new diversions, with limited exceptions
- Requirements for States to regulate in-basin water uses
- Uniform standard for evaluating withdrawal proposals
- Requirement for States to adopt water conservation plans
- Water shipped in small containers (< 20 l) is not considered a diversion
- Waters of the Great Lakes include rivers and groundwater

In the context of the DuPage Water Commission WCAPP, it is important to note that the current Illinois diversion at Chicago (up to the 3,200 cfs limit) is specifically exempted from these requirements. As a result of a Supreme Court ruling in 1967, the rate at which Illinois can divert water from Lake Michigan at Chicago was set at 3,200 cfs. This

limit still governs the State's diversion capacity. The Illinois Department of Natural Resources (IDNR) is responsible for monitoring and managing the State's diversion of Lake Michigan water at Chicago through its Lake Michigan Water Allocation Program.

Under the allocation program, Illinois utilities that use Lake Michigan water are required to maintain an allocation permit. Each permit establishes an allowable annual average rate at which the utility is entitled to take water from Lake Michigan. The IDNR's rules regarding Lake Michigan water use also establish minimum requirements for water conservation by permittees. Under the current rules (17 Ill. Admin. Code, Ch. I, Section 3730.307), permittees are required to meet a target level of 8% for unaccounted-for-flow (adjusted to allow for unavoidable leakage), and to have in place procedures and/or ordinances that promote leak detection, metering, use of low-flow water fixtures, and other water conserving practices.

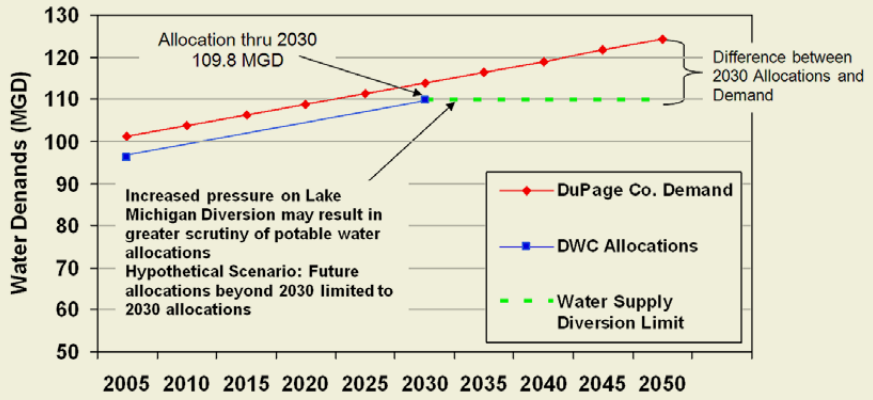
Allocations for 199 Illinois utilities that use Lake Michigan water were recently reviewed and updated by the IDNR. Current allocation permits define the amount of Lake Michigan water that utilities can use through the year 2030. The total amount of water allocated for use by current DWC customers is 96 mgd for water year 2008, and increases to 109.8 mgd by the year 2030. This total does not include water use by Argonne National Laboratories. As a federal facility, water use at Argonne is not regulated under the Illinois allocation program.

While the Illinois diversion of up to 3,200 cfs from Lake Michigan is specifically exempted from the Great Lakes Compact, it is clear the State's management of its diversion will continue to receive intense scrutiny from other stakeholders. As the Great Lakes states and provinces work to comply with the requirements of the Compact, Illinois and Illinois utilities that use Lake Michigan water will likely face continuing public pressure to demonstrate their responsive care and efficient use of the Lake Michigan water resource.

Problem Statement

As a result of its position as a major Illinois user of Lake Michigan water, the DWC and its Member Utilities are likely to face increasing scrutiny of their use of potable water. This scrutiny is likely to result not only from the implications of the Great Lakes Compact, but also from increasing societal focus on conservation and environmental stewardship. In addition, population growth and development are projected to continue to increase in DuPage County and surrounding parts of the Chicago region. Water allocations granted to the DWC utilities and other Lake Michigan water users in Illinois are expected to provide adequate water to meet

Figure 4: Projected Future Water Demands for DuPage County



Source: B. Dziegielewski and F.J. Chowdhury, Regional Water Demand Scenarios for Northeastern Illinois 2005-2050, Southern Illinois University Carbondale June 15, 2008.

needs through at least 2030. However, additional demand studies recently completed suggest that potable water requirements in DuPage County will continue to increase, possibly reaching a level of 124.2 mgd by 2050[2]. The potential for climate change to impact water needs in the region is also an issue of current interest to many.

As a result, it is possible that a significant increase in projected water demand and potential restriction on available water supply could create a significant gap for DWC utilities. While there is no current data to suggest a near-term gap between water demands and available supply, conservation measures that reduce future water demands can reduce the risk that such a gap may develop, and help protect/preserve the finite supply of potable water available to users in DuPage County. Effective water conservation measures can also produce secondary benefits related to reduced costs for operation and maintenance of water treatment, transmission, pumping and distribution facilities. Every gallon of water conserved translates for the DWC into a gallon of water that does not have to be purchased from Chicago and pumped to Member Utilities and their customers.

2 B. Dziegielewski and F.J. Chowdhury. Regional Water Demand Scenarios for Northeastern Illinois 2005-2050, Southern Illinois University, Carbondale June 15, 2008.

DuPage Water Commission Water Conservation Program

Purpose

In light of the circumstances described above, the DuPage Water Commission is undertaking the development and implementation of a Water Conservation and Protection Plan to demonstrate its commitment to appropriate stewardship of the Chicago region's water resources. While the DWC does not face an immediate crisis in terms of supply adequacy or the need to construct costly new pumping or transmission facilities, it recognizes the critical importance of Illinois' Lake Michigan resource and has decided to take a leadership role in promoting improved resource management.

The DWC has already established itself as a leader on water supply issues in the region through its sponsorship of guest lectures from key experts in water resource management, and its commitment to the Northeastern Illinois Regional Water Supply Planning Group (RWSPG). Robert Martin, the DWC's General Manager currently serves as the Vice Chair for the planning group, while representing the DuPage municipalities and S. Louis Rathje, Chairman of the DWC, represents DuPage County for the RWSPG. The effort to develop and implement a water conservation plan is a logical next step for the DWC.

The stated purpose of the DWC's water conservation planning effort is to provide all water users in DuPage County with a consistent message about water conservation and provide DWC customers with the tools needed to be good stewards of the region's finite water supply.

In addition, the DWC has adopted as its water conservation goal a commitment to be the regional leader in promoting water conservation by reducing current DWC demand (expressed as gallons per person per day, gpcd) by 10% within the next 10 years.

It is important to recognize that this goal is not directed toward limiting growth or development within the DWC service area. Total water use within the county will likely continue to increase with continued population growth and development. The goal of the DWC program is to promote water efficiency so that as the total demand for water increases with population, the actual amount of water used per person decreases as a result of specific conservation efforts.

Program Approach and Team

The DWC does not have the authority to require its member communities to conserve water, nor does it seek this authority. Rather, the approach adopted for the Water Conservation and Protection Plan focuses on providing resources and information that can be used by the Member Utilities to educate and encourage their end-users. An initial 42-month schedule was adopted for the effort as outlined below.

0-6 months	■ Plan Development ■ Plan Acceptance
7-18 months	■ Roll-out / Year 1 Implementation
19-30 months	■ Year 2 Implementation
31-42 months	■ Year 3 Implementation

To facilitate development of an effective program, the DWC retained MWH to serve as its conservation consultant, and established a four person Working Group to provide specific input to the plan. Initial plan development efforts were focused around regular meetings attended by the Working Group and staff from DWC and MWH.

The DWC leadership team for the Water Conservation and Protection Plan consists of Bob Martin, the General Manager of the DWC and Terry McGhee, Manager of Water Operations of the DWC.

MWH staff with primary responsibility for the Water Conservation and Protection Plan include Joe Johnson, Principal Project Manager and Catherine Hurley, Senior Civil Engineer. The MWH Project Team also includes key individuals who bring relevant project experience in water conservation, sustainable development, and public outreach from throughout MWH's 6500 person organization.

Members of the water conservation Working Group were selected to represent DWC Member Utilities, DuPage County, and local resource/conservation groups. Working Group members have participated in the overall development of the WCAPP for the DWC, and have provided specific input to tasks including identification of relevant conservation strategies, policies, practices and actions to be considered in the plan; collecting and sharing information on existing water conservation programs in communities throughout DuPage County; and reviewing and recommending a draft conservation program for the DWC. Working Group members include:

- Kay McKeen
- Kevin Buoy
- Joe Breinig
- Jim Kleinwachter

Kay McKeen is with the SCARCE Team. SCARCE was founded in 1990 by Kay and is dedicated to educating students, teachers, residents, businesses, and the general public on the benefits of conserving natural resources and energy, preventing pollution, reducing waste, recycling, and composting organic materials. Funding for SCARCE is provided by DuPage County in addition to local community groups, businesses, and private donors. Details on all the programs and resources available through SCARCE can be found on their website: www.bookrescue.org.

Kevin Buoy is the water and wastewater Operations Manager for DuPage County. The DuPage County Government provides a wide range of services to over 926,000 residents. Essential services provided includes funding and oversight for the county court system, the jail, the health department, the sheriff's department, animal control, transportation and congestion relief, economic development, community services and help for those in need at the County's nursing home. The County is also the pass-through and oversight agency for over $100 million in annual state and federal grants that fund programs such as Community Development Block Grant programs and public safety. The County currently operates several public water systems that obtain water from the DWC. It also operates wastewater collection and treatment facilities and oversees implementation of a county-wide

stormwater management plan. Details of all the programs offered by DuPage County can be found on their website at: www.dupageco.org.

Joe Breinig from the Village of Carol Stream and **Jim Kleinwachter** from The Conservation Foundation round out the membership of the Working Group. Mr. Breinig is the Village Manager of the Village of Carol Stream. Carol Stream is located approximately 25 miles northwest of downtown Chicago and has a population of nearly 40,000 residents (2007). The Village was incorporated in 1959 and today boasts nearly 1,000 businesses and industries. Carol Stream is committed to making the Village an environmentally healthy place to live and work and has focused efforts to improve air and water quality, protect the natural environmental, and reduce waste and water use. Details about the Village of Carol Stream can be found on their website: www.carolstream.org.

The Conservation Foundation was established in 1972 by business and community leaders, and is a not-for-profit land and watershed protection organization. Headquartered on a 60-acre working farm in Naperville, Illinois, the mission of the Foundation is to preserve open space and natural lands, protect rivers and watersheds, and promote stewardship of our environment. The Foundation is supported by nearly 4,000 members and donors, and 500 volunteers in DuPage, Kane, Kendall and Will Counties, Illinois. Details about the Conservation Foundation can be found on their website, www.theconservationfoundation.org.

The DWC, MWH and the Working Group have participated in five face-to-face meetings at the DWC offices in Elmhurst from September through December of 2008 where conservation goals and program details were discussed and consolidated. These meetings were as follows:

- Kick-off Meeting
  September 18th
- Meeting #2 – Goal Development
  October 22nd
- Meeting #3 – Conservation Measures
  November 5th
- Meeting #4 – Implementation Plan
  November 20th
- Meeting #5 – Public Outreach Plan
  December 11th

General assumptions that were determined early on in the process include the following:

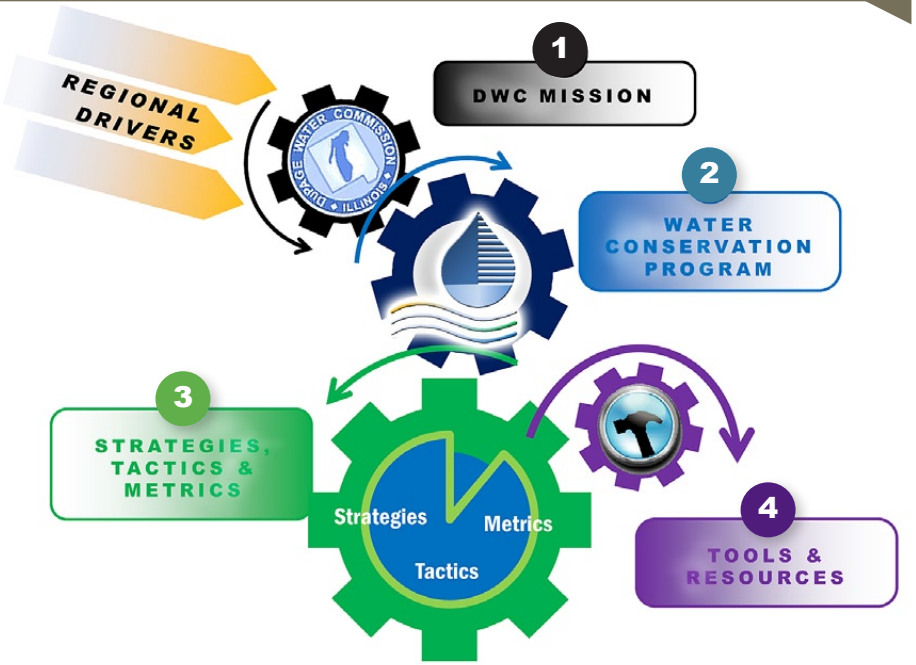
- That the program will include providing resources and information to all communities in the County so that individual communities can educate and encourage the end-users to conserve water.
- There will be consistent messaging across DuPage as well as incorporation and recognition of the existing conservation measures that communities in DuPage are already implementing.
- That the conservation plan will not be limited to DWC customers but is intended to be appropriate for all communities in DuPage County.

The group determined that a recognition and promotion approach would be the most appropriate means to encourage DWC Member Utilities and end-users to participate. The initial implementation plan includes a public outreach program (Section 8) to assist Member Utilities in communicating conservation goals and practices to their customers. DWC Member Utilities will also be provided with resources that can be incorporated into local conservation efforts, most of which will be incrementally rolled out during 2009, and updated during 2010 and 2011.

Program Strategies

Working Group meeting #2 was focused on developing and agreeing upon the program's purpose and goals. The program's official mission, problem statement, purpose, goal and strategies are included below. The roadmap shows the relationship between the various components.

The DWC has specifically chosen the role of driver and catalyst for implementation of the WCAPP by its Member Utilities. The Commission recognizes that its members are a diverse group of utilities with differing customer bases. Conservation measures that are ideally suited for one member utility may not effectively address the needs of another. As a result, the DWC's overall strategy for promoting conservation among its members is focused on development and communication of a clear and consistent message, implementation of a select group of programs to create an initial surge in conservation efforts, and organization and distribution of conservation tools and resources that can be evaluated, customized, and used by the individual Member Utilities to promote effective local programs.



1

1. DuPage Water Commission Mission

- To provide reliable, quality, responsive, and cost-efficient Lake Michigan water service for existing and future customers as required by, or pursuant to, state statutes.
- **Problem Statement:** A significant increase in projected water demand and potential restriction on available water supply could create a significant gap. Conservation measures that reduce future water demands will be needed to reduce the gap and protect/preserve the finite supply of potable water available to water users in DuPage County.

2

2. Water Conservation and Protection Program

- **Purpose:** To provide all water users in DuPage County with a consistent message about water conservation and provide DWC customers with the tools needed to be good stewards of our finite water supply.
- **Goal:** To be the regional leader in promoting water conservation by reducing current DWC demand (in gpcd) by 10% in 10 years.

3

3A. Strategies & Tactics

- DWC will be the driver for water conservation in DuPage County through their internal and external efforts.
- Internally DWC will be a role model in water conservation by:
  - Improving their facility and operations to reflect conservation Best Management Practices (BMPs)
  - Educating their employees on water conservation practices for work and for home
- Externally DWC will be a resource to its customers by:
  - Educating DWC customers, policy makers, and the public about water conservation
  - Providing guidance and tools to DWC customers to assist them in implementing water conservation
  - Tracking the volume and per capita use of water sold to current customers

continued

3

3B. Metrics

- Water use at the DWC office in Elmhurst compared to 2007
- Energy used at DWC pumping stations compared to 2007
- Volume of water sold by DWC to current customers on a total gpcd basis
- Number of educational materials produced/ distributed by DWC each year
- Number of educational programs held by DWC each year
- Creation of model ordinances for use by Member Utilities

4

4. Tools & Resources

- DWC will provide the following tools and resources to Member Utilities:
  - Guidance on utility use of standardized and custom water audit methodologies, as well as conservation planning tools
  - Demonstration programs structured to help raise local awareness of conservation options and benefits among utilities and end users
  - Delivery of links to area-specific resources and templates for use in preparing customized educational/ public outreach materials on water conservation.

Conservation Education

A key focus of discussion for the Working Group during the process of goal setting was the importance of customer education. The general consensus of the group is that water users first need to be educated on water resource issues and the importance of water conservation. Since water conservation has not historically been a focus in Northeastern Illinois, the Working Group believes significant effort will be required to increase the level of understanding and awareness of water conservation. Once the basic foundation of understanding is established, more aggressive water conservation goals and measures would be implemented. The goals and strategies described above were developed by the Working Group taking into consideration the current level of perceived conservation education by water users in DuPage County.

Section 2: Baseline Analysis

The following section discusses the baseline analysis of water use performed at the outset of this project as well as recommendations for ways individual communities can perform similar assessments to customize a conservation program that meets their individual and unique needs. As a water utility embarks upon a water conservation program, it is important to conduct a baseline analysis of the available water use data. DWC's baseline audit is discussed below.

DWC Baseline Analysis

As part of the WCAPP development effort, a baseline analysis of water use has been completed for all of the DWC's Member Utilities. A summary of the baseline analysis is provided on the following pages. The complete analysis can be found in Appendix D.

➲ ***DuPage Baseline Analysis Report***

Data Analysis

The DWC maintains records of historical water use among its customers and produces an annual report summarizing this data for the DWC Board of Commissioners. The Illinois Department of Natural Resources (IDNR) also maintains historic data gathered from Water Use Audit Forms (LMO-2) submitted annually by individual Lake Michigan water allocation permittees. Official regional forecasts of population, households, and employment data for six Illinois counties, including DuPage, through the year 2030 are available from the Chicago Metropolitan Agency for Planning (CMAP). These data were analyzed for the DWC Utilities and are summarized here.

- Total Number of Utility Customers[1]: 28
- Total Population Served[2]: 746, 453
- Service Area Supplied: 300 square miles

1 Illinois American Water Company (IWAC) subsidiaries are counted as one customer (there are seven IAWC subsidiaries served by DWC).
2 2008 population data was calculated using a straight line projection from the approved CMAP population figures for the years 2000 and 2030. Population data is not available for Argonne National Laboratory and Illinois American Water Company.

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Table 2: DWC Member Utilities Monthly Water Pumpage Data May 2007 – April 2008 Source: DuPage Water Commission, 2008.

	Average Daily Flow (MGD)	Maximum Daily Flow (MGD)	Minimum Daily Flow (MGD)	Average Air Temperature (°F)
Average	87.1	101.8	75.4	64
Maximum	113.2	145.1	90.6	88
Minimum	73.5	77.5	65.4	34

Based on historical records, the net annual pumpage has not changed significantly for the majority of DWC customers during the period 1990-2005. One exception to this trend is the City of Naperville where pumpage increased by more than 70% during this period as shown in Figure 6. This increase in pumpage for Naperville corresponds to an increase in population over the same period of nearly 60%. The available data also shows a strong relationship between average water pumpage and average air temperature as would be expected. The relationship between water pumpage by DWC Utilities and average air temperature between May 2006 and April 2008 is shown in Figure 7.

Figure 6: DWC Net Annual Pumpage (1970 - 2005)

Data Source: Illinois Dept of Natural Resources - Water Use Data (LMO-2 Data)

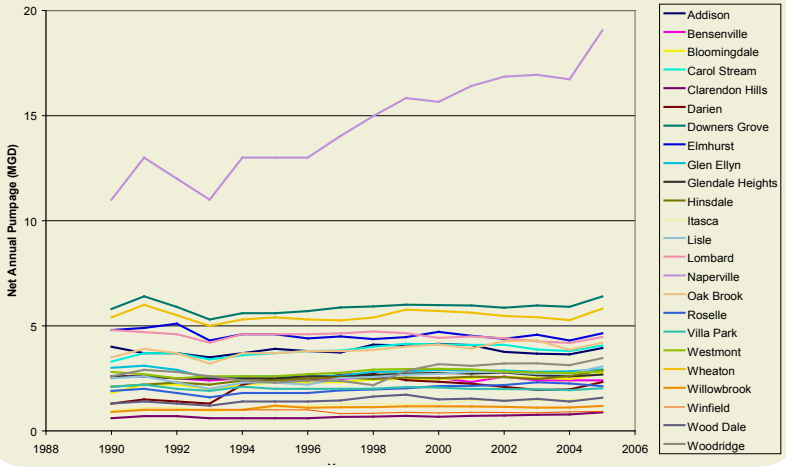
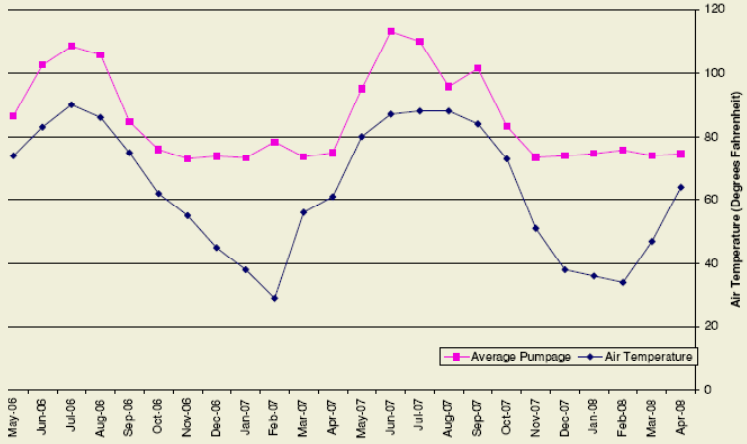


Figure 7: DWC Water Pumpage vs Average Air Temperature *Data Source: DuPage Water Commission, 2008*



Among the 28 DWC customers, pumpage rates and water use by category vary significantly. For example, the total pumpage in calendar year 2007 by Naperville was 6,155 million gallons while that of the Illinois American Water Company - Liberty Ridge East system was only 13 million gallons. Water use by category varies significantly, depending on the amount of residential, industrial or commercial development. For instance, almost 50% of water use in Itasca is attributed to commercial and manufacturing, whereas, in Glen Ellyn, almost 100% of the water use is residential. Lombard uses over 20% of its water for municipal purposes. These variations are illustrated in Figure 8.

Per capita water use is typically defined as the amount of water used by one person during a standard period of time; in relation to water use, per capita usage is expressed as gallons per capita per day (gpcd). For example, per capita residential use for a given utility is equal to the residential water use divided by the total population served. Per capita residential use in the standard American household is estimated to average 101 gpcd[3]. However, per capita rates can vary significantly depending on the type and location of household dwelling, as well as on economic factors and local practices. In general, per capita water use in multifamily dwellings tends to be less than in single family residential units, ranging from 45-70 gpcd. These lower rates are due to the limited outdoor water use and fewer appliances and fixtures per person associated with multi-family developments. For this analysis, total water usage was divided by total service population to determine per capita rates. Per capita rates for DWC customers generally vary from 70 to 160 gpcd with a few outlier data points, including Oak Brook with 415 gpcd and Oakbrook Terrace with 58 gpcd. The overall per capita water use rate for the DWC system was determined to be 106 gpcd in 2007.

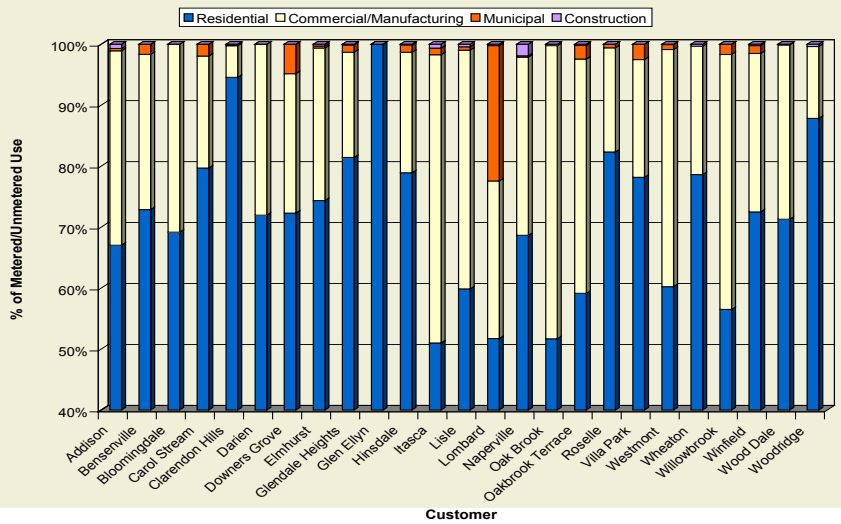
Water use in typical municipal systems can be associated with various activities within the community served. For the purpose of this discussion, water will be described in terms of three major components:

- Base indoor water use
- Outdoor water use
- Unaccounted-for-flow

Base indoor water use is defined as the typical amount of water accounted-for through metering or estimates and used by utility customers to meet normal, non-irrigation demands. Typical components of base indoor water use include indoor use by residential, institutional, commercial, industrial and municipal customers. Outdoor water use is defined as the amount of water accounted-for through metering or estimates and used by utility customers for seasonal outdoor activities related primarily to lawn irrigation. For this analysis, unaccounted-for-flow (UFF) is defined as the difference between the amount of water supplied to a utility's water system and the amount of customer water use that the utility can account for through metering or estimates. UFF may consist of physical leakage or losses in a water system, unauthorized water use, or administrative losses resulting from metering or estimate errors.

Figure 8: DWC Water use by Category (2005)

(Data Source: Illinois Dept of Natural Resources - Water Use Data (LMO-2 Data)



3 Source: Vickers, Amy. "Handbook of Water Use and Conservation" WaterPlow Press, 2001. Data based on USGA national database of water use which indicates average indoor and outdoor water use in the United States averages 101 gpcd.

It is important to note that the definition of unaccounted-for-flow used in this document differs from the definition used in the IDNR LMO-2 water audit. The IDNR audit process allows utilities to take a credit for "unavoidable leakage" based on the age and material of their water distribution networks before calculating their "unaccounted-for-flow". For the purpose of the DWC's water conservation efforts, no credit for leakage will be used, and unaccounted-for-flow is defined as the difference between the amount of water supplied to a utility's water system, and the amount of water use that the utility can account for through metering or estimates.

Unaccounted-for-flow levels in DuPage County are generally about 10% of total pumpage. The total level of unaccounted-for-flow for DWC Utilities during 2005 was determined to be 9.39%. Water year 2005 UFF levels for individual communities are shown in Figure 9 below. DWC members with higher levels of UFF in 2006 included Hinsdale and Lombard, both of which had UFF values in the range of 15%-17%.

Data from 2000-2008 suggest that outdoor water use, occurring primarily in the warm weather months, can range from 5% (Bensenville, Argonne) to 40% (Oak Brook) of a community's annual water use as shown in Figure 10. Potential water savings from outdoor efficiencies and water use restrictions will be greatest for communities with a high outdoor water use. Outdoor water use was calculated for each DWC customer under the assumption that outdoor use occurs primarily in the warm weather months (May - October).

Figure 9: DWC Water Usage Summary (2005)

Data Source: Illinois Dept of Natural Resources - Water Use Data (LMO forms)

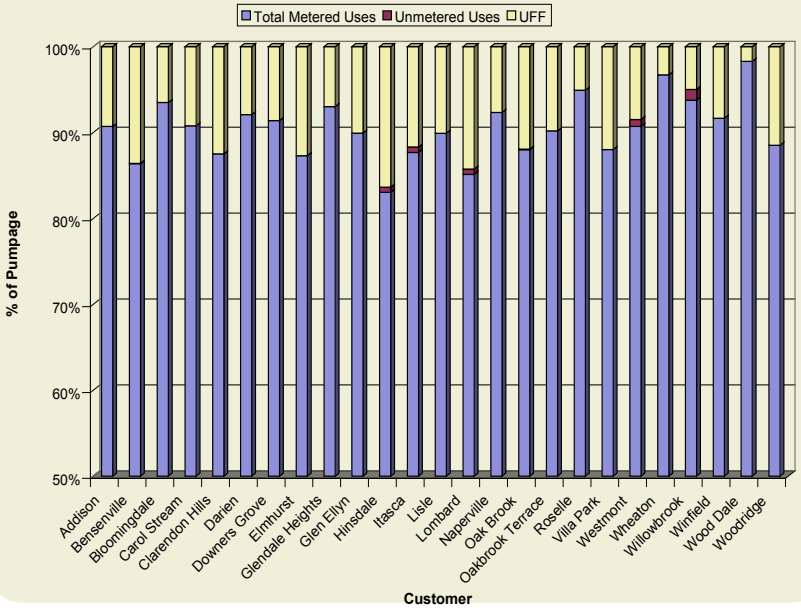


Figure 10: DWC Estimated Outdoor Water Usage Summary (2008) *Data Source: DuPage Water Commission - SCADA data received 10.2.2008*

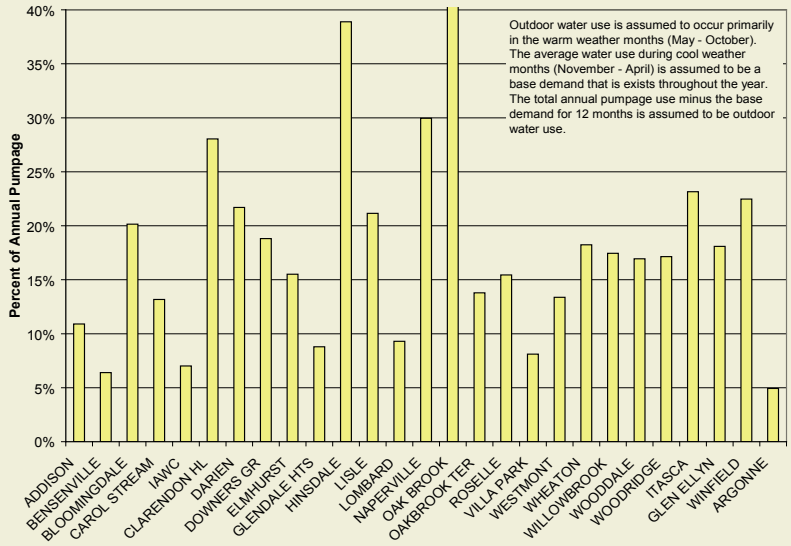
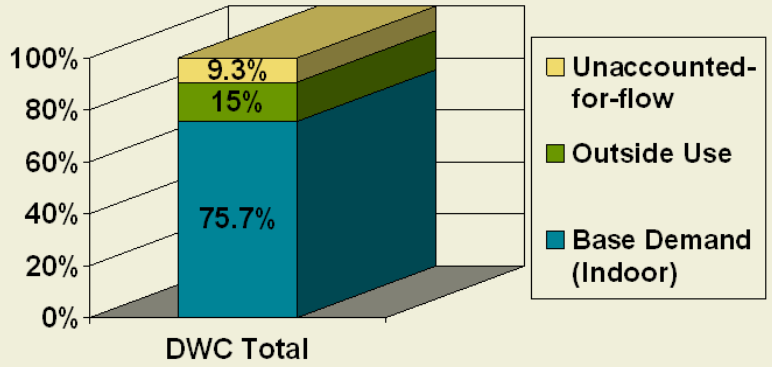
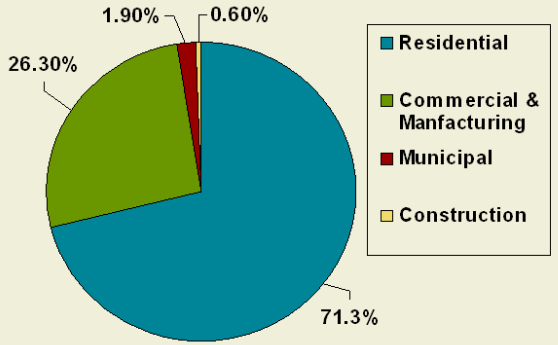


Figure 11: DWC Water Use by Category



Source: Summary of data from DWC and Illinois Department of Natural Resources. Data does not include unaccounted for flow values for Argonne or IAWC.

Figure 12: DWC Water Use by User Type



Source: Summary of data from DWC and Illinois Department of Natural Resources. Data does not include unaccounted for flow values for Argonne or IAWC.

The average water use during cool weather months (November - April) is assumed to be the base demand that exists throughout the year. The outdoor water use is calculated as the total annual water use minus the base demand for 12 months.

Looking at DWC as a whole, approximately 75% of the Commission's annual pumpage can be attributed to base indoor demand and 15% to outside use. The remaining pumpage can be attributed to the sum of the unaccounted-for-flow from all the DWC Member Utilities. Approximately 71% of the DWC annual pumpage goes to residential uses while commercial and manufacturing uses comprise nearly 27%. The remainder goes to municipal and construction applications as shown in Figures 11 and 12.

Current Water Management Practices

DWC's current Member Utilities already have a variety of water management and conservation practices in place. The most significant practices currently in use include regular leak detection surveys and outdoor water use restrictions. Both of these items are included in the list of conservation practices required by the IDNR of Lake Michigan water allocation permittees. A summary of the current degree to which these practices are employed by DWC Member Utilities follows.

Leak Detection Survey

Standard water utility management practices in the United States include the routine identification and repair of system leaks. Repairing system leaks is an important tool that utilities can use to control their unaccounted-for-flow and reduce physical damage to customer properties. Table 3 on the following page provides a summary of the degree to which DWC Member Utilities use leak detection surveys. As indicated, the majority of the DWC utilities conduct some degree of leak detection on an annual basis.

Table 3: Current Leak Detection Practices – DuPage Water Commission Member Utilities: 2008 *Source: DuPage Water Commission, 2008*

Customer	Detection	Frequency	Company Used for Detection
Addison	Yes	Annually	Done Internally
Argonne Labs	N/A	N/A	N/A
Bensenville	Yes	Annually	M.E. Simpson
Bloomingdale	Yes	As needed	ATS (Associated Technical Services)
Carol Stream	Only if problem	Only if problem	No Regular Company - Currently Using Water Services
IAWC	Yes	Annually	M.E. Simpson
Clarendon Hills	Yes	Annually	M.E. Simpson
Darien	Yes	Annually	Out To Bid – Used ATS (Associated Technical Services) Last Time
Downers Grove	Yes	1/2 Town each year	Out To Bid - Currently Using M.E. Simpson
Elmhurst	Yes	Annually	ATS (Associated Technical Services)
Glen Ellyn	Yes	Every 2 - 3 years	M.E. Simpson Or Water Services
Glendale Heights	Yes	Every 5 years	M.E. Simpson Or Water Services
Hinsdale	Yes	Annually	Out To Bid - Currently Using M.E. Simpson
Itasca	Yes	Annually	ATS (Associated Technical Services) or Water Resources
Lisle	No	N/A	N/A
Lombard	Yes	1/2 town each year	M.E. Simpson or ATS (Associated Technical Services)
Naperville	Yes	Annually	ADS Environmental Services
Oak Brook	Yes	Annually	ATS (Associated Technical Services)
Oakbrook Terrace	Yes	Annually	Done Internally
Roselle	Yes	As needed - monthly checks	Severn Trent Services
Villa Park	Yes	Annually	Out To Bid - Used ADS Environmental Services Last Time
Westmont	Yes	Every 3 years	M.E. Simpson
Wheaton	Yes	Annually-monthly checks	Done Internally
Willowbrook	Yes	Every 3 years	Out To Bid - Used ATS (Associated Technical Services) and Water Services
Winfield	Yes	Annually	Water Resources
Wood Dale	Yes	Every other year	M.E. Simpson
Woodridge	Yes	Annually	Severn Trent Services or ADS Environmental Services

DWC Communities Watering Restrictions for 2008

A second form of water management widely practiced by DWC Member Utilities involves the use of outdoor water use restrictions. Outdoor water use restrictions are typically used during warm weather months as a means of reducing peak water use. However, in communities where outdoor water use accounts for a significant percentage of the total annual water use volume, such restrictions can have a direct impact on total water use. Table 4 provides a summary description of the watering restrictions reported to be in use in a 2008 survey of DWC Member Utilities.

Table 4: Summary of Outdoor Water Use Restrictions – DuPage Water Commission Member Utilities: 2008

Municipality	Effective Time	Watering Restriction Plan (Watering Allowed)
Addison	Year round	▪ Even numbered addresses on even days and odd numbered addresses on odd days.
Argonne	N/A	▪ N/A
Bensenville	May 15 - Sept 15	▪ Even numbered addresses on even days and odd numbered addresses on odd days as needed.
Bloomingdale	May 15 - Sept 15	▪ Single family homes odd addresses on Mon., Wed., Sat., even addresses on Tu., Th., Sun. from 5-9am or pm ▪ Commercial addresses on Tu., Th., Sun. from 5-9am or pm. No watering on Friday.
Carol Stream	Year round	▪ Even numbered addresses on even days and odd numbered addresses on odd days
Clarendon Hills	May 15 - Sept 15	▪ South of Burlington R.R. tracks on odd days and North of R.R. tracks on even days. ▪ No watering from 1-4pm.
Darien	May 15 - Sept 15	▪ No watering between 11am and 7pm.
Downers Grove	May 15 - Sept 15	▪ Even addresses on even days and odd addresses on odd days. ▪ No watering 11am-4pm and 11pm-4am.
Elmhurst	May 15 - Sept 15	▪ Even addresses on even days and odd addresses on odd days from 8pm-8am. ▪ No watering on Sunday.
Glendale Heights	N/A	▪ None enforced at the current time.
Glen Ellyn	Year round	▪ Even numbered addresses on even days and odd numbered addresses on odd days.
Hinsdale	May 15 - Sept 15	▪ Even numbered addresses on even days and odd numbered addresses on odd days from 6-10am and 6-10pm.
IAWC	May 15 - Sept 15	▪ Even numbered addresses on even days and odd numbered addresses on odd days from 7-11am and 7-11pm. ▪ Also no watering on the 31st of the month.
Itasca	Year round	▪ Even numbered addresses on even days and odd numbered addresses on odd days.
Lisle	May 15 - Sept 15	▪ Even numbered addresses on even days and odd numbered addresses on odd days from 5-10am and 5-10pm.
Lombard	Year round	▪ Even numbered addresses on even days and odd numbered addresses on odd days.
Naperville	Year round	▪ Even numbered addresses on even days and odd numbered addresses on odd days from 6-10am and 6-10pm.

continued: ***Table 4: Summary of Outdoor Water Use Restrictions – DuPage Water Commission Member Utilities: 2008***

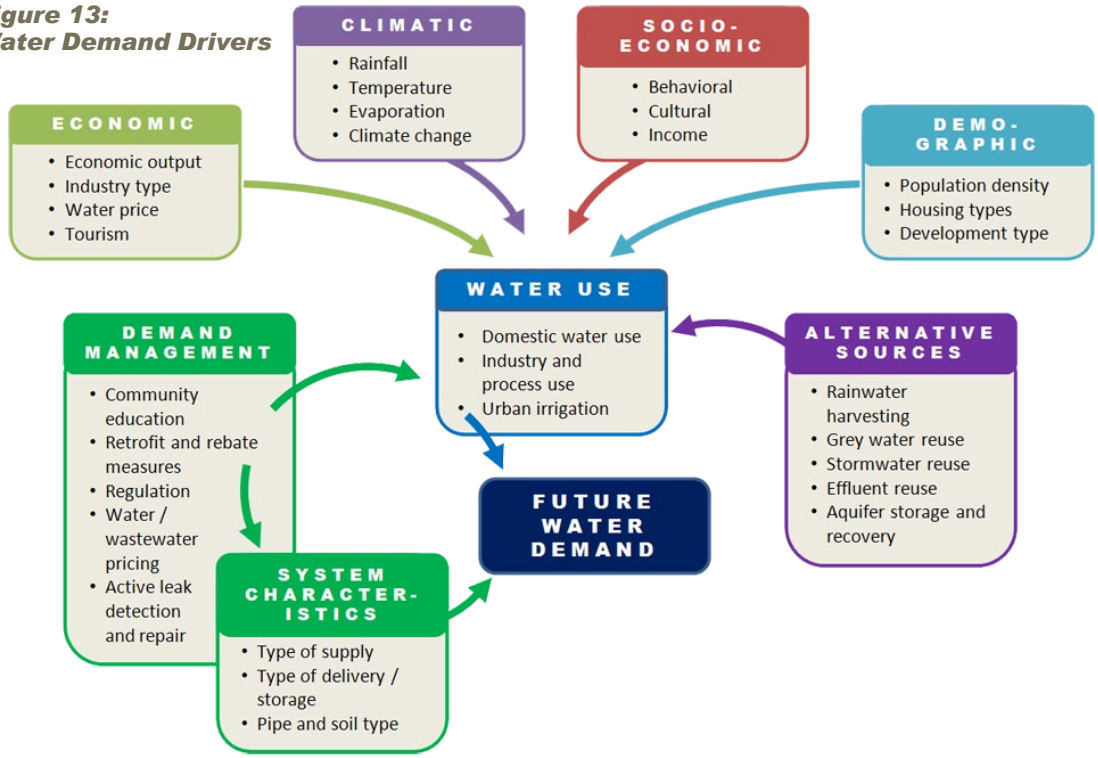
Municipality	Effective Time	Watering Restriction Plan (Watering Allowed)
Oak Brook	Year round	■ Odd addresses on Tu., Th., Sat. and even addresses on Wed., Fri., Sun. from 6-10am and 6-10pm. ■ No watering on Mondays.
Oakbrook Terrace	May 15 - Sept 15	■ Even addresses on Mon., Wed., Fri. and odd addresses on Tu., Th., Sat. from 8pm-8am.
Roselle	May 15 - Sept 15	■ Even numbered addresses on even days and odd numbered addresses on odd days from 5-9am and 6-10pm. ■ Automatic sprinklers from midnight - 6am only.
Villa Park	May 15 - Sept 15	■ Even numbered addresses on even days and odd numbered addresses on odd days from 12:01am-noon and 6:01pm - midnight.
Westmont	May 15 - Oct 15	■ Even numbered addresses on even days and odd numbered addresses on odd days from 7-11am and 7-11pm.
Wheaton	May 15 - Sept 15	■ Even numbered addresses on even days and odd numbered addresses on odd days. No watering from 12-6pm.
Willowbrook	May 15 - Sept 30	■ Addresses east of Rte 83 on even numbered days and west of Rte. 83 on odd days from 6am-noon and 6pm-10pm.
Winfield	May 15 - Sept 15 as needed	■ Even numbered addresses on even days and odd numbered addresses on odd days. No watering from 10am-4pm.
Wood Dale	May - Sept	■ Even numbered addresses on even days and odd numbered addresses on odd days from 9-11am and 9-11pm ■ Not in place at this time. Enforced as needed.
Woodridge	May 15 - Sept 15	■ No watering between 11am and 4pm.

Guidance for Communities on Baselining and Auditing

Communities need to understand their baseline conditions prior to adopting conservation needs so that future actions appropriately address factors that most significantly impact water demand. Some of the key water demand drivers that should be taken into consideration by individual utilities planning their own conservation efforts are shown in the figure below:

There are a number of ways in which to collect and analyze current water demand drivers and actual data. Three options available to DWC Member Utilities include:

Figure 13:
Water Demand Drivers



The Illinois Department of Natural Resources Water Use Audit

All DWC Member Utilities hold permits for the use of Lake Michigan water and are required to comlete and submit to the Illinois Department of Natural Resources (IDNR) an annual Annual Water Use Audit. The audit process involves completing the IDNR's LMO-2 Water Use Audit form for the water year running from October 1st through September 30th. The completed form provides a high-level summary of water use for the utility, including documentation of total lake water pumpage, water sold to other utilities, net annual pumpage, accounted-for-water use by user category, and other data.

One important output of the audit process is the calculation of the Utility's unaccounted-for-flow based on IDNR definitions and procedures. Unaccounted-for-flow is currently defined by IDNR as "the amount of water supplied to a system (including the components of transmission, distribution, storage, and pumping) which is lost from the system prior to delivery to the end user, but not including unavoidable leakage." Unavoidable leakage is calculated based on the age of pipe in the water distribution system and establishes an allowable amount of leakage.

While this method of computing unaccounted-for-flow is currently required by IDNR, the consideration of unavoidable leakage results in each utility's actual unaccounted-for-flow being underestimated. The intention of the DWC WCAPP is to focus on

effective management of total unaccounted-for-flow, thereby encouraging Member Utilities to take a proactive approach toward reducing leakage and losses in their system. As part of the performance measurement process for the WCAPP, Member Utilities will be asked to complete an additional page along with the LMO-2 form to provide an accurate determination of total unaccounted-for-flow. The supplemental page will be prepared during the development of WCAPP resources during the first half of 2009.

The AWWA Water Loss Control Committee Water Audit Software

The American Water Works Association (AWWA) offers a free water audit software package, which includes five worksheets in a spreadsheet file. The majority of data is entered on a reporting worksheet and prompts the user to enter standard water supply information such as the volume of water supplied, customer consumption, and quantities of losses. The software allows the user to enter either known or estimated values. The software then calculates a variety of performance indicators which are useful in making performance comparisons among water utilities. This audit package can be found at the following location:

➲ ***http://www.awwa.org/Resources***

Custom Water Management Spreadsheet Tools

As an alternative to these other procedures, a simple spreadsheet tool that can be used to assess the impacts of general conservation efforts on annual water use has been developed as part of the DWC WCAPP effort. The spreadsheet uses historic water use data from DWC Member Utilities' LMO-2 Water Audit forms, as well as data from the Baseline Water Use Analysis, to provide a framework for analyzing the impacts of general conservation strategies. A sample from the spreadsheet tool is included in Appendix E to this report.

Section 3: Water Conservation Best Practices and Case Studies

Water conservation has been practiced in many parts of the country at some level for the last 30 years. As a result of past conservation efforts in places like California and Las Vegas, best management practices (BMPs) have been established to guide conservation efforts. The basic definition of a BMP is a generally accepted conservation measure or incentive that directly or indirectly results in proven, beneficial, and cost-effective water savings. In the context of water conservation, BMPs are typically established by a water utility as baseline standards for minimum water-efficiency measures and incentives to be used in water conservation programs. BMPs vary depending on local or regional water-use characteristics and demand reduction needs.

Across California, water conservation is an integral part of water resource planning and a region-specific set of BMPs has been established for water conservation programs. In California, a BMP means a policy, program, practice, rule, regulation, or ordinance or the use of devices, equipment or facilities which meets either of the following criteria:

- An established and generally accepted practice that results in more efficient use or conservation of water;
- A practice that has proven significant conservation benefits; is technically and economically feasible and environmentally or socially acceptable; and not otherwise unreasonable for most water suppliers to carry out.[1]

In order to collect a robust selection of BMPs to consider for use within the DWC service area, the Working Group first reviewed BMPs used in California. These BMPs were identified by the California Urban Water Conservation Council, which was created to increase efficient water use statewide through partnerships among urban water agencies, public interest organizations, and private entities. The Council's goal is to integrate urban water conservation BMPs into the planning and management of California's water resources.

BMPs included those that signatory water suppliers committed to implementing keeping in mind that a single implementation method for a BMP would not be appropriate for all water suppliers and that other signatories are already implementing some BMPs. In California, "implementation" means achieving and maintaining the staffing, funding, and in general, the priority levels necessary to achieve the level of activity called for in each BMPs definition, and to satisfy the commitment by the

1 Memorandum of Understanding Regarding Urban Water Conservation in California, Ammended June 13, 2007.

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signatories to use good faith efforts to optimize savings from implementing BMPs.

The California BMPs include:

- Water survey programs for single-family residential and multi-family residential customers
- Residential plumbing retrofits
- System water audits, leak detection and repair
- Metering with commodity rates for all new connections and retrofit of existing connections
- Large landscape conservation programs and incentives
- High-efficiency clothes washing machine financial incentive programs
- Public information
- School education programs
- Conservation programs for commercial, industrial and institutional (CII) accounts
- Wholesale agency assistance programs
- Retail conservation pricing
- Coordinator
- Water waste prohibitions
- Ultra low-flush toilet replacement program

After reviewing the California BMPs, the DWC Working Group widened its lens to consider water conservation programs being implemented by the following entities/regions, as listed below and shown in Figure 14:

- Denver, Colorado,
- Toronto, Canada,
- West Basin Municipal Water District, California, and
- East Bay Municipal Utilities District, California

All of these utilities face immediate and costly challenges with respect to water and are using water conservation as one approach to address the challenges. Highlights of their efforts are summarized on the following pages.

Figure 14: Example Water Conservation Program locations.

Denver Water

Denver, CO

With a service population of 1.3 million people, Denver Water implemented a water conservation strategy as a result of a combination of regulatory concerns and water shortages. The ultimate goal was to reduce water usage to 165 gallons per capita per day by 2016. In order to meet this goal, it was determined that customers would need to reduce their individual use by a total of 12,700 million gallons (MG) of water. Denver Water approached reaching this goal using three different methods in combination. The first method was to implement 3,200 MG permanent demand reductions during a drought. The next method was a 1,400 MG reduction in water use planned through conservation-oriented water rates. The final technique implemented was a "Tap-Smart Plan" which aims to achieve 8,100 MG of demand reductions. The tagline for the Tap-Smart Plan is "Use Only What You Need." Denver water reinforces their program by using this tagline of advertisements across the City – as pictured in the photograph below.

An example of Denver Water's conservation advertising

The Tap-Smart Plan asks that Denver water users eliminate water waste and share fairly the responsibility of water conservation. The intent of the plan is to create positive benefits for the future including higher reservoir levels, drought reserve, higher volumes of water in rivers and streams, agricultural support, increased water-based recreation and improvements in the general environment. Conservation measures in this Tap-Smart Plan cover seven main categories, including:

- City and County of Denver government programs
- Education and Outreach
- Diagnostics
- Rebates and Incentives
- Rules
- Research, Monitoring and Evaluation
- General Administration of all the measures.

City of Toronto

Toronto, Canada

With a service population of 2.59 million people, a water efficiency plan was implemented in the City of Toronto to reduce the capital costs associated with new water supply and wastewater facilities and monitor those water efficiency measures that are expected to reduce peak day water demands and wastewater flows.

The ultimate goal of the plan was to develop a City-wide Water Efficiency Plan containing a set of acceptable water efficiency measures and an implementation plan that is expected to reduce water use, including water loss, in the most cost-effective way.

City of Toronto Annual Water Conservation Report

By 2011, the City expects to reduce the peak day demand by 73 million gallons per day (MGD) to provide capital infrastructure reductions in water treatment supply. The City also expects to reduce wastewater flow by 23 MGD by 2011 to provide capital infrastructure reductions in wastewater collection and treatment.

The City selected various conservation measures that differ based on the type of water user, specifically:

Single Family Residential

- Toilet Replacement
- Clothes Washer Replacement
- Outdoor Water Audit

Multi-Unit Residential

- Toilet Replacement – Public
- Toilet Replacement – Private
- Clothes Washer Replacement
- Outdoor Water Audit

Municipal

- System Leak Detection
- Computer Controlled Irrigation

Industrial, Commercial and Institutional

- Toilet Replacement
- Clothes Washer Replacement
- Indoor Water Audits
- Outdoor Water Audits

West Basin Municipal Water District

Los Angeles, CA

The West Basin Municipal Water District (West Basin) is a public agency that purchases imported water from the Metropolitan Water District of Southern California (MWD) and wholesales the imported water to cities and private companies in southwest Los Angeles County. With a service population of 0.9 million people, West Basin implemented a water conservation strategy due to various water shortages. The ultimate goal of the conservation plan is to meet 12% of customer water demand through conservation practices by 2015.

West Basin Water Conservation Master Plan

Since the 1990s, West Basin has been implementing aggressive water conservation programs to help residents and businesses use water more effectively. Their programs have emphasized such tools as education, legislative advocacy, community outreach, partnerships, grantsmanship, rebate incentives, and plumbing retrofit hardware. These programs, together with passive conservation measures such as updated plumbing and building codes, have directly resulted in significant reductions in retail water use within West Basin's service area. The District selected various conservation measures that differ based on the type of water user, specifically:

Residential

- High Efficiency Toilet Distributions and Rebates
- Residential High Efficiency Clothes Washer Rebates

Commercial

- Incentives
- Complete Restroom Retrofit
- Pre-Rinse Spray Valve Installs
- Comprehensive Laundromat Program
- Industrial Process Improvement
- Comprehensive Supermarket Program

Outdoor

- Smart Controller Distributions
- Ocean-Friendly Landscapes
- Residential and Professional Landscape Workshops

By current estimates, demand management conservation saves more than 4.5 billion gallons of imported water every year. This is equivalent to the amount of water used by almost 30,000 households in Southern California. West Basin's conservation programs include a variety of cost-effective measures that contribute to conserving water, improving water quality, reducing imported water needs and increasing the region's water supply reliability.

East Bay Municipal Utility District

San Francisco Bay Area, CA

With a service population of 1.3 million people, the East Bay Municipal Utility District (EBMUD) implemented a water conservation strategy due to water shortages. EBMUD supplies water and provides wastewater treatment for parts of Alameda and Contra Costa counties on the eastern side of San Francisco Bay in northern California. The ultimate goal of EBMUD's conservation plan is to achieve 35 million gallons per day (MGD) of cost-effective and sustained water savings over a 25-year period (1995-2020) while maintaining and improving savings resulting from previous conservation efforts.

East Bay MUD Landscape Water Conservation Guidance Manual

The EBMUD conservation plan uses four basic strategies, specifically, incentives, education, regulation and support. Incentives used by the EBMUD include water audits, rebates and conservation devices. EBMUD strives to educate their communities through presentations, publications, community events, displays and demonstration projects. New-service plan reviews and wastewater prohibition techniques have been used from a regulatory standpoint. Finally, EBMUD uses continual support techniques to meet their conservation goals including conservation related committee work, research, database development and program evaluation.

To date, EBMUD's conservation program has achieved 18 MGD of water savings.

Northeastern Illinois

The DWC Working Group next reviewed the water conservation efforts being considered by the Northeastern Illinois Regional Water Supply Planning Group (RWSPG) in cooperation with the Chicago Metropolitan Association for Planning (CMAP) and began fine-tuning the list of BMPs to those most applicable to Northeastern Illinois.

In May 2008, the RWSPG approved the "Regional Water Demand Scenarios for Northeastern Illinois: 2005-2050"[2].The approval of the report provides a point of common ground for the RWSPG to begin identifying water resource strategies for the Regional Water Supply Plan. The study presents future water-demand scenarios for geographical areas, which encompass groundwater withdrawal points and surface water intakes in the 11-county regional planning area of Northeastern Illinois (Boone, Cook, DeKalb, DuPage, Kane, Kankakee, Kendall, Grundy, Lake, McHenry, and Will). The study generated three water demand scenarios by major user sectors and geographical subareas within the region. The three scenarios represent water withdrawals under current or baseline demand conditions (CT scenario) as well as under less resource intensive and more resource intensive

2. B. Dziegielewski and F.J. Chowdhury. Regional Water Demands Scenarios for Northeastern Illinois: 2005-2030, Southern Illinois University Carbaondate. June 15,2008.

scenarios (LRI and MRI scenarios), which were extended to the year 2050.

The RWSPG also reviewed the California BMPs and provided feedback on which BMPs were applicable to the Northeastern Illinois region.

DWC Conservation Program Development

The Working Group's review of existing conservation programs as discussed above revealed that although many water utilities and regions had commonalities among their programs, there were an equal amount of unique components. The programs were different in large part due to program drivers (drought or limiting supply) and resources (available funding). The Working Group decided that for the DWC, a custom water conservation program should be created which takes into consideration the current level of understanding and awareness of water conservation in Northeastern Illinois. To do this, the group started with a basic list of water conservation measures and incentives and packaged them together to form a program that would meet the specific needs of the DWC and its Member Utilities.

A conservation measure is the device or practice that results in a more efficient use of water and reduces water demand. Conservation measures can be grouped into two main categories:

- Hardware devices or equipment
- Behavior or management practices

Examples of water conservation measures include:

- Residences: low-volume toilets (hardware), wash only full loads of laundry or dishes (behavior)
- Water utilities: leak detection and repair (hardware), service and adjust valves and connections (behavior)

Conservation measures can be further divided into categories based on the type of water use they reduce. The Working Group categorized conservation measures into three additional groups :

- Indoor measures
- Outdoor measures
- Unaccounted-for-flow measures

A conservation incentive increases customer awareness about the value of reducing water use and motivates water users to implement conservation or efficiency measures. Conservation incentives are grouped into three main categories:

- Educational
- Financial
- Regulatory

Examples of water conservation incentives include:

- Educational: bill inserts, radio and TV advertisement
- Regulatory: water-efficiency policies and ordinances

The Working Group created a list of the conservation measures and incentives they deemed generally appropriate for conservation programs in Northeastern Illinois. The list is shown below:

Conservation Measures

Hardware - Indoor

- High efficiency toilets
- Toilet retrofit devices for high-volume toilets
- Low flow shower head
- Low flow faucets
- Faucet retrofit with aerators
- Low flow or waterless urinals
- Urinal retrofit devices
- High efficiency washing machine

- Water efficient dishwashers
- Leak detection tablets
- Shower timer

Hardware - Outdoor

- Rain barrels and cisterns for rainwater harvesting
- Automatic shutoff nozzles for hand-held watering
- Flow-control devices for manual sprinkling
- Sprinkler with variable spray patterns and low precipitation rates
- Soaker hoses
- Shutoff devices activated by rainfall
- Rain gauges
- Irrigation system controllers (for automatic in-ground sprinkler and drip systems)
- Soil moisture sensors and probes
- Drip irrigation systems
- Practical turf areas
- Native and drought tolerant turf grasses
- Native and drought tolerant plants
- Soil improvements
- Mulches
- Recirculating water fountains and decorations
- Pool and pond covers
- Grey water/treated effluent reuse for irrigation

Behavior / Management Practice - Indoor

- Turning off the faucet while brushing teeth
- Washing dishes when machine is full
- Load dishes without rinsing first
- Washing clothes in a full load only
- Restaurants to provide water on request only
- Limit shower time
- Fix leaking fixtures
- Self-performed water audit and selection of areas to improve water efficiency/ conservation

Behavior / Management Practice - Outdoor

- "No Watering" option
- Check for and repair leaks
- Use containers for small areas and individual plants
- Proper irrigation scheduling to maximize efficiency
- Monthly adjustment of irrigation system controllers
- Maintenance of sprinkler components
- Sprinkler distribution uniformity
- Design new landscapes with water-wise planning and design principles
- Limit turf to functional areas
- Use separate irrigation systems for different hydrozones
- Replace nonfunctional turf areas with low-water-use alternative ground cover and plants
- Proper maintenance of water-efficient landscapes
- Perform landscape water audits

Hardware - Unaccounted for Flow

- Leak detection and repair
- Water audit
- Meter testing and repair

Behavior / Management Practice - Unaccounted for Flow

- Add per capita calculator on water bills and track past and average usage
- Billing system set to look for spikes or non-typical usage
- Meet with top users a few times per year to evaluate/identify areas for improvement in conservation
- Limit water waste during tank cleaning and repair
- Limit water waste in the water quality laboratory
- Tighten valves
- Repair leaks at pump station facilities
- Repair leaks in distribution main
- Grey water/treated effluent reuse for street cleaning
- Capture/reuse of water from hydrant flushing

Conservation Incentives

Education - Indoor

- Sticker, logo, flag or other insignia that communicates participation in program
- Feature information on participating residences, businesses and utilities in newsletters, bill-stuffers and websites
- Education on benefits & value of replacing high-water usage fixtures/devices
- Displays at hardware and home improvement stores on indoor water efficient devices / equipment
- Education programs at hardware and home improvement stores on indoor water efficient devices
- Tips on how to find and fix leaks for homeowners and businesses
- Redesigned bills that include historical water use and calculation for gallons/ person/day
- Education for landlords on water and money saving practices for indoor facilities
- Demonstration projects for indoor water efficiency
- Education focused on students
- Award or recognition to customers for participation in pledge program

Education - Outdoor

- Sticker, logo, flag or other insignia that communicates participation in program
- Redesigned bills that include historical water use and calculation for gallons/ person/day
- Education on proper lawn watering and maintenance
- Education on native and drought tolerant landscaping specific to local area
- Education on how to pick smart irrigation systems for customers with reduced pressure zone (RPZ) backflow preventers
- Scorecard for outdoor water users with significant turf areas for large non-residential facilities
- Displays at hardware and home improvement stores on outdoor water efficient devices / equipment
- Featured sale and marketing of native and drought tolerant plants and grasses by hardware and home improvement stores
- Demonstration projects for outdoor water efficiency
- Education sessions at hardware and home improvement stores on outdoor water efficient devices
- Marketing of rain barrels and green stormwater management principles by partnering with gutter cleaning/repair companies
- Education on how to find and fix leaks in landscape irrigation systems
- Education for landlords on water and money saving practices for outdoor facilities
- Collaborate with landscape architects/ designers
- Education focused on students
- Provide award or recognition to customers for participation in pledge program

Education – Unaccounted-for-Flow

- Sticker, logo, flag or other insignia that communicates participation in program
- Information on leak detection and repair technologies
- Information on standard utility management practices to handle unaccounted for flow
- Education on financial return for water loss management activities and cost of not implementing practices
- Information on case studies/demonstration projects
- Provide award or recognition to utilities for participation in pledge program

Regulation - Indoor

- Require minimum standards for water efficient fixtures and appliances as part of permit process for new construction or renovations on existing structures
- Laws and plumbing codes for water-efficient fixtures and appliances

Regulation - Outdoor

- Require minimum standards for water efficient landscaping and landscaping irrigation systems as part of permit process for new construction or renovation on existing structures
- Ordinance for alternate water management scheme
- Ordinances requiring efficient irrigation systems for new landscaping
- Ordinances requiring all irrigation systems to have “rain shutoff devices”
- Penalties for outdoor water waste
- Pollution prevention requirements

Regulation - Unaccounted for Flow

- Require true unaccounted for flow targets as part of agreement with DWC
- Contractor compensation based on water savings achieved

Financial - Indoor

- Rebate for purchase of low flow devices (toilets, shower heads, washing machines, etc.)
- Bill credits
- Conservation rate structures
- Surcharge fees
- Cost sharing with other utilities and businesses

Financial - Outdoor

- Rebate for purchase of low flow devices and replacement of existing turf with native and drought tolerant turf grasses, plants
- Bill credits
- Conservation rate structures
- Surcharge fees
- Cost sharing with other utilities and businesses

Financial - Unaccounted for Flow

- Bill credit for meeting unaccounted for flow target

The Working Group evaluated these potential conservation measures and incentives to determine which should be included in the DWC Water Conservation and Protection Plan. A detailed discussion of this process and the selected program elements is provided in Section 4.

Section 4: Conservation Measure Evaluation Framework

In order to further screen the list of conservation measures outlined in Section 3, the Working Group first developed 'Must Have' criteria. It was determined that if a particular measure did not meet these initial rules, the measure would be eliminated from consideration. These 'Must Have' criteria are as follows:

1. Relatively easy to implement
2. Provide educational benefit
3. Socially acceptable

Next, screening criteria were identified as the basis for assessing and prioritizing conservation measures that passed the initial 'Must Have' criteria. The Working Group also developed metrics and weighting factors for each of the screening criteria.

A preliminary list of criteria included:

- Benefit towards goals based upon how much water would be saved as a result of the specific measure;
- Current level of use measured qualitatively with respect to how much the particular measure is currently being implemented; and
- Difficulty or cost expressed in terms of implementation costs, including costs related to required organizational changes.

These criteria were selected because they address three different factors that would contribute to the success of the measure. A conservation measure must lead to a reduction in water otherwise it will not contribute to the overall conservation goal. Another way to look at a measure is how many people will actually implement it. The measure will not reduce water use if people do not apply it. Finally, the program will make the largest impact in reducing water if there is potential for a significant increase in use of the measure.

These criteria and their assigned metrics for ranking purposes are shown in the following table.

	Ranking/Metrics		
Criteria	**1**	**2**	**3**
Benefit towards Goals	Minimal Water Savings	Measurable Water Savings	Significant Savings
Current Level of Use	Significant	Some	None
Difficulty or Cost	Major behavior change or high cost	Inconvenient change or moderate investment	Low effort or low cost

Weighting factors provide an additional means for assigning a level of importance to each criteria. The Working Group assigned levels of importance of equal value for each of these criteria as shown below, but, it is understood that these weights may vary for each community participating in the program.

Criteria Weight / Level of Importance	
Benefit towards Goals	33%
Current Level of Use	33%
Difficulty or Cost	34%

Using this approach, the DWC Working Group developed a preliminary prioritization by scoring and weighting potential conservation measures. Essentially, the model multiplies the score for each each criterion by the weight, or level of importance, assigned to each criterion, to derive a composite score for each conservation measure. A sample of the spreadsheet scoring is shown below.

	Measure	*Benefit towards Goals*	*Current Level of Use*	*Difficulty or Cost*	*Total*
		33%	**33%**	**34%**	**100%**
Indoor Hardware	High efficiency toilets	3	2	2	**2.3**
	Toilet retrofit devices for high-volume toilets	2	3	3	**2.7**
	Low flow shower head	2	2	3	**2.3**
	Low flow faucets	2	3	2	**2.3**
	Faucet aerator retrofit	1	3	3	**2.3**
	Low flow and waterless urinals	3	3	1	**2.3**
	Urinal retrofit devices	2	3	2	**2.3**
	High efficiency washing machines	3	3	1	**2.3**
	Water efficient dishwashers	1	2	2	**1.7**
	Leak detection tablets	2	3	3	**2.7**
	Shower timer	1	3	3	**2.3**
	Tankless water heaters	2	3	1	**2.0**

The scores in the tool are color-coded for ease of recognition as follows:

- Measures with a total weighted score below 2.0 are not shaded.
- Measures with a total weighted score between 2.0 and 2.5 are shaded in light green.
- Measures with a total weighted score between 2.5 and 2.9 are shaded in bright green.
- Measures with a total weighted score above 2.9 are shaded dark green.

The DWC Working Group used the tool to evaluate the conservation measures listed previously. After discussion among the group, a set of conservation measures and incentives were selected for inclusion in the WCAPP. They were grouped and organized to form four water conservation education programs. As discussed previously, education is a primary goal of the WCAPP. For this reason, the separate education programs all combine some tangible water conservation hardware measure with a significant education component. The conservation measures selected for implementation by the DWC are listed on the following pages.

Program 1 – Water Pledge

Purpose: To increase awareness about water conservation by asking DWC Member Utilities and customers to make a pledge to conserve water and providing a framework for evaluating progress and giving recognition and rewards.

Program 2 – Residential Leak Detection and Repair

Purpose: To promote efficient water use by providing customers with leak detection tablets and educational materials on how to fix toilet leaks

Program 3 – Rain Gauge and Landscape Irrigation

Purpose: To promote proper landscape irrigation practices by providing rain gauges and educational materials to customers on when to water outdoor plants and turf and how much water they require.

Program 4 – Rain Barrel

Purpose: To promote rain water harvesting by providing rain barrels and educational materials to DWC Member Utilities for use as education tools for their customers.

Detailed descriptions of these programs are included in the next section. These four items, together with educational materials and resources, are the water conservation program elements that the DWC will promote to heighten overall awareness of water conservation among Member Utilities. Member Utilities will be encouraged to support these programs and implement other conservation measures for their service areas, based on their specific needs. The Water Conservation Measure Evaluation Tool used by the DWC Working Group is available for Member Utilities to use in prioritizing their own measures. An example Conservation Measure Evaluation spreadsheet is illustrated in Appendix F and can be accessed through the link provided, or from the compact disc accompanying this document. Member Utilities are encouraged to complete the evaluation in a group setting that includes representatives from affected stakeholders.

➲ **TOOL**
Conservation Measures Evaluation Spreadsheet

Section 5: WCAPP Implementation Plan

The DWC Working Group has developed the WCAPP to provide the tools and resources for DWC Member Utilities to deliver a consistent message about water conservation to water users in DuPage County. An implementation program has been developed to clearly lay out the schedule and major milestones for program implementation. The key stages of program implementation include the following:

- Leadership Acceptance
- Resource Development
- Utility Inclusion
- Conservation Education Programs

These key program stages are illustrated in the schedule on the following page.

A Leadership Acceptance

The first step to program implementation is to present the conservation program plan to three main stakeholder groups. These include the DuPage Water Commission, the DuPage Managers and Mayors Conference, and DuPage County. A presentation will be made to each group to gain buy-in and approval of the proposed water conservation program plan. The endorsement of the conservation program by these three groups is a milestone that must be reached before moving forward with the rest of the program.

The presentations will be scheduled for the first eight weeks of 2009.

B Resource Development

With approval from the stakeholders, development of the resources to be delivered in 2009 will begin. Resources will be developed in two main categories: education materials and model ordinances. The resources will be fully developed before being introduced to the Member Utilities.

The resources are scheduled to be complete by the end of the 2nd quarter of 2009.

C Member Utility Inclusion

The third stage in the WCAAP Implementation Plan is to engage the Member Utilities in implementation activities. It is recommended that an initial preview meeting be scheduled with Member Utility representatives to present the finalized conservation program overview and provide an introduction to the resources that will be available. Representatives will also be able to give input and feedback.

Upon completion of the resource package, a formal roll-out will be made to the Member Utilities. The roll-out will be intended to provide the program details, schedule and a description of the resources that will be provided by DWC to the Member Utilities. As part of the roll-out, a workshop will also be scheduled to train key Member Utility staff on the specific program components,

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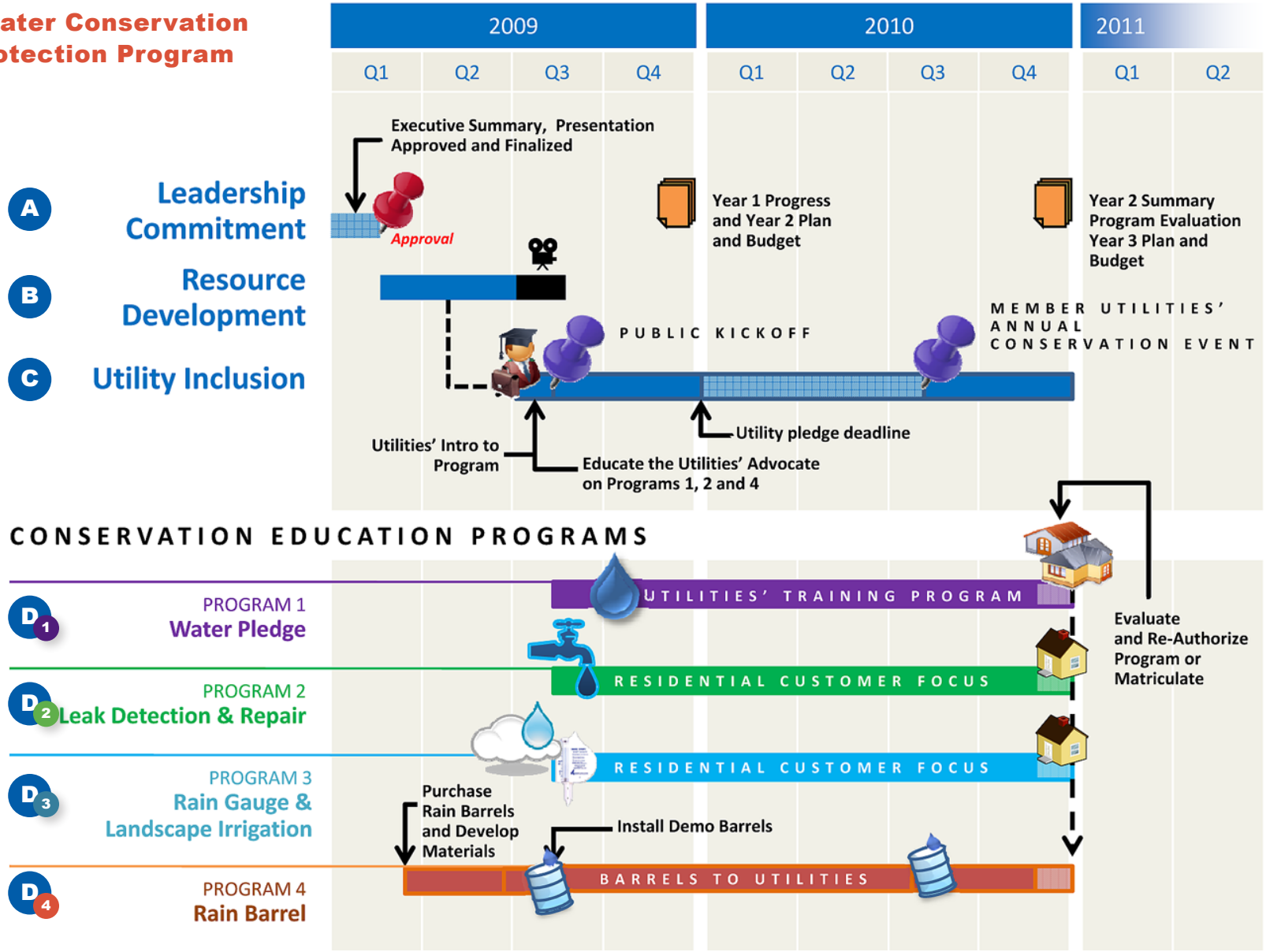
DWC Water Conservation and Protection Program



provide answers to frequently asked questions, and provide guidance regarding the administration of the program. It is the intention of the DWC to equip its Member Utilities with the resources and support to successfully implement the WCAPP with their customers.

Member Utility inclusion is scheduled to start at the beginning of the 3rd quarter 2009 with initial meetings and workshops to be completed within six weeks of commencement. Working with the Member Utilities will be an ongoing process and is intended to continue throughout the duration of the program. Monthly or bi-monthly contact will be made with the Utilities to check on progress, answer questions, and recruit additional Utilities to participate in the program.

D Conservation Education Programs

The water conservation education program will have an official public kick-off after the initial Member Utility inclusion/training has been completed. It is anticipated that this event will take place in the third quarter of 2009.

The specific conservation education programs to be implemented as part of the DWC WCAPP are described in detail on the next few pages. Member Utilities will be encouraged to select additional conservation measures and incentives that they would like to promote with their individual customers to complement these programs.

Residential Focus. The intention of the DWC Conservation Program is to first focus on residential customers, since residential water use accounts for more than 70% of the total use by DWC Member Utilities. The programs described in detail are primarily focused on residential customers, although they may be applicable to non-residential customers. These education programs will be evaluated after the first two years of the program to determine whether and how the DWC can extend the programs to non-residential customers. For this reason, there is not a defined schedule for the 3rd year of the program at this time.

D1 Program 1 – Water Pledge

Purpose: To increase customer awareness about water conservation by asking customers to make a pledge to conserve water and providing a framework for evaluating progress and giving recognition and rewards.

Timeframe: Water Pledge kit developed 1st-2nd Quarter 2009; Provided to Member Utilities for general public roll-out in 3rd Quarter 2009

Resources: Description of the program, template conservation pledge text, application for participation, and decal/sticker for recognition of participation.

Program Description: The goal of the water pledge program is to bring attention to water conservation in DuPage County and solicit commitments to implemention of conservation BMPs by utilities and their customers. The initial focus of this program will be DWC Member Utilities and residential water users in DuPage County. Separate pledge documents and guidelines will be established for Member Utilities and residents.

The Member Utility pledge will formalize their participation in the DWC Water Conservation Program and consists of a commitment to work towards a specific unaccounted-for-flow goal and promote or distribute materials about the program provided by DWC. They will also be encouraged to customize the conservation templates provided and identify a local champion for water conservation for their customers. Member Utilities will be presented with a list of best management practices for reducing unaccounted-for-flow and the water conservation education programs provided by DWC. Each Member Utility will be asked to fill out a form that indicates which BMPs and education programs they will be participating in and/or promoting. Member Utilities are expected to participate in reducing unaccounted-for-flow as a minimum and are highly encouraged to participate in the other programs as well.

A utility training and education process will be established to explain the details of the Water Conservation Program and outline the water conservation pledge requirements. Regular outreach will be made to the Member Utilities to track progress, answer questions, and work towards adoption of the pledge by all Member Utilities by the end of

2009. Each Member Utility will be asked to submit an annual progress report on their conservation program efforts to the DWC.

Template materials will also be provided to the Member Utilities for a residential water pledge program. The residential water pledge will provide background information on typical daily water use and ways that individuals can save water. To participate in the pledge, residents will select items from the list of conservation tips and make a commitment to reducing water use in those areas. Member Utilities will be asked to manage the list of their customers who have made the pledge. Upon receipt of the Water Conservation Pledge forms, Member Utilities will be encouraged to send applicants a sticker or decal with the logo of the program to indicate they have made the pledge.

Annual recognition will be given to Member Utilities by DWC for their participation in the pledge program. DWC will also work with the Utilities to provide recognition to residents who have made pledge participation.

D2 Program 2 – Leak Detection and Repair

Purpose: To promote efficient water use by providing customers with leak detection tablets and educational materials on how to fix toilet leaks

Timeframe: Conservation kit developed 1st-2nd Quarter 2009; Distribution as part of general public roll-out to in 3rd Quarter 2009

Resources: Leak Detection and Repair Kit will include two leak detection tables, a pamphlet on how to use the tables, and tips to fixing common toilet leaks.

Program Description: The leak detection and repair program focuses on reducing indoor, residential water use associated with toilets. The program combines leak detection tablets (hardware) with the information on how to fix toilet leaks (education) to result in reducing water waste due to leaking toilets. This program is considered to be a cost effective and time efficient way to reduce indoor water use. Toilets are typically the largest source of indoor residential water demand, making up approximately 26.7% or 18.5 gallons per person per day for a typical non-conserving single family home[1].Toilet leaks are common and can range from a couple of gallons to more than 100 gallons per day per leaking toilet. Toilet leak repairs are inexpensive compared to the purchase and/or installation of a new toilet.

This program is also intended to have a significant element of education. In many cases the toilet leaks are undetectable by the naked eye without the help of the leak detection tablets. Adults and children can both be part of the process to test the toilets in their house and can increase their awareness of water conservation opportunities from the experience.

Leak detection and repair kits will be provided the general public and to Member Utilities by the DWC. Member Utilities will also be provided with information on the purchase of additional leak detection and repair kits directly from the supplier.

1 Mayer et al, Residential End Uses of Water, pp. 107-108

D3 Program 3 – Rain Gauge and Landscape Irrigation

Purpose: To promote proper landscape irrigation practices by providing rain gauges and educational materials to customers on when to water outdoor plants and turf and how much water they require.

Timeframe: Conservation kit developed 1st-2nd Quarter 2009; Distribution as part of the general public roll-out in 3rd Quarter 2009.

Resources: Rain Gauge and Landscape Irrigation Kit to include one rain gauge and a pamphlet on proper landscape irrigation practices.

Program Description: The rain gauge and landscape irrigation program focuses on reducing outdoor water use associated with landscape irrigation. This program combines a conventional rain gauge (hardware) with a pamphlet on proper landscape irrigation practices (education) to result in reducing water use from wasteful outdoor water use. The rain gauge can be used to measure the amount of rain that has fallen. This hardware is combined with regionally specific information on the proper quantity and duration required for irrigating local landscapes. Proper implementation of this program has the potential to significantly reduce outdoor water use for participating customers.

This program was selected because it addresses the largest component of outdoor water use for the average residential customer. On average, 80 - 90% of the outdoor component of residential water use goes to watering lawns, plants and gardens.[2] Poor irrigation scheduling, such as watering too often or for too long, is the primary source of water waste associated with landscape irrigation. This program directly addresses both of these components of water waste associated with irrigation scheduling.

Rain gauge and landscape irrigation kits will be provided to the general public and Member Utilities by the DWC as part of its public outreach efforts. Member Utilities will also be provided with information on the purchase of additional kits directly from the supplier.

2 Amy Vickers, *Handbook of Water Use and Conservation*, Amherst, MA, 2002. pp 141

D4 Program 4 – Rain Barrel

Purpose: To promote rain water harvesting by providing rain barrels and educational materials to DWC Member Utilities for use as educational tools with their customers.

Timeframe: Develop education materials and purchase rain barrels 1st-2nd Quarter 2009; Provide demonstration barrels to DWC Member Utilities 3rd Quarter 2009.

Resources: Rain barrels, including demonstration models, installation instructions and education signage.

Program Description: The rain barrel program focuses on reducing outdoor use of potable water associated with landscape irrigation through rainwater capture and reuse. This program combines a rain barrel (hardware) with a pamphlet on installation and common applications (education) and demonstrates opportunities to promote rain barrel use.

In a typical rain barrel installation, downspouts are connected to the rain barrel allowing rainwater to be collected and save for use at another time. Rain barrels come in a range of sizes with 75 gallons as a common capacity. A spigot at the bottom of the rain barrel is used to access water collected in the barrel. A garden hose can be connected to the spigot for easy access to the water. Multiple rain barrels can be connected together and installed at one location to increase capacity for rainwater collection.

As part of this program, DWC will purchase rain barrels and provide up to four units to each Member Utility. DWC will work the Member Utilities to identify locations to install the rain barrels where they will be visible to the general public and can be used to teach residents about rain barrel installation, use and maintenance. Member Utilities are encouraged to promote the use of rain barrels within their service areas by publicizing local business and organizations who sell rain barrels or by offering discounts to purchase the barrels. The DWC does not plan to include a rebate or purchase program for rain barrels to the general public in its conservation program. DWC may also purchase demonstration rain barrels which would be equipped with a piece of downspout and a pump to circulate water through the rain barrel. This "demo barrel" would be made available to the Member Utilities to serve as an education piece, and could be set up indoors or outdoors at community events.

Program Collateral

As part of the WCAPP Implementation effort, the DWC (with support of the Working Group) will provide Member Utilities with tangible collateral to support and promote the conservation program. Many of these items will be in electronic format and designed to be customized by the Member Utilities. DWC Member Utilities will also be encouraged to purchase or secure promotional materials for their own use.

Resources that the DWC will make available by the end of the 2nd quarter of 2009 include the following:

Advertising

- Press release introducing program
- Logo with conservation message
- Advertisement poster
- Flier on conservation program (overview)
- PowerPoint presentation on conservation program
- Newspaper / newsletter description announcing program
- Template for promoting/advertising conservation program

Education

- Flier on indoor water use tips
- Flier on outdoor water use tips
- List of conservation website resources
- Educational video
- Conservation Kit - Leak Detection (leak detection tablets and flier)
- Conservation Kit – Rain Gauge and Landscape Irrigation (rain gauge and flier)
- Water Conservation Pledge – application, instructions, and participation sticker/ certificate
- Demonstration Rain Barrel (for loan to Member Utilities, including signage and flier)
- Youth-focused activity sheet
- Utility Unaccounted-for-Flow Calculation form and BMP Checklist
- Utility water pledge and annual reporting form
- Utility training materials on program contents and administration

Model Ordinance

- Model ordinance for irrigation schedule schemes

- Model ordinance for low water use landscaping

Resources DWC Member Utilities could secure for their own use include:

Advertising

- Conference/event booth to promote conservation program

Education

- Direct mail literature
- Bill inserts
- List of conservation books
- Conservation library - books and videos
- Data on current trends and goals
- Handbooks for lawn watering practices and water efficient landscaping design
- Take-home materials for students on conservation
- Conservation curriculum for teachers
- Water use calculators
- Resource Lists – tailored to audiences
- Speakers Bureau – selected to match with BMPs that are the focus of the program
- Rebate coupons
- Conservation checklists developed for specific industries
- Fliers/handouts on WaterSense products and where to buy them
- Local workshops and training programs for specialized users
- Scorecard for self-evaluation of water use and potential savings

Model Ordinance

- Model ordinances/codes for water efficiency standards in new construction
- Model ordinances/codes for allowing grey water/treated effluent for irrigation or street cleaning
- Info on pricing models for utilities

The DWC will strive to provide appropriate levels of support for communities in order to provide success in their customized water conservation programs. The Working Group will continue to seek an understanding of each community's needs to identify issues common to multiple communities and determine how these needs can be addressed in the most cost-effective manner. It is expected that these conversations be held annually as the Member Utilities provide an update of their progress on the program to DWC.

Section 6: Change Enablement

Implementing a water conservation program requires that water utilities and their customers make changes to their behavior. The following section provides guidance and recommendations for leading the required change for both groups. In this section, 'internal change,' refers to changes at the Utility level, while 'external change,' refers to the general public's necessary behavioral changes.

Internal Change Enablement

Change enablement is defined as the deliberate, disciplined attention to "the people side of change". Change enablement facilitates the transition to new practices and behaviors that lead to the implementation and reinforcement of target strategies. For this particular effort, change enablement will be critical to confirm that internal staff at individual Member Utilities understand what is being proposed under each community's water conservation plan.

The building blocks of a successful change enablement program are: Organization and Change Assessment, Sponsorship, Communication, Training and Support. These building blocks are described in detail below. Experience shows that a formal change enablement process, applied in a comprehensive manner, can significantly improve the return on investment an organization makes in new practices. Successful change translates into more rapid and complete acceptance by staff of new tools and associated resources and therefore a faster and higher payback on investments. In this case these results translate into a greater chance of meeting water conservation goals.

The DWC will be heading up the overall Water Conservation Plan efforts and providing resources to Member Utilities. Individual Member Utilities will be urged to establish their own, unique water conservation program that appeal to their customers and specific needs and provide the changes needed to make increased conservation a routine practice among water users.

Organization and Change Assessments

Various tools are available to assess how ready a community is for change and the impact of changes on the community members. Other tools can reveal the formal and informal networks that exist within an organization and who the key individuals are who can influence the implementation of new practices and behaviors. Change readiness assessments will be made available to member communities for these purposes. The administration

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of the assessment tools at the beginning of the program and again at various intervals can provide trending data to track progress throughout the implementation process.

Sponsorship

Because even planned change can appear chaotic to staff, senior sponsorship and identification of a conservation advocate will be essential for the success of each Member Utility's Water Conservation Program. It will be key for each community's staff to understand the responsibility and authority they have for implementation of the proposed changes. As part of the change enablement efforts, it will be important for the senior sponsor and advocates to be clear champions for the changes and for the ensuing benefits. They should spearhead the celebration of milestones and recognition events connected to the changes underway. Establishing the appropriate advocate will be the responsibility of individual Member Utilities, while senior sponsors are anticipated to work with DWC staff to obtain resources. The conservation advocate should have the full support of utility management and be available to work closely with the DWC to implement the WCAPP for their customers.

Communication

Regular communications from the senior sponsor and conservation advocate will be essential to gain the support of water users for changes and to maintain clarity about such issues as the timing, who will be impacted, and how new practices and behaviors can be incorporated into daily routines. Communications are most effective when they are consistent in style, part of a continuous flow of information, and delivered by the appropriate sender. Studies have shown that audiences prefer to receive vision and strategy messages from executive leadership and information about specific impacts to them and their work from operational staff. This stresses the importance of the buy-in from individual Member Utilities, so that senior leadership at each utility can communicate important messages and goals to their staff and their customers.

Training and Support

Training that focuses on skills needed to be successful during and after the changes is essential to the success of a Member Utility's water conservation program. A comprehensive education program will equip staff with the knowledge and skills to succeed in the changed environment that each individual community envisions. It will be important to create complementary training programs to confirm that staff understands new procedures and their individual roles relative to them. Successful training programs are best followed by reinforcement programs to support staff as they endeavor to apply lessons presented in formal training sessions.

The DWC will provide training to key utility staff and develop materials to be used in training the broader set of water users. It is critical that utility staff fully understand the WCAPP and how they can contribute to its success.

Resistance Management

Providing staff and leaders with the ability to successfully lead, communicate and implement changes is important to achieve project implementation success. Despite other steps taken to engage an audience, change is almost always accompanied by some level of resistance. This resistance is a set of behaviors that strive to maintain the status quo. It is recommended that a plan be put in place to modify those forces maintaining the status quo. This produces less tension and resistance than increasing forces for change and so is a more effective change strategy. The plan should allow for proactive steps to be taken to diminish potential effects of resistance. Addressing and resolving resistance is a necessary aspect of successful behavioral transformation.

8-Step Process for Change

It is recommended that the DWC and its Member Utilities take into consideration John Kotter's 8-step process for change in both its internal and external change management efforts. These are as follows:[3]

- ***Establish a sense of urgency***
- ***Create a guiding coalition***
- ***Develop a vision and a strategy***
- ***Communicate the change vision***
- ***Empower people for broad-based action***
- ***Generate short-term wins to catalyze success***
- ***Consolidate gains and produce more change***
- ***Anchor new approaches in the culture***

3 John P. Kotter, "Leading Change". Harvard Business School Press: Boston, MA 1996

External Change Management through Public Outreach

Public outreach is change enablement for the public. Similar to the importance of internal change enablement, as discussed in the previous section, change enablement for the community-at-large is critical to ensuring that residents understand what is being proposed under each Member Utility's water conservation plan in order to ensure buy-in and integration into the day-to-day activities of each affected resident.

The public outreach program for each community will need to be customized to a Member Utility's unique culture and environment. The DWC will provide public outreach resources to communities for customization. In general, these resources will include educational materials, model ordinances, leak detection and rain gauge kits, demonstration rain barrels, and messaging and branding collateral. A list of resources is provided in Section 5.

A key resource that will be available to Member Utilities is a water conservation website developed and maintained by DWC. The website will be the clearing house for information on the DWC WCAPP and a site that Member Utilities can connect to from their websites. The Water Conservation website will also allow the public to see individual Utility water conservation activities as well as link to Member Utility sites.

Customizing Public Outreach Approach

The DWC is serving as the driver for the conservation program and is committed to working with the Member Utilities to get the information distributed to water users in DuPage County. Public outreach information and resources will be developed and provided to the Member Utilities for their use, as discussed in Section 5.

DWC will sponsor activities or partner with Member Utilities to hold public outreach events. At a minimum, the DWC will sponsor a water conservation event for the DWC Member Utilities that serves as the formal kick-off for the conservation program. It's anticipated that representatives from the DWC, DuPage Managers and Mayors, and DuPage County will be present at this event to formally endorse the program. Invitees also will include representatives from the DWC Member Utilities. DWC will have materials available describing the conservation program as well as conservation kits for distribution. The event will focus on generating energy around the water conservation program within DWC Member Utilities and serve as a launching point for other public outreach events.

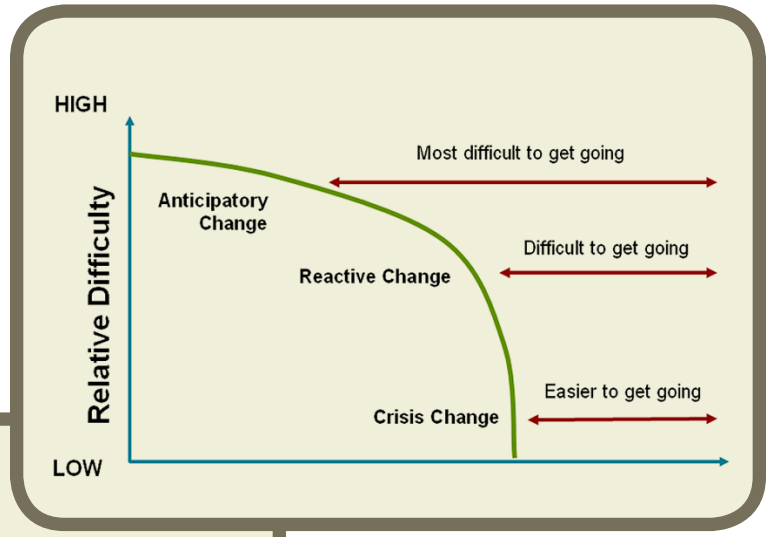
While developing a custom program, it will be important for each Member Utility to map out their individual needs to ensure program success. While the DWC will introduce the Water Conservation Plan and provide resources, it will

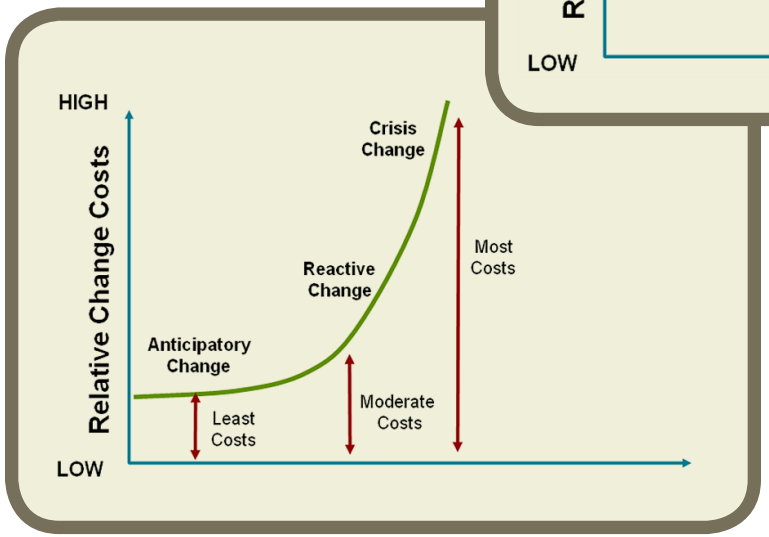
be the responsibility of each individual Member Community to develop their own program and potentially create new resources, if desired. Member Utilities are encouraged to publicly kick-off the conservation in their communities either by organizing a conservation-focused event or bringing the resources/materials on the program to currently scheduled public events. Recommendations will be provided to the Member Utilities on the types of events and resources available to promote the conservation program to the public.

It is realized that the urgency for change is not necessarily high at present. This makes it more difficult to deploy a program to promote change. However, past experience has taught that the cost of change is significantly higher when trying to deploy a program such as this in the midst of a crisis. This concept is supported by the two figures presented here.

Thus, the DWC is calling on its Member Utilities to take up the charge now to minimize costs and risks and maximize opportunities for the betterment of the collective good.

Change can be difficult to start when the perceived need for change is low.





Change is usually least expensive when addressed early and most costly when addressed during a crisis.

Section 7:
Performance Measurement Approach

Progress toward the WCAPP goals will be measured across all Member Utilities using a consistent and clearly defined set of metrics. This section outlines the process the DWC will use to measure progress and determine the success of the program. The DWC will also track progress towards the metrics they established in Section 1.

By end of 2009, it is desired that each Member Utility will complete their pledge to participate in the DWC WCAPP. An initial meeting and training session will be provided by the DWC where the WCAPP will be outlined. Included in the pledge will be each member's initial thoughts on how they will attempt to meet their commitment.

At end of year, when each Member Utility sets out to prepare their allocation annual report, there will be an additional page to be completed which will outline the conservation measures that the utility embarked upon. Specifically, utilities will be asked to indicate what they have done to contribute to the program's over-arching goal of reducing current DWC demand (in gpcd) by 10% in 10 years.

Participation in the WCAPP is not currently linked to the IDNR Lake Michigan Water Allocation Program. However, DWC views the WCAPP program as a proactive step to conserve water before additional legal requirements are established. It is the intention of DWC that success of the WCAPP will serve as a platform to increase discussions between the DWC, Member Utilities and IDNR regarding Lake Michigan water allocations.

"... the answer lies not in finding a single instant solution but in taking an incremental approach supported by market forces. Setting some objectives, doing what we know we can do, learning from experience, and then doing more.

This isn't an insoluble problem. We can find a solution. And we should start now."

Lord Browne
Group Chief Executive, British Petroleum
for the Council on Foreign Relations,
New York, 24 June 2004

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Appendix A: Glossary

American Water Works Association (AWWA): a professional organization serving the drinking water supply profession, primarily in North America.

Base indoor use: the typical amount of water accounted-for through metering or estimates and used by utility customers to meet normal, non-irrigation demands.

Best Management Practices (BMPs): a generally accepted conservation measures or incentives that directly or indirectly result in proven, beneficial, and cost-effective water savings - typically established by a water utility as baseline standards for minimum water-efficiency measures and incentives to be used in water conservation programs.

Change enablement: the deliberate, disciplined attention to "the people side of change".

Coalition: a combination or alliance.

Commodity rates: The monetary rate for water from a public supply.

Compact: an agreement – an example is the Great Lakes Basin Compact, an international covenant agreed to in 1968 established to manage water transfers into and out of the Great Lakes.

Conservation incentive: increases customer awareness about the value of reducing water use and motivates water users to implement conservation or efficiency measures.

Conservation measure: the device or practice that results in a more efficient use of water and reduces water demand.

Diversion: an alteration in the natural course of a stream for the purpose of water supply, usually causing some of the water to leave the natural channel.

Drip irrigation system: a type of microirrigation system that operates at low pressure and delivers water in slow, small drips to individual plants or groups of plants through a network of plastic conduits and emitters.

Drought: an extended period of below-normal precipitation that can result in water supply shortages, increased water demand or both.

Flow-control devices: Hardware that can be installed to restrict or control the flow on plumbing.

Hardware: plumbing fixture retrofit devices and other technology or equipment that can be installed.

High efficiency toilets: a toilet that uses no more than 1.6 gallons per flush.

Implementation: achieving and maintaining the staffing, funding, and in general, the priority levels necessary to achieve the level of activity called for in each BMP's definition, and to satisfy the commitment by the signatories to use good faith efforts to optimize savings from implementing BMPs.

Leak detection tablets: a method for identifying water leakage from pipes, plumbing fixtures and fittings.

Low-flow faucets: a faucet that uses no more than 2.5 gallons per minute at 80 pounds of pressure per square inch.

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Low-flow shower head: a showerhead that uses no more than 2.5 gallons per minute at 80 pounds of pressure per square inch.

Low-flow or waterless urinals: a urinal that uses no more than 1.0 gallons per flush.

Mission statement: a summary describing the aims, values, and overall plan of an organization or individual.

Model ordinance: a sample statute or regulation that can be used as an example for other city governments to customize and adopt; often is taken from a city government which has already enacted the statue or regulation.

Native plants: plants that are indigenous to an area and thus require little to no supplemental irrigation after becoming established.

Net Annual Pumpage: the total volume of water pumped within one year.

Outdoor water use: the amount of water accounted-for through metering or estimates and used by utility customers for seasonal outdoor activities related primarily to lawn irrigation.

Per capita water use: the amount of water used by one person during a standard period of time; in relation to water use, per capita is expressed as gallons per capita per day (gpcd).

Potable water: water fit or suitable for drinking.

Rain barrels: a barrel used as a cistern to hold rainwater.

Rain gauge: Any instrument designed to measure rain amount; includes recording, nonrecording, and rain-intensity gauges.

Rain water harvesting: the capture and use of runoff from rainfall and other precipitation.

Regional forecast: a water use forecast for a specified geographic area.

Residential water use: water use in homes.

Soaker hose: a porous tube that allows water to seep from it; used to irrigate plants. It is used to conserve water and to avoid wetting plant foliage.

Steering committee: A group of experts/stakeholders constituted in order to assist the competent authority in the decision-making.

Stewardship: a personal responsibility to taking care of or managing something; in the case of the environment, the U.S. Environmental Protection Administration has defined Environmental Stewardship as the responsibility for environmental quality shared by all those whose actions affect the environment.

Sustainable: meeting present needs without compromising those of future generations.

Unaccounted-for-flow (UFF): the difference between the amount of water supplied to a utility water system and the amount of customer water use that the utility can account for through metering or estimates.

Water allocation: the share or portion of Lake Michigan water allocated.

Water conservation: practices, techniques, and technologies that improve the efficiency of water use.

Water pledge: an individual commitment to protecting water resources today.

Watering restrictions: Rules limiting times and ways people can use water for outdoor irrigation.

Appendix B: Contact List

Title and Organization	Mailing Address	E-mail Address
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Joe Johnson, P.E. Vice President, Project Manager, MWH	MWH 175 W. Jackson Blvd., Ste. 1900 Chicago, Illinois 60604 Phone: (312) 831-3000, Fax: (312) 831-3889	Joe.Johnson@mwhglobal.com
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Appendix D:
Baseline Analysis Document

On the following pages we've provided the full text of the Baseline Analysis prepared for DuPage County.

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Baseline Analysis

DuPage Water Commission
Water Conservation Program
Elmhurst, Illinois

Overview

The mission of the DuPage Water Commission (DWC) is to provide reliable, quality, responsive, and cost-efficient Lake Michigan water service for existing and future customers as required by, or pursuant to, state statutes. The DWC is a water wholesaler, purchasing water from the City of Chicago and selling it to local water utilities in their service area of DuPage County, Illinois. The local water utilities then sell the water directly to residential, commercial and industrial customers. The DWC has initiated efforts to develop and implement a Water Conservation and Protection Program (WCAPP) for their service area. One of the initial steps in developing the WCAPP is a baseline analysis of the available water use and census data.

Data Analysis

The DWC maintains records of historical water use among its customers and produces an annual report summarizing this data for the DWC Board of Commissioners. The Illinois Department of Natural Resources (IDNR) also maintains historic data gathered from Annual Water Use Audit Forms (LMO-2) submitted annually by individual Lake Michigan water allocation permittees. The official regional forecast of population, households, and employment data for six Illinois counties, including DuPage, through the year 2030 is available from the Chicago Metropolitan Agency for Planning (CMAP). The aforementioned data was analyzed for the DuPage County customers and is summarized below.

- Total Number of Customers Served[1]: 28
- Total Population Served[2]: 746, 453
- Service Area Supplied: 300 square miles

Monthly Water Pumpage Data from May, 2007 – April, 2008

	Average Daily Flow (MGD)	Maximum Daily Flow (MGD)	Minimum Daily Flow (MGD)	Average Air Temperature (°F)
Average	87.1	101.8	75.4	64
Maximum	113.2	145.1	90.6	88
Minimum	73.5	77.5	65.4	34

[1] Illinois American Water Company (IWAC) subsidiaries are counted as one customer (there are seven IAWC subsidiaries).
[2] 2008 population data was calculated using a straight line projection from the approved CMAP population figures for the years 2000 and 2030. Population data is not available for Argonne National Laboratory and Illinois American Water Company.

10/17/2008

MWH
BUILDING A BETTER WORLD

The attached information including an overview map, summary table and nine figures summarizing selected data will be used by a Working Group established by the DWC to help develop the WCAPP. A brief description of each attachment is included below.

Figure	Description
A	Overview of major waterways, roadways and location of individual customers within DuPage County.
1	Summary of total daily usage from 1993-2006, including both average daily usage and maximum daily usage.
2	Comparison of total net annual pumpage with service population from 1990-2005.
3	Comparison of monthly water pumpage with average air temperature from May 2006-April 2008.
4	Comparison of population with per capita rates for the year 2008.
5	Net annual pumpage data for each customer from 1990-2005.
6	Summary of general water use for the year 2005; broken down into metered uses, unmetered uses and unaccounted-for-flow for each customer.
7	Summary of water use by category for the year 2005; broken down into residential, commercial/manufacturing, municipal, and construction water use for each customer.
8	Map which spatially identifies the populations and total flow in 2005 for DWC customers.
9	Map which spatially identifies the water use in 2005 by category for DWC customers.
10	Monthly Variation in Customer Water Usage from 2000 to 2008.
11	Comparison of estimated outdoor water use among DWC customers.

Table	Description
1	Summary of historic water use data including total volume pumped, allocations, population and per capita rates for the year 2007.

Discussion

The net annual pumpage has not changed significantly for the majority of DWC customers from 1990-2005, with the exception of Naperville. One major cause of the rapid increase in pumpage for Naperville is that the population of Naperville has increased significantly, by almost 50%, during this time period. Based on the available data, the average water pumpage is shown to be directly related to the average air temperature.

Among the 28 DWC customers, pumpage rates and water use by category vary significantly. For example, the total pumpage in 2007 by Naperville was 6,155 million gallons while that of Illinois American Water Company (Liberty Ridge East) was only 13 million gallons. Water use by category varies significantly, depending on the amount of residential, industrial or

commercial developments. For instance, almost 50% of water use in Itasca is attributed to commercial and manufacturing whereas in Glen Ellyn, almost 100% of the water use is residential based. Lombard uses over 20% of its water for municipal purposes. It is also assumed that newer residential customers will have lower water usage due to modern and more efficient customer appliances and fixtures, as well as relatively new system watermains. This information will need to be taken into consideration when determining appropriate conservation measures. See Figures 1-2 and Figures 5-10 for additional information on pumpage and water use.

Per capita water use is typically defined as the amount of water used by one person during a standard period of time; in relation to water use, per capita is expressed as gallons per capita per day (gpcd)[3]. For example, per capita residential use is equal to the residential water use divided by the total population served. Per capita residential use in the standard American household is estimated to average 101 gpcd[3]. However, per capita rates can fluctuate depending on the type of household dwellings. For instance, per capita use in multifamily dwellings tends to be less, ranging from 45-70 gpcd, due to little outdoor water use and fewer appliances and fixtures per person[3]. For this analysis, total water usage was divided by total service population to determine per capita rates. Per capita rates for DWC customers generally vary from 70 to 160 gpcd with a few outlier data points, including Oak Brook with 415 gpcd and Oak Brook Terrace with 58 gpcd. See Figure 4 for additional information.

Water use in typical municipal systems can be associated with various activities within the community served. For the purpose of this discussion, water will be described in terms of three major components:

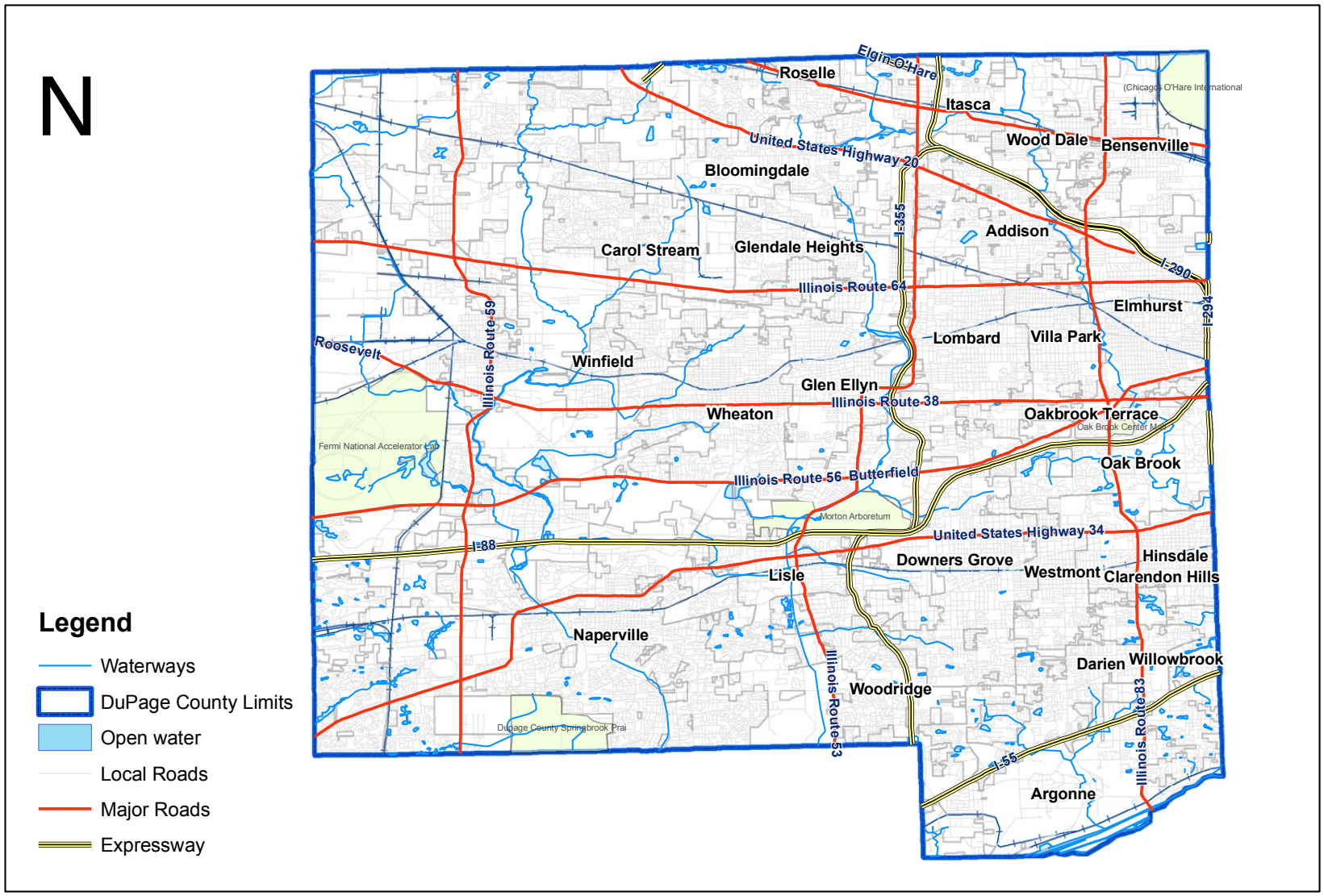
- Base indoor water use
- Outdoor water use
- Unaccounted-for-flow

Base indoor water use is defined as the typical amount of water accounted-for through metering or estimates and used by utility customers to meet normal, non-irrigation demands. Typical components of base indoor water use include indoor use by residential, institutional, commercial, industrial and municipal customers. Outdoor water use is defined as the amount of water accounted-for through metering or estimates and used by utility customers for seasonal outdoor activities related primarily to lawn irrigation. Unaccounted-for-flow (UFF) is defined as the difference between the amount of water supplied to a utilities water system and the amount of customer water use that the utility can account for through metering or estimates. UFF may consist of physical leakage or losses in a water system, unauthorized water use, or administrative losses resulting from metering or estimate errors.

[3] Reference: Vickers, Amy. Handbook of Water Use and Conservation. WaterPlow Press, 2001.

Unaccounted-for-flows generally hovers around 10% of total use for individual communities. Some communities, such as Hinsdale and Lombard, have higher UFF values around 15%, as shown in Figure 6. Communities with a high UFF will experience more water savings from utility focused investment measures, such as leak detection and water main replacement.

Outdoor water use, occurring primarily in the warm weather months, ranges from 5% (Bensonville, Argonne) to 40% (Oak Brook) of a community's annual water use. Potential water savings from outdoor efficiencies and water use restrictions will be greatest for communities with a high outdoor water use. Outdoor water use was calculated for each DWC customer under the assumption that outdoor use occurs primarily in the warm weather months (May - October). The average water use during cool weather months (November - April) is assumed to be a base demand that is exists throughout the year. The outdoor water use is calculated as the total yearly water use minus the base demand for 12 months. See Figures 3 and 11 for additional information.



MWH

Map A
DWC Customer Location Overview
DuPage Water Commission
Elmhurst, Illinois

Table 1
Historic Water Use - FY 2008 Totals

Customer	Code	Total Pumpage *x 1,000 gallons*	Total Allocation *x 1,000 gallons*	Total Allocation *MGD*	Percent of Allocation *%*	Population	Per Capita Rate *gal/person/day*
Addison	A	1,350,454	1,662,836	4.432	81.21%	36,532	101
Argonne Nat'l Lab	AA	168,906	276,670	0.758	61.05%	-	-
Bensenville	B	846,736	982,252	2.645	86.20%	20,317	114
Bloomingdale	C	898,459	1,043,663	2.815	86.09%	23,342	105
Carol Stream	D	1,403,643	1,666,671	4.425	84.22%	40,710	94
Clarendon Hills	E	298,984	272,590	0.776	109.68%	7,883	104
Darien	F	829,202	1,042,042	2.873	79.57%	23,060	99
Downers Grove	G	2,141,223	2,502,701	6.733	85.56%	51,391	114
DuPage County (SERWF)[1]	-	34,694	359,027	0.637	9.66%	-	-
Elmhurst	H	1,567,001	1,718,512	4.703	91.18%	42,993	100
Glen Ellyn	J	988,636	1,114,874	2.971	88.68%	28,234	96
Glendale Heights	I	1,002,408	1,085,204	2.986	92.37%	32,534	84
Hinsdale	K	1,027,357	979,383	2.706	104.90%	18,434	153
IAWC-Arrowhead	L	59,092	71,084	0.193	83.13%	-	-
IAWC- Country Club	L	33,827	41,793	0.111	80.94%	-	-
IAWC- DuPage/Lisle	L	188,097	216,660	0.579	86.82%	-	-
IAWC- Liberty Ridge East	L	11,621	21,777	0.069	53.36%	-	-
IAWC- Liberty Ridge West	L	100,986	85,528	0.047	118.07%	-	-
IAWC- Lombard Heights	L	20,553	66,104	0.334	31.09%	-	-
IAWC- Valley View	L	265,980	255,500	0.700	104.10%	-	-
Itasca	M	558,800	645,298	1.709	86.60%	8,863	173
Lisle	N	1,003,229	1,183,221	3.153	84.79%	22,329	123
Lombard	O	1,596,325	1,798,730	4.858	88.75%	44,258	99
Naperville	P	6,537,685	7,414,583	19.651	88.17%	137,630	130
Oak Brook	Q	1,350,102	1,529,077	4.184	88.30%	8,915	415
Oakbrook Terrace	R	58,816	93,715	0.248	62.76%	2,801	58
Roselle	S	688,438	831,931	2.246	82.75%	23,971	79
Villa Park	T	691,999	777,419	2.134	89.01%	22,340	85
Westmont	U	937,081	1,063,396	2.921	88.12%	25,125	102
Wheaton	V	1,904,747	2,163,392	5.881	88.04%	56,943	92
Willowbrook	W	421,969	489,196	1.307	86.26%	10,274	113
Winfield	X	332,059	409,263	1.074	81.14%	10,240	89
Wood Dale	Y	525,209	609,462	1.647	86.18%	13,613	106
Woodridge	Z	1,160,309	1,259,687	3.586	92.11%	33,723	94
TOTAL		31,004,627	35,733,241	96.092		746,453*	
AVERAGE		911,901	1,050,978	2.826	82.67%	29,858**	106**

[1]DuPage County Service began in January, 2008.
*Total does not include Illinois American Water Company, DuPage Country Water Service, or Argonne National Laboratory.
**Total does not include Illinois American Water Company, DuPage Country Water Service, or Argonne National Laboratory. Additionally, the outlier data points corresponding to Oak Brook and Oak Brook Terrace have been removed from the avergae per capita rate.

Data Source : DuPage Water Commission Historical Water Usage Data (Website)

DuPage Water Commission
Total Historical Daily Usage (MGD)

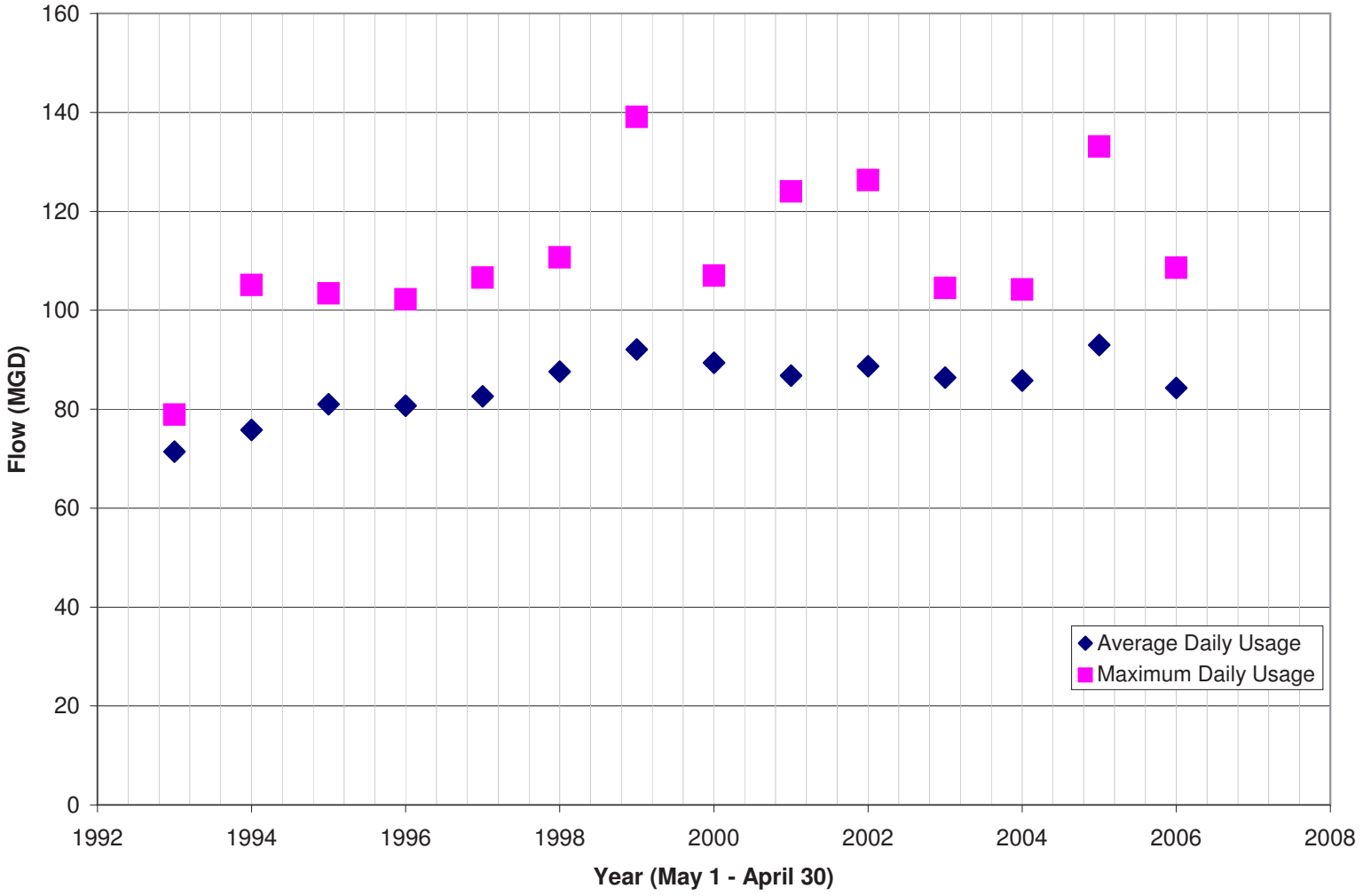
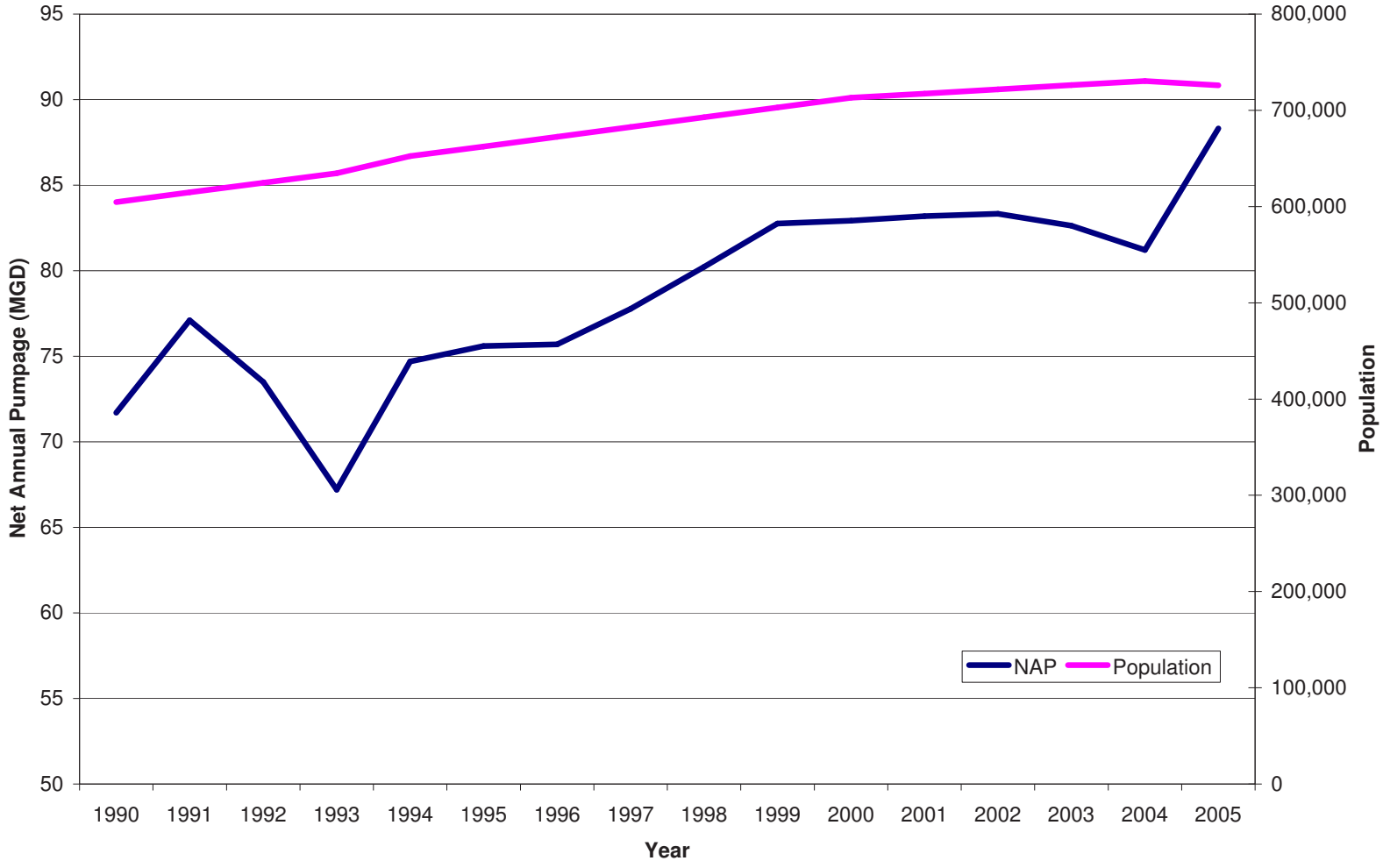


Figure 1

Data Source: Illinois Department of Natural Resources - Water Use Data (LMO forms)

DuPage Water Commission
Total Net Annual Pumpage vs Population Served*
1990-2005



*Does not include data for Argonne National Laboratory, DuPage County (SERWF) and Illinois American Water Company.

Figure 2

Data Source: DuPage Water Commission - 2007-2008 Annual Report

DuPage Water Commission
Water Pumpage vs Average Air Temperature

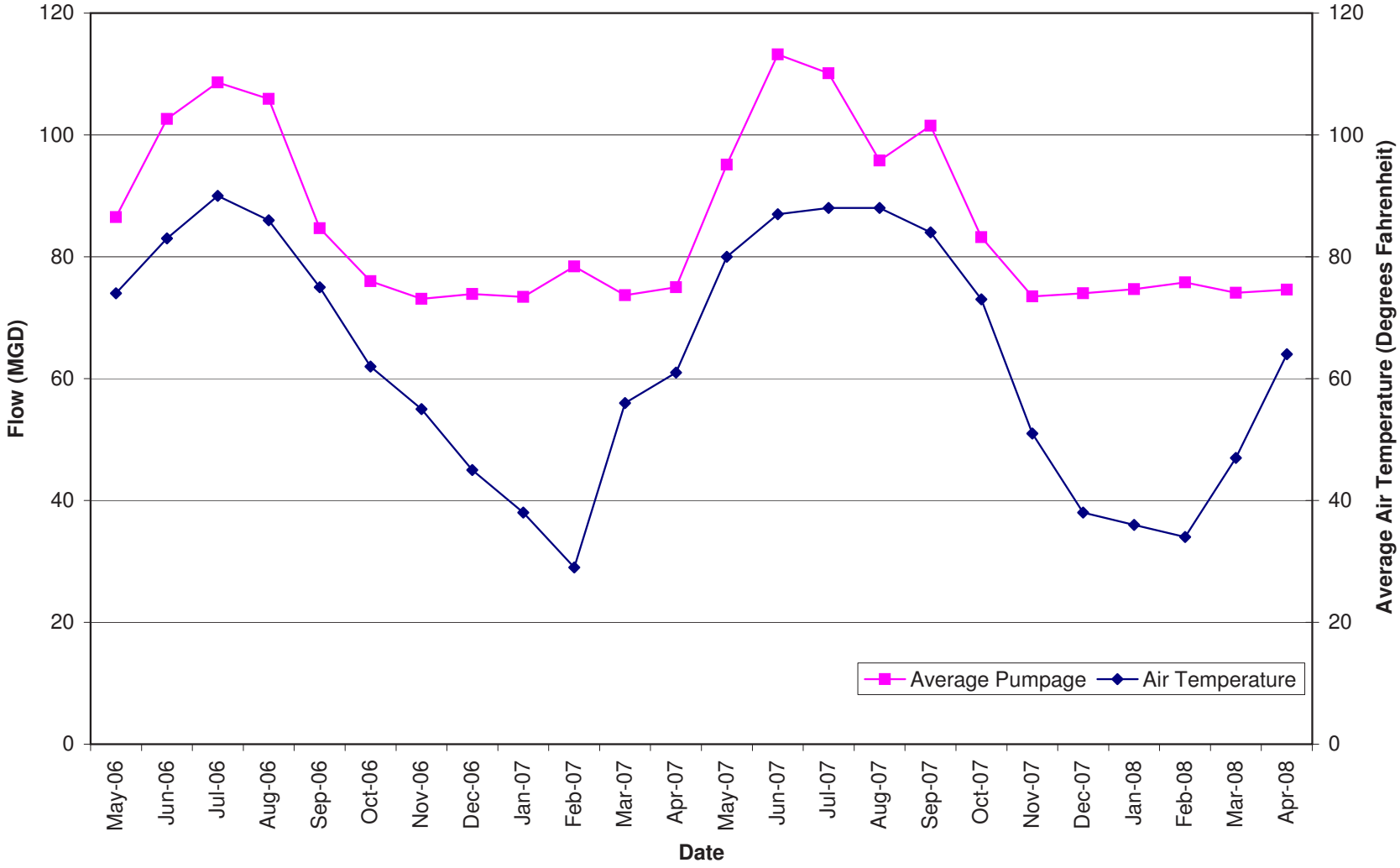
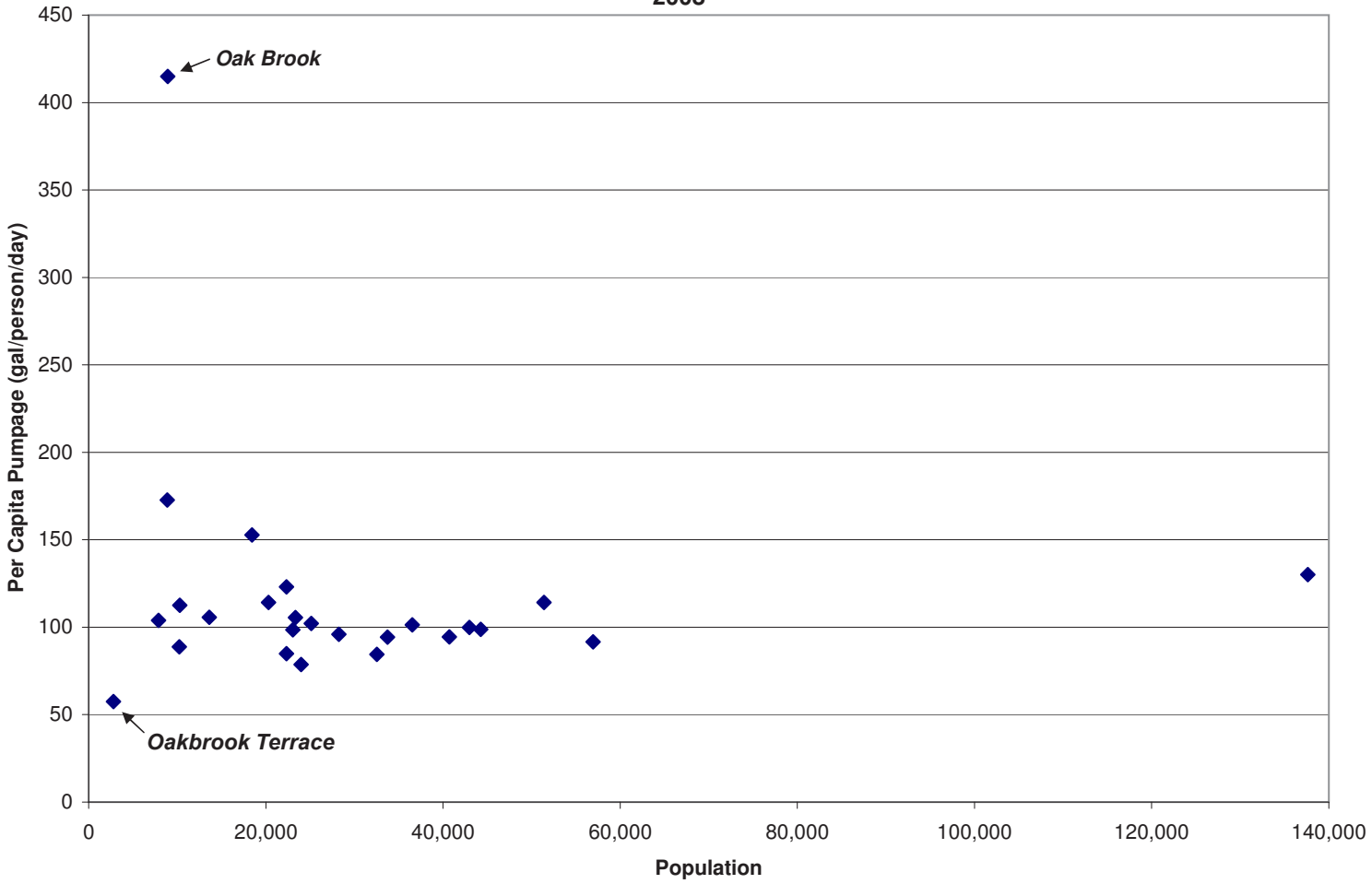


Figure 3

Data Source: DuPage Water Commission Historical Water Usage Data (Website) & Chicago Metropolitan Agency for Planning - Census

DuPage Water Commission
Population vs Per Capita Pumpage*
2008



*Per Capita Rate = Total Pumpage/Total Population
Plot does not include per capita data for Illinois American Water Company, DuPage County Water Service, or Argonne National Laboratory.

Figure 4

Data Source: Illinois Department of Natural Resources - Water Use Data (LMO

DuPage Water Commission
Net Annual Pumpage (1990 - 2005)

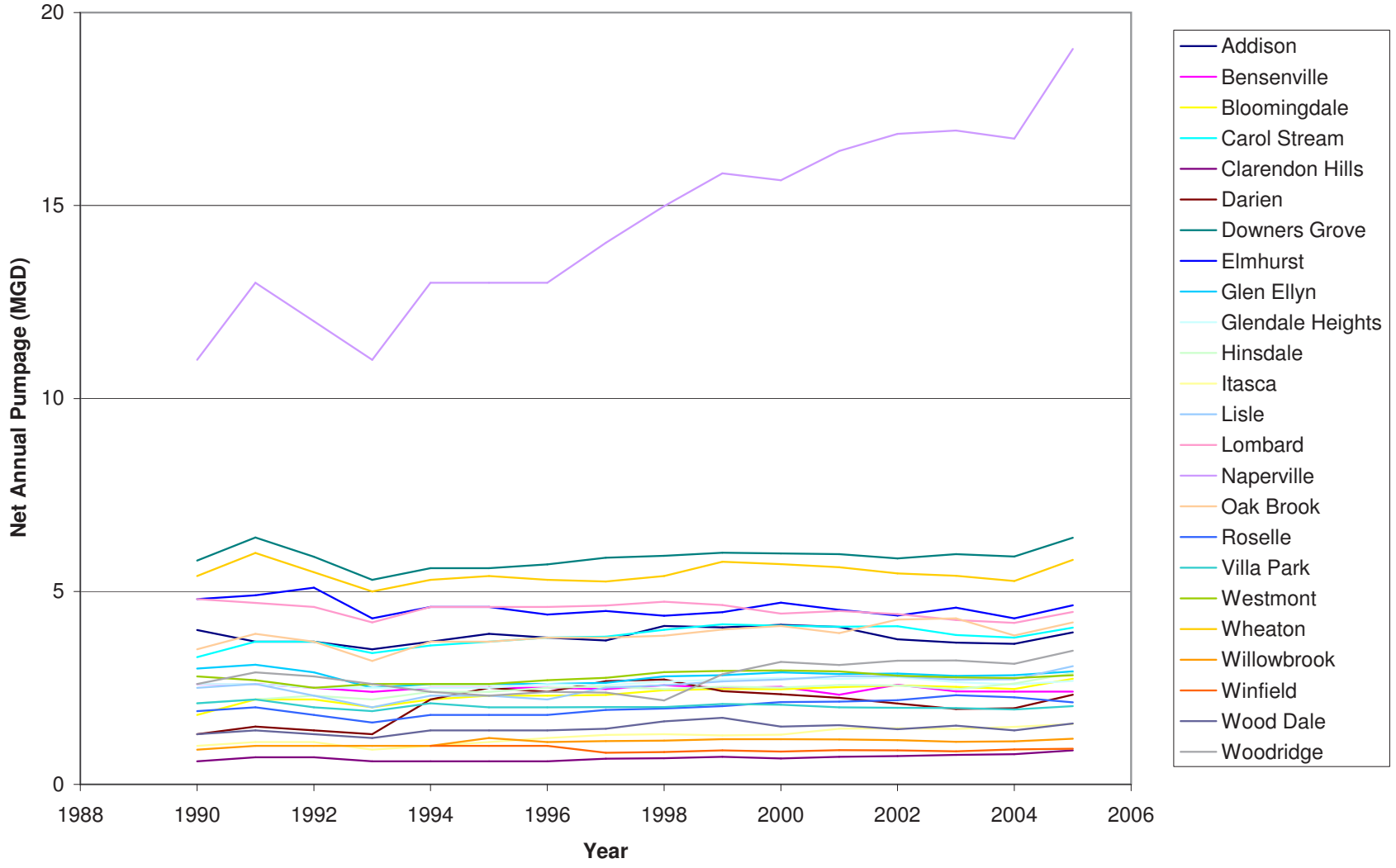


Figure 5

Data Source: Illinois Department of Natural Resources - Water Use Data (LMO forms)

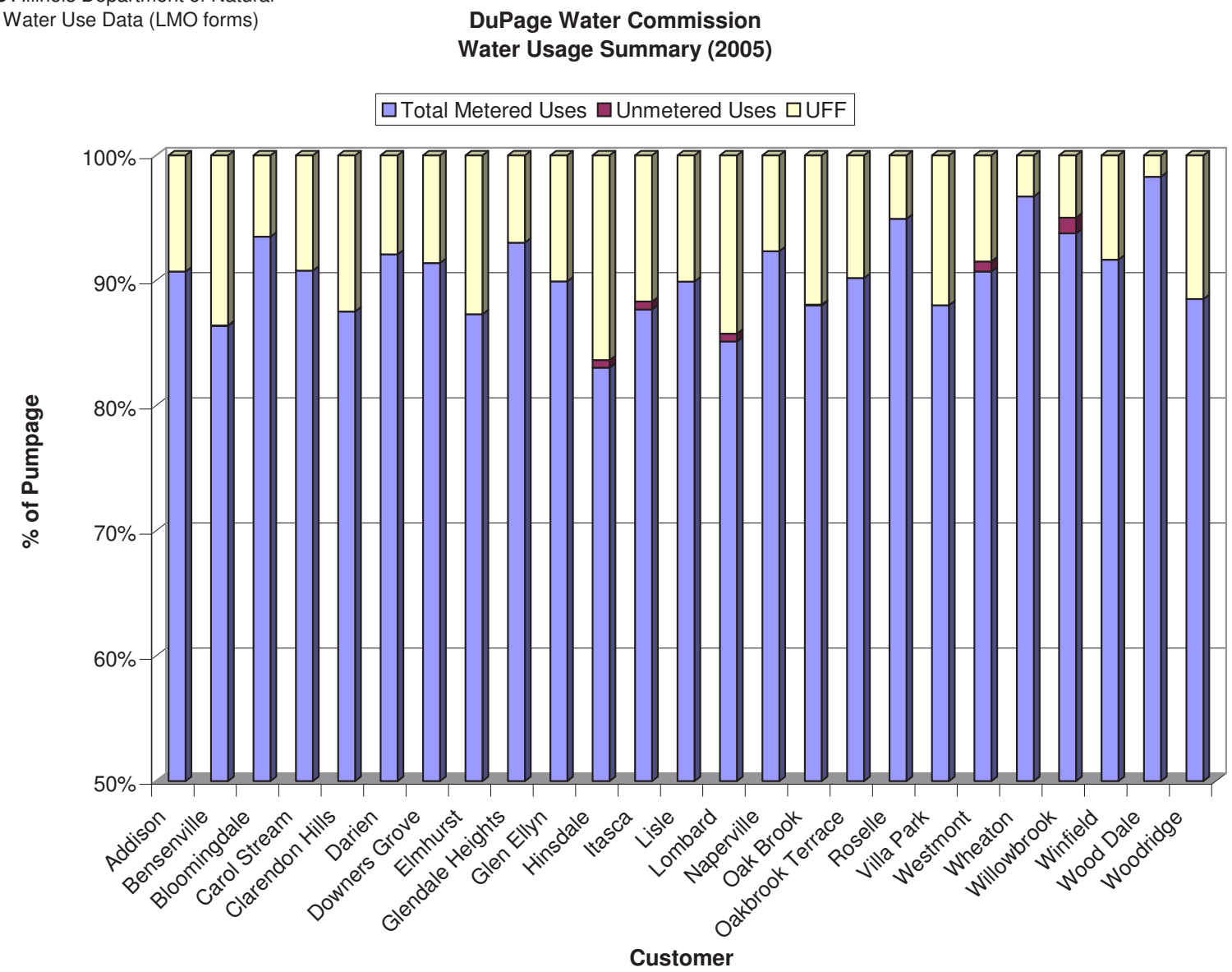


Figure 6

Data Source: Illinois Department of Natural Resources - Water Use Data (LMO forms)

DuPage Water Commission
Water Use by Category (2005)

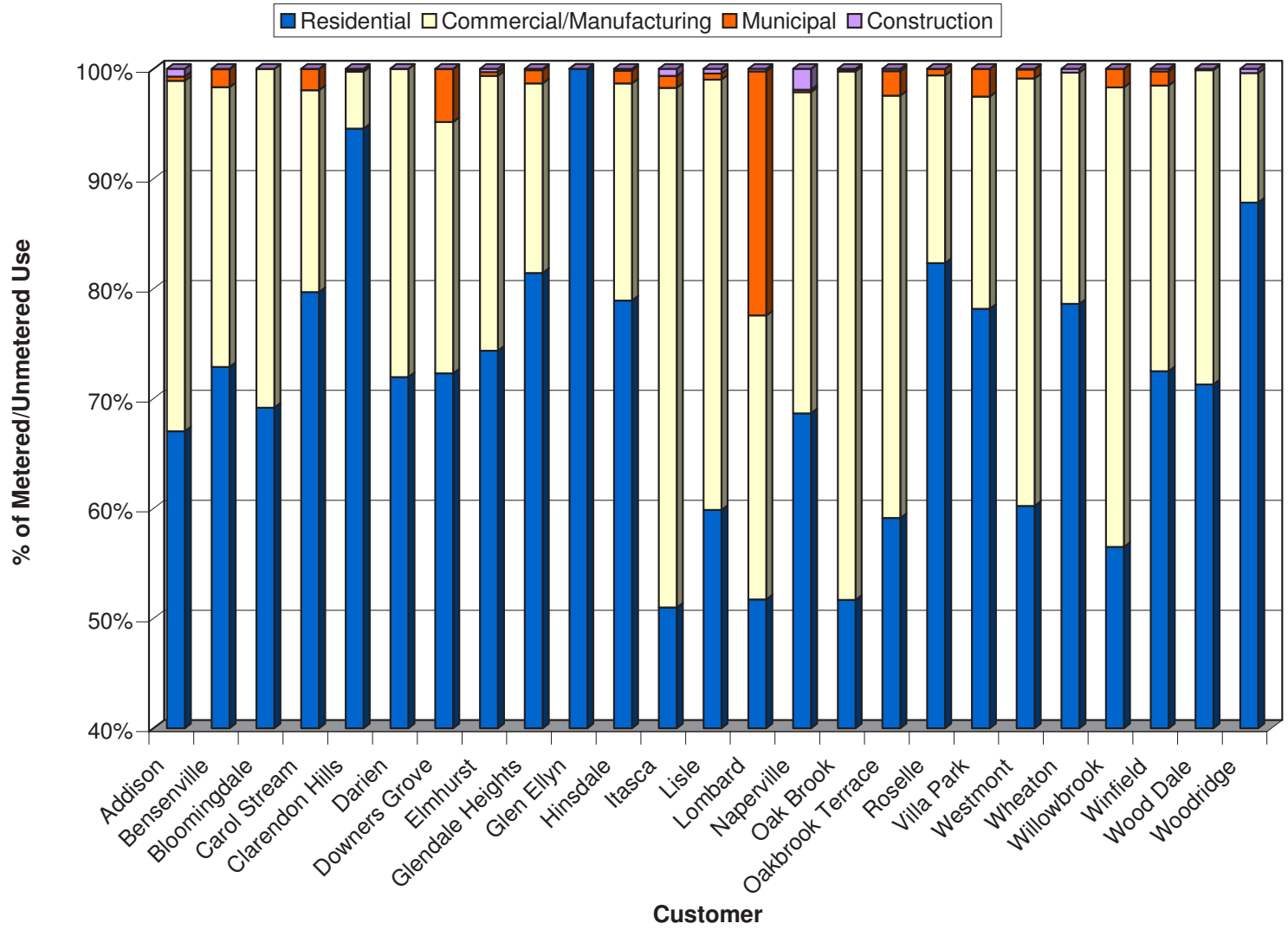
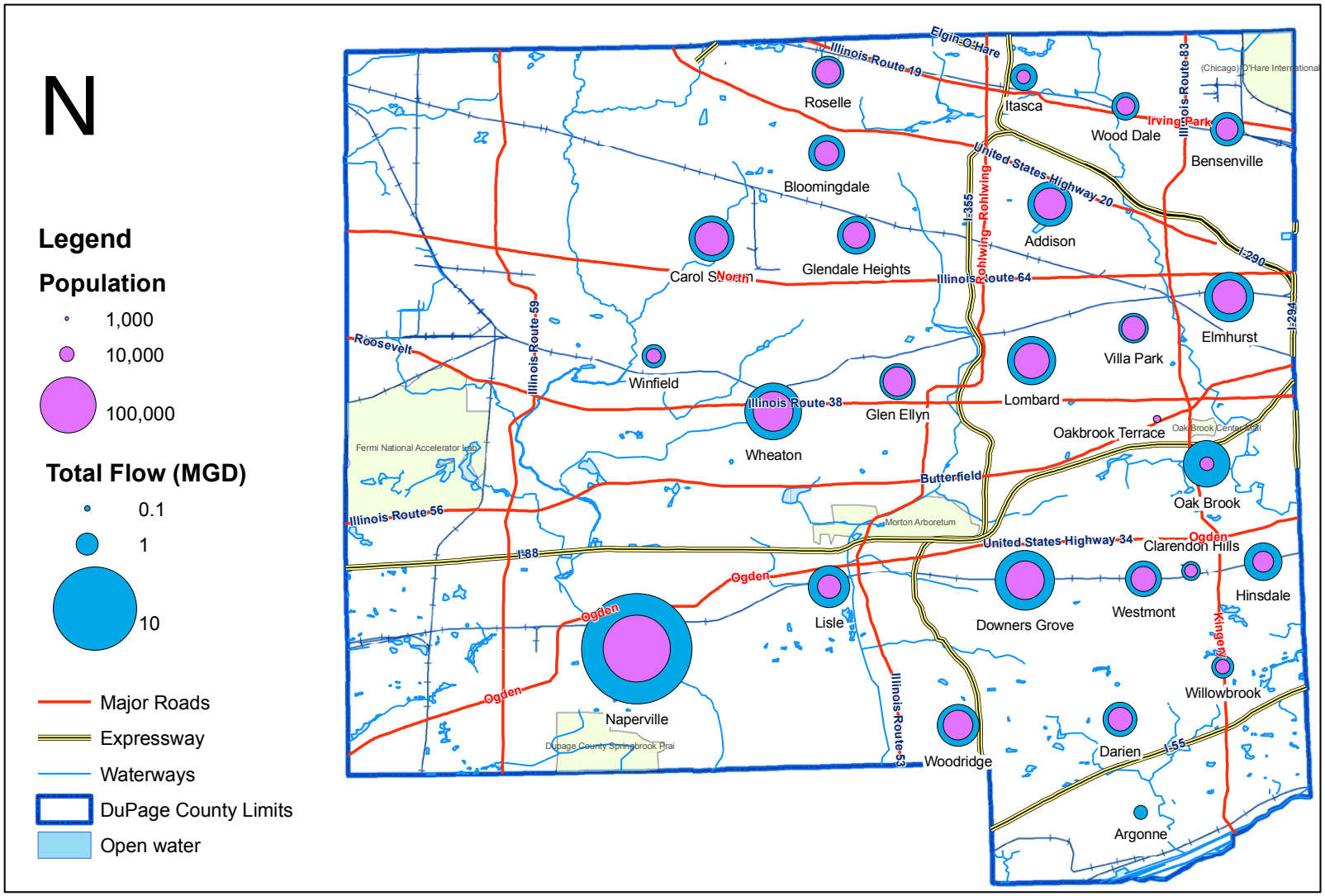


Figure 7



MWH

5 Miles

Figure 8
DWC Customer Water Usage vs. Population 2005
DuPage Water Commission
Elmhurst, Illinois

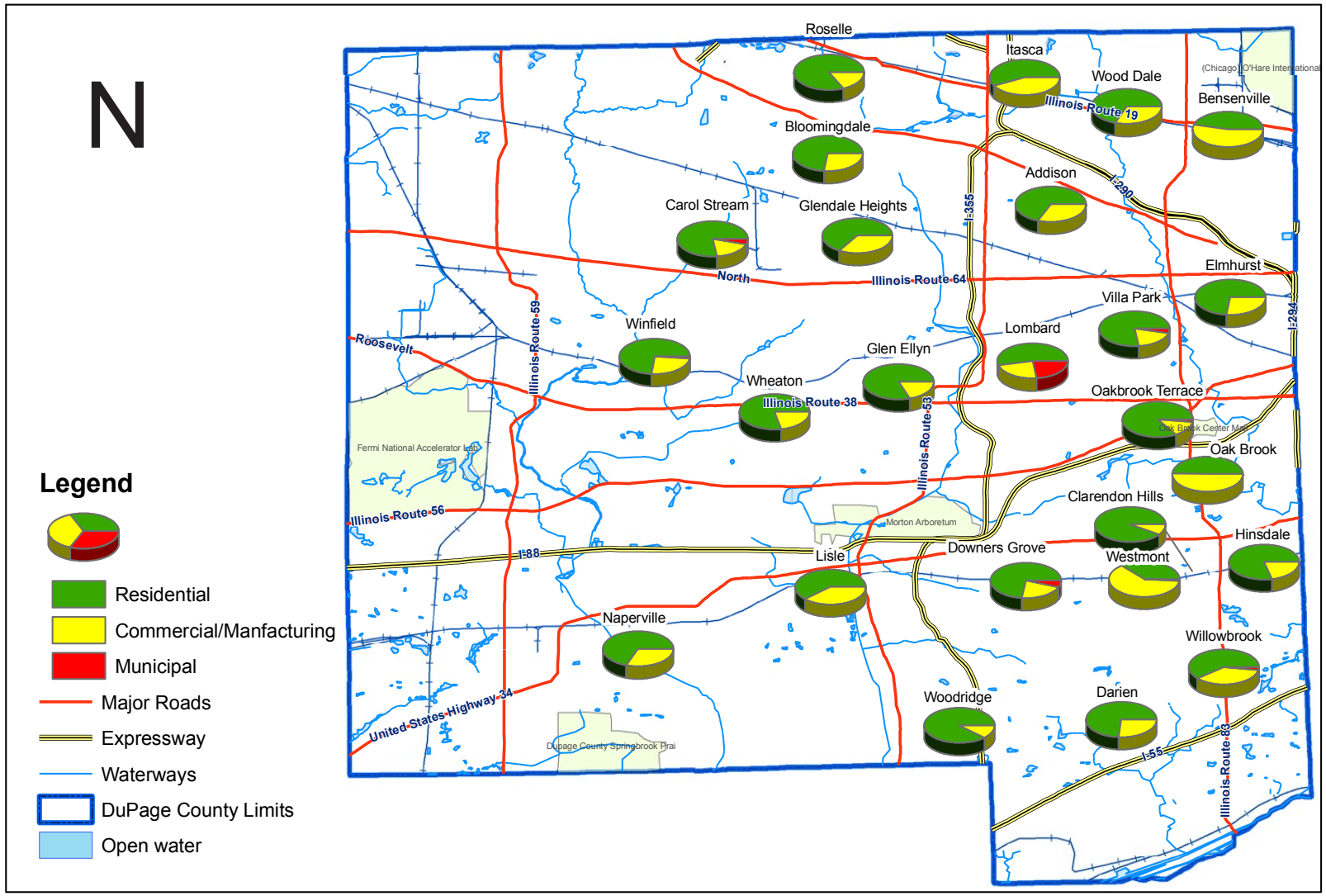


Figure 9
Distribution of Water Usage by Customer 2005
DuPage Water Commission
Elmhurst, Illinois

Data Source: DuPage Water Commission - SCADA Data
Received 10-2-2008

DuPage Water Commission
Monthly Variation in Customer Water Usage
2000-2008

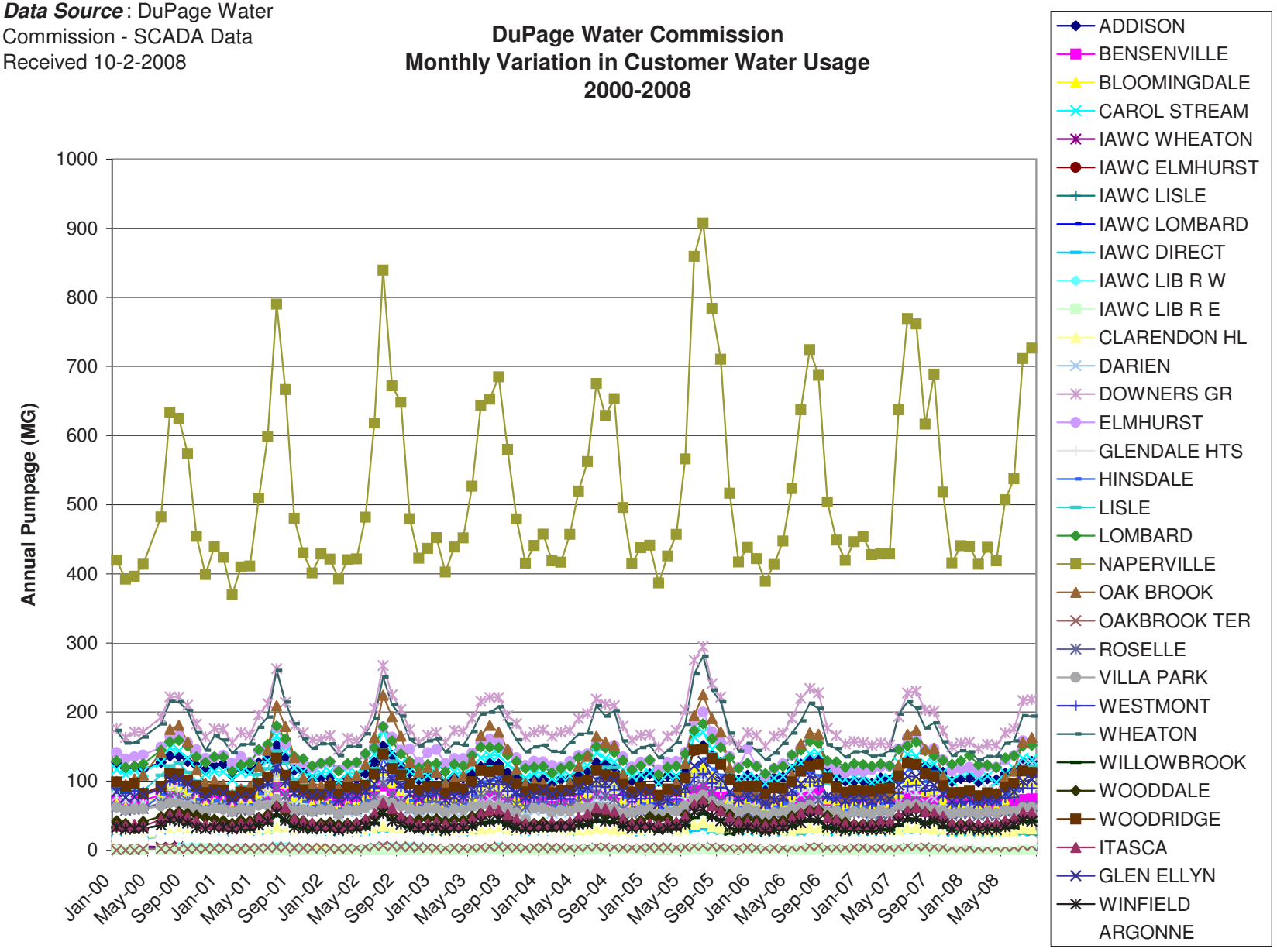


Figure 10

Data Source: DuPage Water Commission - SCADA Data Received 10-2-2008

DuPage Water Commission
Estimated Outdoor Water Usage
January - December 2008

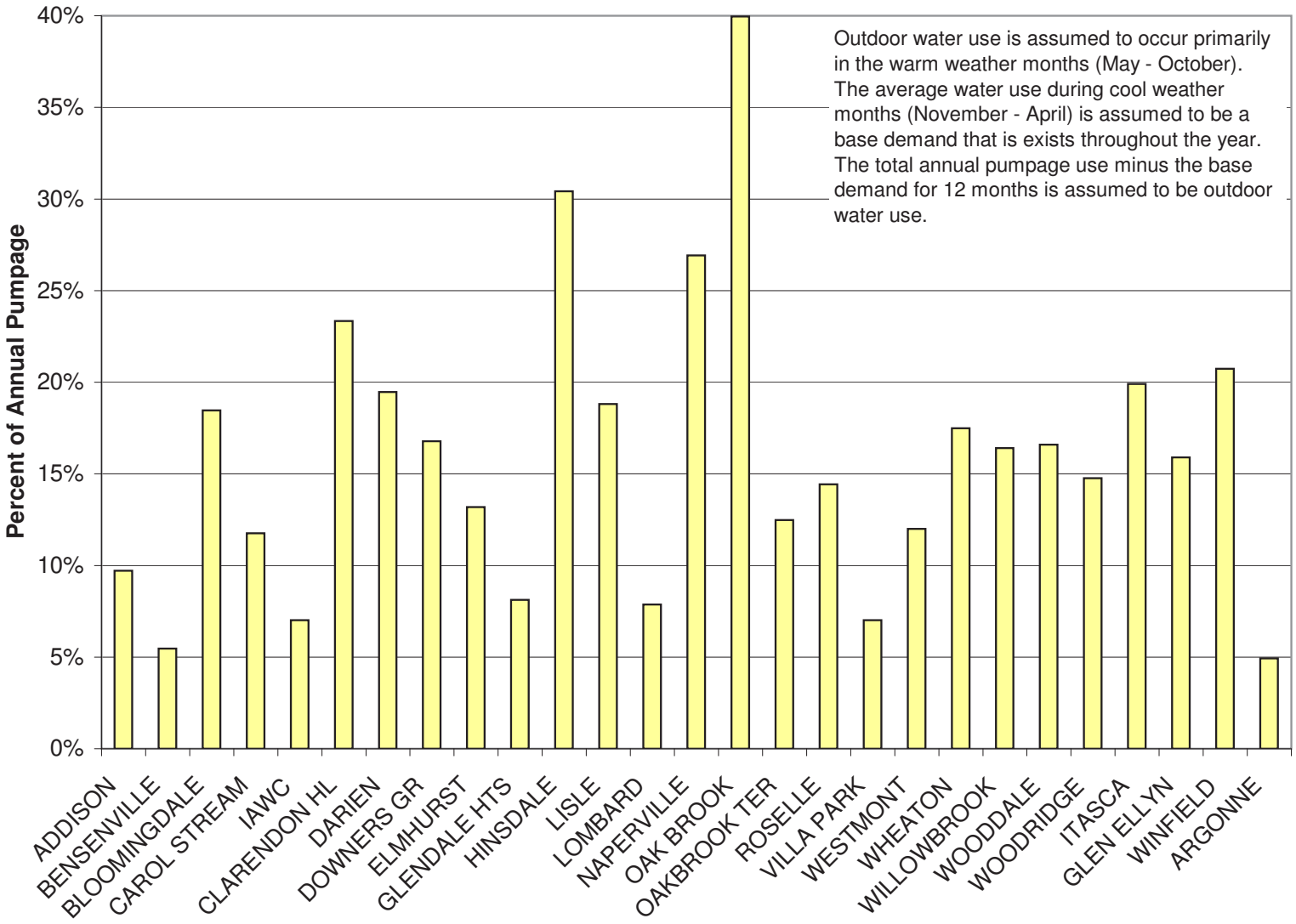
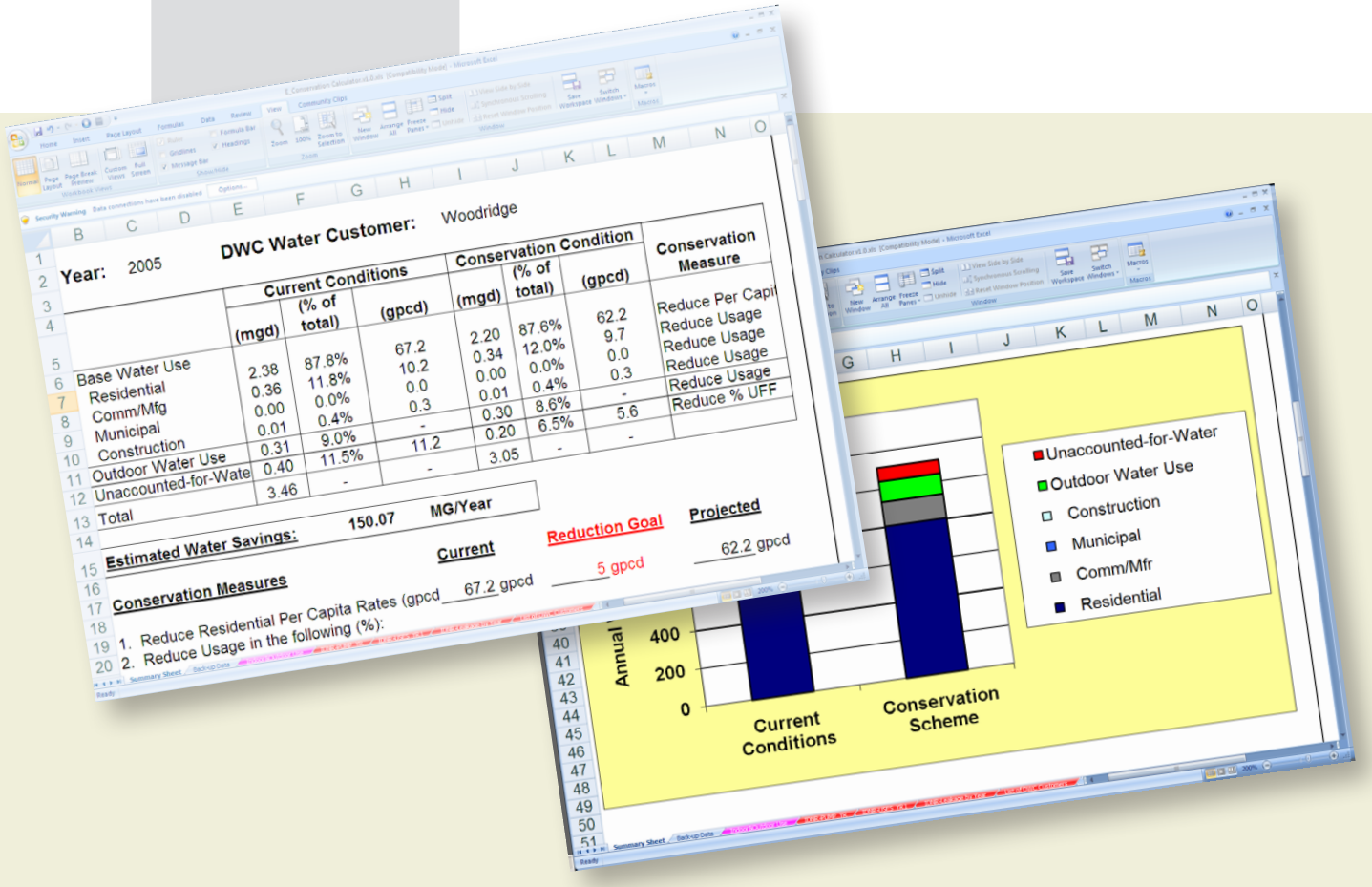


Figure 11

Appendix E:
Water Management Tool >



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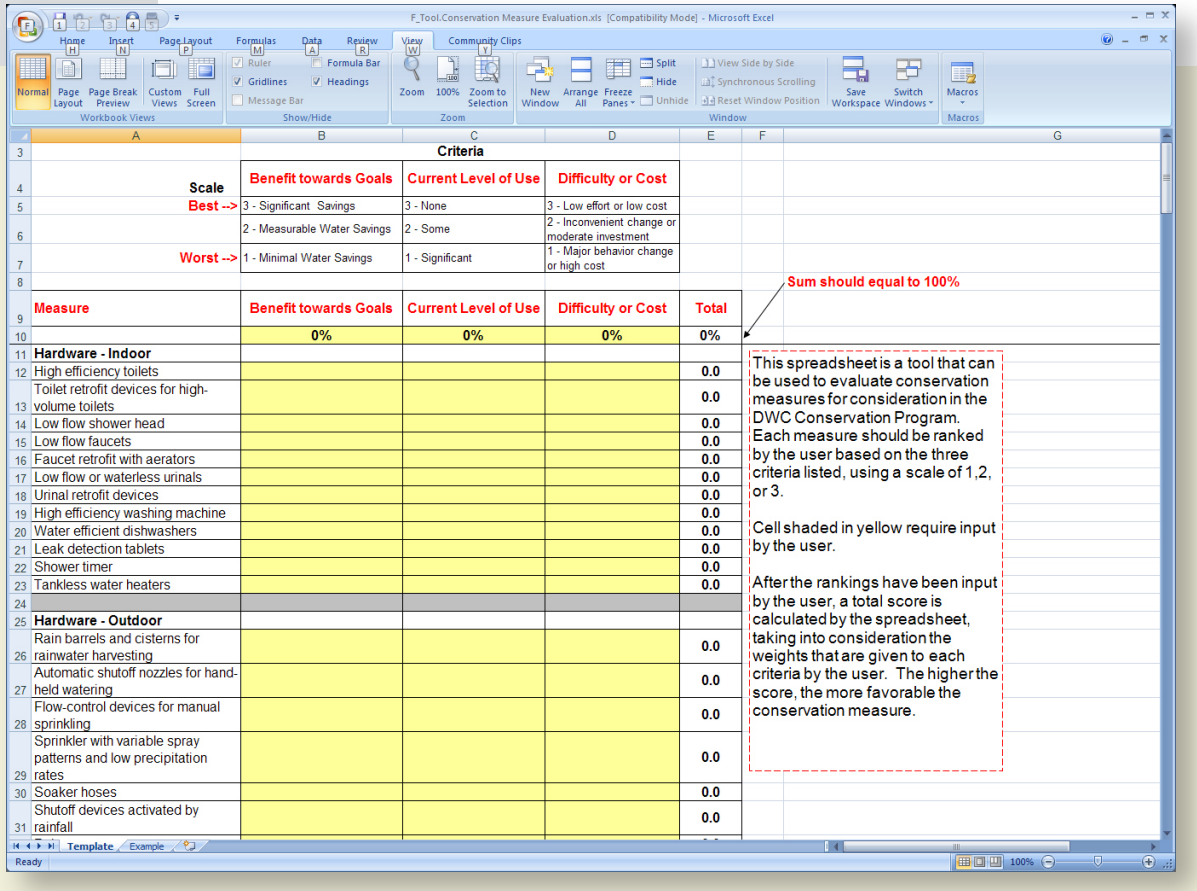
Appendix F:
Conservation Measure Evaluation Tool >



F_Tool.Conservation Measure Evaluation.xls [Compatibility Mode] - Microsoft Excel

		Criteria		
Scale		Benefit towards Goals	Current Level of Use	Difficulty or Cost
Best -->		3 - Significant Savings	3 - None	3 - Low effort or low cost
		2 - Measurable Water Savings	2 - Some	2 - Inconvenient change or moderate investment
Worst -->		1 - Minimal Water Savings	1 - Significant	1 - Major behavior change or high cost

Sum should equal to 100%

Measure	Benefit towards Goals	Current Level of Use	Difficulty or Cost	Total
	0%	0%	0%	0%
Hardware - Indoor				
High efficiency toilets				0.0
Toilet retrofit devices for high-volume toilets				0.0
Low flow shower head				0.0
Low flow faucets				0.0
Faucet retrofit with aerators				0.0
Low flow or waterless urinals				0.0
Urinal retrofit devices				0.0
High efficiency washing machine				0.0
Water efficient dishwashers				0.0
Leak detection tablets				0.0
Shower timer				0.0
Tankless water heaters				0.0
Hardware - Outdoor				
Rain barrels and cisterns for rainwater harvesting				0.0
Automatic shutoff nozzles for hand-held watering				0.0
Flow-control devices for manual sprinkling				0.0
Sprinkler with variable spray patterns and low precipitation rates				0.0
Soaker hoses				0.0
Shutoff devices activated by rainfall				0.0

This spreadsheet is a tool that can be used to evaluate conservation measures for consideration in the DWC Conservation Program. Each measure should be ranked by the user based on the three criteria listed, using a scale of 1,2, or 3.

Cell shaded in yellow require input by the user.

After the rankings have been input by the user, a total score is calculated by the spreadsheet, taking into consideration the weights that are given to each criteria by the user. The higher the score, the more favorable the conservation measure.

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